Draft Revised and Recirculated Initial Study/ Mitigated Negative Declaration

Big Tujunga Reservoir Restoration Project

Appendices A through F

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August 2021

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APPENDIX A

AIR QUALITY AND GREENHOUSE GAS MODELING DATA

Big Tujunga Sediment Removal IS-MND

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	90.00	0.00	0
Other Asphalt Surfaces	6.50	Acre	6.50	283,140.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	541	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Adjusted CO2 IF reflects RPS for SCE.

Land Use - Lot acreage: Big Tujunga Reservoir Area: 68 acres

Maple SRS: 22 acres

Construction Phase - Schedule based on Data Needs

Off-road Equipment - 4 Excavators, 4 Rubber Tired Dozers, 4 Tractors

Off-road Equipment - 4 Excavators, 4 Rubber Tired Dozers, 4 tractors

Off-road Equipment - 1 Tractor

Off-road Equipment - 1 Cement and Mortar Mixer

Off-road Equipment - Pumps (4) are electrical and powered by a generator.

Off-road Equipment - 1 Generator Set

Off-road Equipment - 1 Paver, 1 Paving Equipment, 1 Roller

Off-road Equipment - 1 Generator set, 1 crushing/proc., 2 tractors

Off-road Equipment - 1 tractor

Off-road Equipment - All hand tools

Off-road Equipment - 4 Rubber Tired Dozers, 4 tractors

Off-road Equipment - 4 Rubber tired dozers, 4 tractors

Off-road Equipment - 1 paver, 1 paving equipm, 1 roller

Off-road Equipment - 1 Excavator, 1 Rubber Tired Dozer, 4 Tractor/Loaders

Trips and VMT - Worker Trips from County engineers. Water truck trips accounted for in vendor trips. 2 water tenders trucking water from offsite

Grading -

Road Dust -

Area Coating - No Painting

Energy Use -

Construction Off-road Equipment Mitigation - Tier 4 Final and electrical pumps

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	16988	0
tblConstEquipMitigation	FuelType	Diesel	Electrical
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
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tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblConstructionPhase	NumDays	155.00	25.00
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tblConstructionPhase	NumDays	155.00	131.00
tblConstructionPhase	NumDays	110.00	52.00
tblConstructionPhase	NumDays	110.00	25.00
tblConstructionPhase	NumDays	110.00	25.00
tblConstructionPhase	NumDays	60.00	27.00
tblConstructionPhase	NumDays	60.00	11.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
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tblConstructionPhase	NumDaysWeek	5.00	6.00
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tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00

tblConstructionPhase	NumDaysWeek	5.00	6.00
tblLandUse	LotAcreage	0.00	90.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
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tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
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tblTripsAndVMT	VendorTripLength	7.90	10.00
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tblTripsAndVMT	WorkerTripNumber	30.00	96.00
tblTripsAndVMT	WorkerTripNumber	20.00	50.00
tblTripsAndVMT	WorkerTripNumber	119.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	20.5770	197.2142	124.8111	0.2324	51.0219	10.1022	61.1241	27.2401	9.3452	36.5852	0.0000	22,612.3835	22,612.3835	5.8676	0.0000	22,759.0726
Maximum	**20.5770**	**197.2142**	**124.8111**	**0.2324**	**51.0219**	**10.1022**	**61.1241**	**27.2401**	**9.3452**	**36.5852**	**0.0000**	**22,612.3835**	**22,612.3835**	**5.8676**	**0.0000**	**22,759.0726**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	3.9774	13.6690	126.7377	0.2324	21.6341	0.3552	21.9893	11.0861	0.3529	11.4390	0.0000	22,612.3835	22,612.3835	5.8676	0.0000	22,759.0726
Maximum	**3.9774**	**13.6690**	**126.7377**	**0.2324**	**21.6341**	**0.3552**	**21.9893**	**11.0861**	**0.3529**	**11.4390**	**0.0000**	**22,612.3835**	**22,612.3835**	**5.8676**	**0.0000**	**22,759.0726**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**80.67**	**93.07**	**-1.54**	**0.00**	**57.60**	**96.48**	**64.03**	**59.30**	**96.22**	**68.73**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**	**0.0000**	**1.7500e-003**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**	**0.0000**	**1.7500e-003**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	SPS Site Preparation	Site Preparation	1/1/2020	1/31/2020	6	27	
2	BTR Site Preparation	Site Preparation	4/1/2020	4/13/2020	6	11	
3	BTR Access Road Grading	Grading	4/16/2020	5/14/2020	6	25	
4	Dewatering Activities	Trenching	4/16/2020	6/15/2020	6	52	
5	Paving Haul Roads	Paving	4/16/2020	5/14/2020	6	25	
6	Culvert Crossing Repair	Paving	4/16/2020	5/14/2020	6	25	
7	BTR Grading and Hauling	Grading	5/15/2020	10/14/2020	6	131	
8	SPS Grading	Grading	5/15/2020	10/14/2020	6	131	
9	SPS Construction	Building Construction	7/15/2020	10/14/2020	6	79	
10	Seasonal Stockpile/Crushing	Trenching	8/15/2020	10/14/2020	6	52	
11	SPS Paving	Paving	8/15/2020	10/14/2020	6	52	
12	Slope Protection Activity	Grading	9/15/2020	10/14/2020	6	26	
13	Hydroblasting for Cement Slurry	Trenching	9/15/2020	10/14/2020	6	26	
14	Sluicegate Repair	Trenching	9/15/2020	10/14/2020	6	26	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 6.5

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor

SPS Site Preparation	Concrete/Industrial Saws	0	8.00	81	0.73
SPS Site Preparation	Excavators	1	8.00	158	0.38
SPS Site Preparation	Rubber Tired Dozers	1	8.00	247	0.40
SPS Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
BTR Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
BTR Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
BTR Access Road Grading	Air Compressors	0	6.00	78	0.48
BTR Access Road Grading	Excavators	4	8.00	158	0.38
BTR Access Road Grading	Graders	0	8.00	187	0.41
BTR Access Road Grading	Rubber Tired Dozers	4	8.00	247	0.40
BTR Access Road Grading	Scrapers	0	8.00	367	0.48
BTR Access Road Grading	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Dewatering Activities	Cranes	0	7.00	231	0.29
Dewatering Activities	Forklifts	0	8.00	89	0.20
Dewatering Activities	Generator Sets	0	8.00	84	0.74
Dewatering Activities	Pumps	4	24.00	84	0.74
Dewatering Activities	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Dewatering Activities	Welders	0	8.00	46	0.45
Paving Haul Roads	Excavators	0	8.00	158	0.38
Paving Haul Roads	Graders	0	8.00	187	0.41
Paving Haul Roads	Pavers	1	8.00	130	0.42
Paving Haul Roads	Paving Equipment	1	8.00	132	0.36
Paving Haul Roads	Rollers	1	8.00	80	0.38
Paving Haul Roads	Rubber Tired Dozers	0	8.00	247	0.40
Paving Haul Roads	Scrapers	0	8.00	367	0.48
Paving Haul Roads	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Culvert Crossing Repair	Cement and Mortar Mixers	1	8.00	9	0.56
Culvert Crossing Repair	Pavers	0	8.00	130	0.42
Culvert Crossing Repair	Paving Equipment	0	8.00	132	0.36
Culvert Crossing Repair	Rollers	0	8.00	80	0.38

BTR Grading and Hauling	Excavators	4	8.00	158	0.38
BTR Grading and Hauling	Graders	0	8.00	187	0.41
BTR Grading and Hauling	Rubber Tired Dozers	4	8.00	247	0.40
BTR Grading and Hauling	Scrapers	0	8.00	367	0.48
BTR Grading and Hauling	Tractors/Loaders/Backhoes	4	8.00	97	0.37
SPS Grading	Excavators	0	8.00	158	0.38
SPS Grading	Graders	0	8.00	187	0.41
SPS Grading	Rubber Tired Dozers	4	8.00	247	0.40
SPS Grading	Scrapers	0	8.00	367	0.48
SPS Grading	Tractors/Loaders/Backhoes	4	8.00	97	0.37
SPS Construction	Cranes	0	7.00	231	0.29
SPS Construction	Forklifts	0	8.00	89	0.20
SPS Construction	Generator Sets	0	8.00	84	0.74
SPS Construction	Rubber Tired Dozers	4	8.00	247	0.40
SPS Construction	Tractors/Loaders/Backhoes	4	7.00	97	0.37
SPS Construction	Welders	0	8.00	46	0.45
Seasonal Stockpile/Crushing	Crushing/Proc. Equipment	1	8.00	85	0.78
Seasonal Stockpile/Crushing	Generator Sets	1	8.00	84	0.74
Seasonal Stockpile/Crushing	Tractors/Loaders/Backhoes	2	8.00	97	0.37
SPS Paving	Pavers	1	8.00	130	0.42
SPS Paving	Paving Equipment	1	8.00	132	0.36
SPS Paving	Rollers	1	8.00	80	0.38
Slope Protection Activity	Excavators	0	8.00	158	0.38
Slope Protection Activity	Graders	0	8.00	187	0.41
Slope Protection Activity	Rubber Tired Dozers	0	8.00	247	0.40
Slope Protection Activity	Scrapers	0	8.00	367	0.48
Slope Protection Activity	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Hydroblasting for Cement Slurry	Generator Sets	1	8.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
SPS Site Preparation	6	30.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
BTR Site Preparation	1	20.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
BTR Access Road Grading	12	40.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
Dewatering Activities	4	30.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving Haul Roads	3	6.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Culvert Crossing Repair	1	16.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
BTR Grading and Hauling	12	96.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
SPS Grading	8	50.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
SPS Construction	8	0.00	10.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Seasonal Stockpile/Crushing	4	16.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
SPS Paving	3	10.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Slope Protection Activity	1	0.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Hydroblasting for Cement Slurry	1	6.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Sluicegate Repair			0.00	0.00	19.80	7.90				

3.1 Mitigation Measures Construction

Use Alternative Fuel for Construction Equipment

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 SPS Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000

Off-Road	2.1625	22.1655	16.5182	0.0261		1.2043	1.2043		1.1080	1.1080		2,530.5350	2,530.5350	0.8184		2,550.9956
Total	**2.1625**	**22.1655**	**16.5182**	**0.0261**	**6.0221**	**1.2043**	**7.2264**	**3.3102**	**1.1080**	**4.4182**		**2,530.5350**	**2,530.5350**	**0.8184**		**2,550.9956**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.1957	0.1432	1.5709	4.4700e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		445.1209	445.1209	0.0138		445.4670
Total	**0.2425**	**1.4232**	**1.9388**	**7.9000e-003**	**0.5442**	**0.0109**	**0.5551**	**0.1464**	**0.0103**	**0.1567**		**811.5330**	**811.5330**	**0.0354**		**812.4179**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	0.3200	1.3867	17.1199	0.0261		0.0427	0.0427		0.0427	0.0427	0.0000	2,530.5350	2,530.5350	0.8184		2,550.9956
Total	**0.3200**	**1.3867**	**17.1199**	**0.0261**	**2.3486**	**0.0427**	**2.3913**	**1.2910**	**0.0427**	**1.3337**	**0.0000**	**2,530.5350**	**2,530.5350**	**0.8184**		**2,550.9956**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.1957	0.1432	1.5709	4.4700e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		445.1209	445.1209	0.0138		445.4670
Total	**0.2425**	**1.4232**	**1.9388**	**7.9000e-003**	**0.5442**	**0.0109**	**0.5551**	**0.1464**	**0.0103**	**0.1567**		**811.5330**	**811.5330**	**0.0354**		**812.4179**

3.3 BTR Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.2095	2.1052	2.2797	3.1100e-003		0.1331	0.1331		0.1225	0.1225		300.7685	300.7685	0.0973		303.2004
Total	**0.2095**	**2.1052**	**2.2797**	**3.1100e-003**	**0.0000**	**0.1331**	**0.1331**	**0.0000**	**0.1225**	**0.1225**		**300.7685**	**300.7685**	**0.0973**		**303.2004**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.1305	0.0955	1.0473	2.9800e-003	0.3010	2.4700e-003	0.3035	0.0798	2.2800e-003	0.0821		296.7473	296.7473	9.2300e-003		296.9780
Total	**0.1773**	**1.3755**	**1.4152**	**6.4100e-003**	**0.3937**	**9.6800e-003**	**0.4034**	**0.1065**	**9.1700e-003**	**0.1157**		**663.1594**	**663.1594**	**0.0308**		**663.9289**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0380	0.1646	2.3421	3.1100e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	300.7685	300.7685	0.0973		303.2004
Total	**0.0380**	**0.1646**	**2.3421**	**3.1100e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**300.7685**	**300.7685**	**0.0973**		**303.2004**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509

Worker	0.1305	0.0955	1.0473	2.9800e-003	0.3010	2.4700e-003	0.3035	0.0798	2.2800e-003	0.0821		296.7473	296.7473	9.2300e-003		296.9780
Total	**0.1773**	**1.3755**	**1.4152**	**6.4100e-003**	**0.3937**	**9.6800e-003**	**0.4034**	**0.1065**	**9.1700e-003**	**0.1157**		**663.1594**	**663.1594**	**0.0308**		**663.9289**

3.4 BTR Access Road Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					24.0883	0.0000	24.0883	13.2409	0.0000	13.2409			0.0000			0.0000
Off-Road	6.1359	63.4001	38.7165	0.0672		3.2199	3.2199		2.9623	2.9623		6,512.9178	6,512.9178	2.1064		6,565.5780
Total	**6.1359**	**63.4001**	**38.7165**	**0.0672**	**24.0883**	**3.2199**	**27.3082**	**13.2409**	**2.9623**	**16.2032**		**6,512.9178**	**6,512.9178**	**2.1064**		**6,565.5780**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.2610	0.1909	2.0946	5.9600e-003	0.6021	4.9400e-003	0.6070	0.1597	4.5500e-003	0.1642		593.4946	593.4946	0.0185		593.9560
Total	**0.3078**	**1.4709**	**2.4625**	**9.3900e-003**	**0.6948**	**0.0122**	**0.7069**	**0.1863**	**0.0114**	**0.1978**		**959.9067**	**959.9067**	**0.0400**		**960.9069**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3945	0.0000	9.3945	5.1640	0.0000	5.1640			0.0000			0.0000
Off-Road	0.8243	3.5718	40.3747	0.0672		0.1099	0.1099		0.1099	0.1099	0.0000	6,512.9178	6,512.9178	2.1064		6,565.5780
Total	**0.8243**	**3.5718**	**40.3747**	**0.0672**	**9.3945**	**0.1099**	**9.5044**	**5.1640**	**0.1099**	**5.2739**	**0.0000**	**6,512.9178**	**6,512.9178**	**2.1064**		**6,565.5780**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.2610	0.1909	2.0946	5.9600e-003	0.6021	4.9400e-003	0.6070	0.1597	4.5500e-003	0.1642		593.4946	593.4946	0.0185		593.9560
Total	**0.3078**	**1.4709**	**2.4625**	**9.3900e-003**	**0.6948**	**0.0122**	**0.7069**	**0.1863**	**0.0114**	**0.1978**		**959.9067**	**959.9067**	**0.0400**		**960.9069**

3.5 Dewatering Activities - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Off-Road	5.0781	42.3485	45.1506	0.0789		2.4864	2.4864		2.4864	2.4864		7,476.4148	7,476.4148	0.4473		7,487.5972
Total	**5.0781**	**42.3485**	**45.1506**	**0.0789**		**2.4864**	**2.4864**		**2.4864**	**2.4864**		**7,476.4148**	**7,476.4148**	**0.4473**		**7,487.5972**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1957	0.1432	1.5709	4.4700e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		445.1209	445.1209	0.0138		445.4670
Total	**0.1957**	**0.1432**	**1.5709**	**4.4700e-003**	**0.4516**	**3.7100e-003**	**0.4553**	**0.1197**	**3.4200e-003**	**0.1232**		**445.1209**	**445.1209**	**0.0138**		**445.4670**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0789		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0789**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1957	0.1432	1.5709	4.4700e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		445.1209	445.1209	0.0138		445.4670
Total	**0.1957**	**0.1432**	**1.5709**	**4.4700e-003**	**0.4516**	**3.7100e-003**	**0.4553**	**0.1197**	**3.4200e-003**	**0.1232**		**445.1209**	**445.1209**	**0.0138**		**445.4670**

3.6 Paving Haul Roads - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6783	7.0328	7.3260	0.0114		0.3764	0.3764		0.3463	0.3463		1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3595**	**7.0328**	**7.3260**	**0.0114**		**0.3764**	**0.3764**		**0.3463**	**0.3463**		**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0392	0.0286	0.3142	8.9000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		89.0242	89.0242	2.7700e-003		89.0934
Total	**0.0392**	**0.0286**	**0.3142**	**8.9000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**89.0242**	**89.0242**	**2.7700e-003**		**89.0934**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1402	0.6077	8.6478	0.0114		0.0187	0.0187		0.0187	0.0187	0.0000	1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8214**	**0.6077**	**8.6478**	**0.0114**		**0.0187**	**0.0187**		**0.0187**	**0.0187**	**0.0000**	**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0392	0.0286	0.3142	8.9000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		89.0242	89.0242	2.7700e-003		89.0934
Total	**0.0392**	**0.0286**	**0.3142**	**8.9000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**89.0242**	**89.0242**	**2.7700e-003**		**89.0934**

3.7 Culvert Crossing Repair - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0588	0.3682	0.3085	7.1000e-004		0.0143	0.0143		0.0143	0.0143		50.5163	50.5163	5.2400e-003		50.6474
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7400**	**0.3682**	**0.3085**	**7.1000e-004**		**0.0143**	**0.0143**		**0.0143**	**0.0143**		**50.5163**	**50.5163**	**5.2400e-003**		**50.6474**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1044	0.0764	0.8378	2.3800e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		237.3978	237.3978	7.3800e-003		237.5824

Total	**0.1044**	**0.0764**	**0.8378**	**2.3800e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**237.3978**	**237.3978**	**7.3800e-003**		**237.5824**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	7.1000e-004		0.0000	0.0000		0.0000	0.0000	0.0000	50.5163	50.5163	5.2400e-003		50.6474
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6812**	**0.0000**	**0.0000**	**7.1000e-004**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**50.5163**	**50.5163**	**5.2400e-003**		**50.6474**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1044	0.0764	0.8378	2.3800e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		237.3978	237.3978	7.3800e-003		237.5824
Total	**0.1044**	**0.0764**	**0.8378**	**2.3800e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**237.3978**	**237.3978**	**7.3800e-003**		**237.5824**

3.8 BTR Grading and Hauling - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					24.0883	0.0000	24.0883	13.2409	0.0000	13.2409			0.0000			0.0000
Off-Road	6.1359	63.4001	38.7165	0.0672		3.2199	3.2199		2.9623	2.9623		6,512.9178	6,512.9178	2.1064		6,565.5780
Total	**6.1359**	**63.4001**	**38.7165**	**0.0672**	**24.0883**	**3.2199**	**27.3082**	**13.2409**	**2.9623**	**16.2032**		**6,512.9178**	**6,512.9178**	**2.1064**		**6,565.5780**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.6264	0.4582	5.0269	0.0143	1.4450	0.0119	1.4569	0.3832	0.0109	0.3941		1,424.3869	1,424.3869	0.0443		1,425.4944
Total	**0.6732**	**1.7382**	**5.3949**	**0.0177**	**1.5377**	**0.0191**	**1.5567**	**0.4099**	**0.0178**	**0.4277**		**1,790.7990**	**1,790.7990**	**0.0659**		**1,792.4453**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					9.3945	0.0000	9.3945	5.1640	0.0000	5.1640			0.0000			0.0000
Off-Road	0.8243	3.5718	40.3747	0.0672		0.1099	0.1099		0.1099	0.1099	0.0000	6,512.9178	6,512.9178	2.1064		6,565.5780
Total	**0.8243**	**3.5718**	**40.3747**	**0.0672**	**9.3945**	**0.1099**	**9.5044**	**5.1640**	**0.1099**	**5.2739**	**0.0000**	**6,512.9178**	**6,512.9178**	**2.1064**		**6,565.5780**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.6264	0.4582	5.0269	0.0143	1.4450	0.0119	1.4569	0.3832	0.0109	0.3941		1,424.3869	1,424.3869	0.0443		1,425.4944
Total	**0.6732**	**1.7382**	**5.3949**	**0.0177**	**1.5377**	**0.0191**	**1.5567**	**0.4099**	**0.0178**	**0.4277**		**1,790.7990**	**1,790.7990**	**0.0659**		**1,792.4453**

3.9 SPS Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					24.0883	0.0000	24.0883	13.2409	0.0000	13.2409			0.0000			0.0000
Off-Road	5.1560	53.7496	25.6452	0.0465		2.7524	2.7524		2.5322	2.5322		4,512.4441	4,512.4441	1.4594		4,548.9295
Total	**5.1560**	**53.7496**	**25.6452**	**0.0465**	**24.0883**	**2.7524**	**26.8407**	**13.2409**	**2.5322**	**15.7731**		**4,512.4441**	**4,512.4441**	**1.4594**		**4,548.9295**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3262	0.2386	2.6182	7.4500e-003	0.7526	6.1800e-003	0.7588	0.1996	5.6900e-003	0.2053		741.8682	741.8682	0.0231		742.4450
Total	**0.3262**	**0.2386**	**2.6182**	**7.4500e-003**	**0.7526**	**6.1800e-003**	**0.7588**	**0.1996**	**5.6900e-003**	**0.2053**		**741.8682**	**741.8682**	**0.0231**		**742.4450**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3945	0.0000	9.3945	5.1640	0.0000	5.1640			0.0000			0.0000
Off-Road	0.5701	2.4706	24.7026	0.0465		0.0760	0.0760		0.0760	0.0760	0.0000	4,512.4441	4,512.4441	1.4594		4,548.9295
Total	**0.5701**	**2.4706**	**24.7026**	**0.0465**	**9.3945**	**0.0760**	**9.4705**	**5.1640**	**0.0760**	**5.2400**	**0.0000**	**4,512.4441**	**4,512.4441**	**1.4594**		**4,548.9295**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3262	0.2386	2.6182	7.4500e-003	0.7526	6.1800e-003	0.7588	0.1996	5.6900e-003	0.2053		741.8682	741.8682	0.0231		742.4450
Total	**0.3262**	**0.2386**	**2.6182**	**7.4500e-003**	**0.7526**	**6.1800e-003**	**0.7588**	**0.1996**	**5.6900e-003**	**0.2053**		**741.8682**	**741.8682**	**0.0231**		**742.4450**

3.10 SPS Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.0512	52.6970	24.5054	0.0450		2.6858	2.6858		2.4710	2.4710		4,362.0598	4,362.0598	1.4108		4,397.3293
Total	**5.0512**	**52.6970**	**24.5054**	**0.0450**		**2.6858**	**2.6858**		**2.4710**	**2.4710**		**4,362.0598**	**4,362.0598**	**1.4108**		**4,397.3293**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Vendor	0.0403	1.1334	0.3269	2.8200e-003	0.0733	5.7700e-003	0.0790	0.0211	5.5200e-003	0.0266		300.7275	300.7275	0.0192		301.2064
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0403**	**1.1334**	**0.3269**	**2.8200e-003**	**0.0733**	**5.7700e-003**	**0.0790**	**0.0211**	**5.5200e-003**	**0.0266**		**300.7275**	**300.7275**	**0.0192**		**301.2064**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5511	2.3883	23.5315	0.0450		0.0735	0.0735		0.0735	0.0735	0.0000	4,362.0598	4,362.0598	1.4108		4,397.3293
Total	**0.5511**	**2.3883**	**23.5315**	**0.0450**		**0.0735**	**0.0735**		**0.0735**	**0.0735**	**0.0000**	**4,362.0598**	**4,362.0598**	**1.4108**		**4,397.3293**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0403	1.1334	0.3269	2.8200e-003	0.0733	5.7700e-003	0.0790	0.0211	5.5200e-003	0.0266		300.7275	300.7275	0.0192		301.2064
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0403**	**1.1334**	**0.3269**	**2.8200e-003**	**0.0733**	**5.7700e-003**	**0.0790**	**0.0211**	**5.5200e-003**	**0.0266**		**300.7275**	**300.7275**	**0.0192**		**301.2064**

3.11 Seasonal Stockpile/Crushing - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3712	11.4881	12.6172	0.0198		0.7034	0.7034		0.6821	0.6821		1,889.1017	1,889.1017	0.2787		1,896.0703
Total	**1.3712**	**11.4881**	**12.6172**	**0.0198**		**0.7034**	**0.7034**		**0.6821**	**0.6821**		**1,889.1017**	**1,889.1017**	**0.2787**		**1,896.0703**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1044	0.0764	0.8378	2.3800e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		237.3978	237.3978	7.3800e-003		237.5824
Total	**0.1044**	**0.0764**	**0.8378**	**2.3800e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**237.3978**	**237.3978**	**7.3800e-003**		**237.5824**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2119	0.9182	13.0670	0.0198		0.0283	0.0283		0.0283	0.0283	0.0000	1,889.1017	1,889.1017	0.2787		1,896.0703
Total	**0.2119**	**0.9182**	**13.0670**	**0.0198**		**0.0283**	**0.0283**		**0.0283**	**0.0283**	**0.0000**	**1,889.1017**	**1,889.1017**	**0.2787**		**1,896.0703**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1044	0.0764	0.8378	2.3800e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		237.3978	237.3978	7.3800e-003		237.5824
Total	**0.1044**	**0.0764**	**0.8378**	**2.3800e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**237.3978**	**237.3978**	**7.3800e-003**		**237.5824**

3.12 SPS Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6783	7.0328	7.3260	0.0114		0.3764	0.3764		0.3463	0.3463		1,103.8667	1,103.8667	0.3570		1,112.7920

Paving	0.3275					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0058**	**7.0328**	**7.3260**	**0.0114**		**0.3764**	**0.3764**		**0.3463**	**0.3463**		**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0653	0.0477	0.5236	1.4900e-003	0.1505	1.2400e-003	0.1518	0.0399	1.1400e-003	0.0411		148.3736	148.3736	4.6100e-003		148.4890
Total	**0.0653**	**0.0477**	**0.5236**	**1.4900e-003**	**0.1505**	**1.2400e-003**	**0.1518**	**0.0399**	**1.1400e-003**	**0.0411**		**148.3736**	**148.3736**	**4.6100e-003**		**148.4890**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1402	0.6077	8.6478	0.0114		0.0187	0.0187		0.0187	0.0187	0.0000	1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.3275					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.4677**	**0.6077**	**8.6478**	**0.0114**		**0.0187**	**0.0187**		**0.0187**	**0.0187**	**0.0000**	**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0653	0.0477	0.5236	1.4900e-003	0.1505	1.2400e-003	0.1518	0.0399	1.1400e-003	0.0411		148.3736	148.3736	4.6100e-003		148.4890
Total	**0.0653**	**0.0477**	**0.5236**	**1.4900e-003**	**0.1505**	**1.2400e-003**	**0.1518**	**0.0399**	**1.1400e-003**	**0.0411**		**148.3736**	**148.3736**	**4.6100e-003**		**148.4890**

3.13 Slope Protection Activity - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.2095	2.1052	2.2797	3.1100e-003		0.1331	0.1331		0.1225	0.1225		300.7685	300.7685	0.0973		303.2004
Total	**0.2095**	**2.1052**	**2.2797**	**3.1100e-003**	**0.0000**	**0.1331**	**0.1331**	**0.0000**	**0.1225**	**0.1225**		**300.7685**	**300.7685**	**0.0973**		**303.2004**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0380	0.1646	2.3421	3.1100e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	300.7685	300.7685	0.0973		303.2004
Total	**0.0380**	**0.1646**	**2.3421**	**3.1100e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**300.7685**	**300.7685**	**0.0973**		**303.2004**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.14 Hydroblasting for Cement Slurry - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3991	3.4786	3.7055	6.5800e-003		0.1962	0.1962		0.1962	0.1962		623.0346	623.0346	0.0351		623.9116
Total	**0.3991**	**3.4786**	**3.7055**	**6.5800e-003**		**0.1962**	**0.1962**		**0.1962**	**0.1962**		**623.0346**	**623.0346**	**0.0351**		**623.9116**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0392	0.0286	0.3142	8.9000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		89.0242	89.0242	2.7700e-003		89.0934
Total	**0.0392**	**0.0286**	**0.3142**	**8.9000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**89.0242**	**89.0242**	**2.7700e-003**		**89.0934**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0658	0.2850	4.0564	6.5800e-003		8.7700e-003	8.7700e-003		8.7700e-003	8.7700e-003	0.0000	623.0346	623.0346	0.0351		623.9116
Total	**0.0658**	**0.2850**	**4.0564**	**6.5800e-003**		**8.7700e-003**	**8.7700e-003**		**8.7700e-003**	**8.7700e-003**	**0.0000**	**623.0346**	**623.0346**	**0.0351**		**623.9116**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0392	0.0286	0.3142	8.9000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		89.0242	89.0242	2.7700e-003		89.0934
Total	**0.0392**	**0.0286**	**0.3142**	**8.9000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**89.0242**	**89.0242**	**2.7700e-003**		**89.0934**

3.15 Sluicegate Repair - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**0.0000**			**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**0.0000**			**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0
User Defined Industrial	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907
User Defined Industrial	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					

Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Unmitigated	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Landscaping	7.0000e-005	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**		**1.7500e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-005	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**		**1.7500e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Big Tujunga Sediment Removal IS-MND

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	90.00	0.00	0
Other Asphalt Surfaces	6.50	Acre	6.50	283,140.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	541	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Adjusted CO2 IF reflects RPS for SCE.

Land Use - Lot acreage: Big Tujunga Reservoir Area: 68 acres

Maple SRS: 22 acres

Construction Phase - Schedule based on Data Needs

Off-road Equipment - 4 Excavators, 4 Rubber Tired Dozers, 4 Tractors

Off-road Equipment - 4 Excavators, 4 Rubber Tired Dozers, 4 tractors

Off-road Equipment - 1 Tractor

Off-road Equipment - 1 Cement and Mortar Mixer

Off-road Equipment - Pumps (4) are electrical and powered by a generator.

Off-road Equipment - 1 Generator Set

Off-road Equipment - 1 Paver, 1 Paving Equipment, 1 Roller

Off-road Equipment - 1 Generator set, 1 crushing/proc., 2 tractors

Off-road Equipment - 1 tractor

Off-road Equipment - All hand tools

Off-road Equipment - 4 Rubber Tired Dozers, 4 tractors

Off-road Equipment - 4 Rubber tired dozers, 4 tractors

Off-road Equipment - 1 paver, 1 paving equipm, 1 roller

Off-road Equipment - 1 Excavator, 1 Rubber Tired Dozer, 4 Tractor/Loaders

Trips and VMT - Worker Trips from County engineers. Water truck trips accounted for in vendor trips. 2 water tenders trucking water from offsite

Grading -

Road Dust -

Area Coating - No Painting

Energy Use -

Construction Off-road Equipment Mitigation - Tier 4 Final and electrical pumps

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	16988	0
tblConstEquipMitigation	FuelType	Diesel	Electrical
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	17.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	24.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	1,550.00	79.00
tblConstructionPhase	NumDays	155.00	26.00
tblConstructionPhase	NumDays	155.00	25.00
tblConstructionPhase	NumDays	155.00	131.00
tblConstructionPhase	NumDays	155.00	131.00
tblConstructionPhase	NumDays	110.00	52.00
tblConstructionPhase	NumDays	110.00	25.00
tblConstructionPhase	NumDays	110.00	25.00
tblConstructionPhase	NumDays	60.00	27.00
tblConstructionPhase	NumDays	60.00	11.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00

tblConstructionPhase	NumDaysWeek	5.00	6.00
tblLandUse	LotAcreage	0.00	90.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	541
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	46.00	10.00
tblTripsAndVMT	WorkerTripNumber	15.00	30.00
tblTripsAndVMT	WorkerTripNumber	10.00	16.00
tblTripsAndVMT	WorkerTripNumber	8.00	10.00
tblTripsAndVMT	WorkerTripNumber	3.00	0.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00
tblTripsAndVMT	WorkerTripNumber	3.00	20.00
tblTripsAndVMT	WorkerTripNumber	30.00	40.00
tblTripsAndVMT	WorkerTripNumber	10.00	30.00
tblTripsAndVMT	WorkerTripNumber	8.00	6.00
tblTripsAndVMT	WorkerTripNumber	3.00	16.00

tblTripsAndVMT	WorkerTripNumber	30.00	96.00
tblTripsAndVMT	WorkerTripNumber	20.00	50.00
tblTripsAndVMT	WorkerTripNumber	119.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	20.4466	197.1212	125.6847	0.2342	51.0219	10.1020	61.1239	27.2401	9.3450	36.5851	0.0000	22,791.9418	22,791.9418	5.8708	0.0000	22,938.7105
Maximum	**20.4466**	**197.1212**	**125.6847**	**0.2342**	**51.0219**	**10.1020**	**61.1239**	**27.2401**	**9.3450**	**36.5851**	**0.0000**	**22,791.9418**	**22,791.9418**	**5.8708**	**0.0000**	**22,938.7105**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	3.8470	13.5761	127.6113	0.2342	21.6341	0.3550	21.9891	11.0861	0.3527	11.4388	0.0000	22,791.9418	22,791.9418	5.8708	0.0000	22,938.7105
Maximum	**3.8470**	**13.5761**	**127.6113**	**0.2342**	**21.6341**	**0.3550**	**21.9891**	**11.0861**	**0.3527**	**11.4388**	**0.0000**	**22,791.9418**	**22,791.9418**	**5.8708**	**0.0000**	**22,938.7105**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**81.19**	**93.11**	**-1.53**	**0.00**	**57.60**	**96.49**	**64.03**	**59.30**	**96.23**	**68.73**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**	**0.0000**	**1.7500e-003**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**	**0.0000**	**1.7500e-003**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	SPS Site Preparation	Site Preparation	1/1/2020	1/31/2020	6	27	
2	BTR Site Preparation	Site Preparation	4/1/2020	4/13/2020	6	11	
3	BTR Access Road Grading	Grading	4/16/2020	5/14/2020	6	25	
4	Dewatering Activities	Trenching	4/16/2020	6/15/2020	6	52	
5	Paving Haul Roads	Paving	4/16/2020	5/14/2020	6	25	
6	Culvert Crossing Repair	Paving	4/16/2020	5/14/2020	6	25	
7	BTR Grading and Hauling	Grading	5/15/2020	10/14/2020	6	131	
8	SPS Grading	Grading	5/15/2020	10/14/2020	6	131	
9	SPS Construction	Building Construction	7/15/2020	10/14/2020	6	79	
10	Seasonal Stockpile/Crushing	Trenching	8/15/2020	10/14/2020	6	52	
11	SPS Paving	Paving	8/15/2020	10/14/2020	6	52	
12	Slope Protection Activity	Grading	9/15/2020	10/14/2020	6	26	
13	Hydroblasting for Cement Slurry	Trenching	9/15/2020	10/14/2020	6	26	
14	Sluicegate Repair	Trenching	9/15/2020	10/14/2020	6	26	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 6.5

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor

SPS Site Preparation	Concrete/Industrial Saws	0	8.00	81	0.73
SPS Site Preparation	Excavators	1	8.00	158	0.38
SPS Site Preparation	Rubber Tired Dozers	1	8.00	247	0.40
SPS Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
BTR Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
BTR Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
BTR Access Road Grading	Air Compressors	0	6.00	78	0.48
BTR Access Road Grading	Excavators	4	8.00	158	0.38
BTR Access Road Grading	Graders	0	8.00	187	0.41
BTR Access Road Grading	Rubber Tired Dozers	4	8.00	247	0.40
BTR Access Road Grading	Scrapers	0	8.00	367	0.48
BTR Access Road Grading	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Dewatering Activities	Cranes	0	7.00	231	0.29
Dewatering Activities	Forklifts	0	8.00	89	0.20
Dewatering Activities	Generator Sets	0	8.00	84	0.74
Dewatering Activities	Pumps	4	24.00	84	0.74
Dewatering Activities	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Dewatering Activities	Welders	0	8.00	46	0.45
Paving Haul Roads	Excavators	0	8.00	158	0.38
Paving Haul Roads	Graders	0	8.00	187	0.41
Paving Haul Roads	Pavers	1	8.00	130	0.42
Paving Haul Roads	Paving Equipment	1	8.00	132	0.36
Paving Haul Roads	Rollers	1	8.00	80	0.38
Paving Haul Roads	Rubber Tired Dozers	0	8.00	247	0.40
Paving Haul Roads	Scrapers	0	8.00	367	0.48
Paving Haul Roads	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Culvert Crossing Repair	Cement and Mortar Mixers	1	8.00	9	0.56
Culvert Crossing Repair	Pavers	0	8.00	130	0.42
Culvert Crossing Repair	Paving Equipment	0	8.00	132	0.36
Culvert Crossing Repair	Rollers	0	8.00	80	0.38

BTR Grading and Hauling	Excavators	4	8.00	158	0.38
BTR Grading and Hauling	Graders	0	8.00	187	0.41
BTR Grading and Hauling	Rubber Tired Dozers	4	8.00	247	0.40
BTR Grading and Hauling	Scrapers	0	8.00	367	0.48
BTR Grading and Hauling	Tractors/Loaders/Backhoes	4	8.00	97	0.37
SPS Grading	Excavators	0	8.00	158	0.38
SPS Grading	Graders	0	8.00	187	0.41
SPS Grading	Rubber Tired Dozers	4	8.00	247	0.40
SPS Grading	Scrapers	0	8.00	367	0.48
SPS Grading	Tractors/Loaders/Backhoes	4	8.00	97	0.37
SPS Construction	Cranes	0	7.00	231	0.29
SPS Construction	Forklifts	0	8.00	89	0.20
SPS Construction	Generator Sets	0	8.00	84	0.74
SPS Construction	Rubber Tired Dozers	4	8.00	247	0.40
SPS Construction	Tractors/Loaders/Backhoes	4	7.00	97	0.37
SPS Construction	Welders	0	8.00	46	0.45
Seasonal Stockpile/Crushing	Crushing/Proc. Equipment	1	8.00	85	0.78
Seasonal Stockpile/Crushing	Generator Sets	1	8.00	84	0.74
Seasonal Stockpile/Crushing	Tractors/Loaders/Backhoes	2	8.00	97	0.37
SPS Paving	Pavers	1	8.00	130	0.42
SPS Paving	Paving Equipment	1	8.00	132	0.36
SPS Paving	Rollers	1	8.00	80	0.38
Slope Protection Activity	Excavators	0	8.00	158	0.38
Slope Protection Activity	Graders	0	8.00	187	0.41
Slope Protection Activity	Rubber Tired Dozers	0	8.00	247	0.40
Slope Protection Activity	Scrapers	0	8.00	367	0.48
Slope Protection Activity	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Hydroblasting for Cement Slurry	Generator Sets	1	8.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
SPS Site Preparation	6	30.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
BTR Site Preparation	1	20.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
BTR Access Road Grading	12	40.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
Dewatering Activities	4	30.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving Haul Roads	3	6.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Culvert Crossing Repair	1	16.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
BTR Grading and Hauling	12	96.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
SPS Grading	8	50.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
SPS Construction	8	0.00	10.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Seasonal Stockpile/Crushing	4	16.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
SPS Paving	3	10.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Slope Protection Activity	1	0.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Hydroblasting for Cement Slurry	1	6.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Sluicegate Repair			0.00	0.00	19.80	7.90				

3.1 Mitigation Measures Construction

Use Alternative Fuel for Construction Equipment

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 SPS Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000

Off-Road	2.1625	22.1655	16.5182	0.0261		1.2043	1.2043		1.1080	1.1080		2,530.5350	2,530.5350	0.8184		2,550.9956
Total	**2.1625**	**22.1655**	**16.5182**	**0.0261**	**6.0221**	**1.2043**	**7.2264**	**3.3102**	**1.1080**	**4.4182**		**2,530.5350**	**2,530.5350**	**0.8184**		**2,550.9956**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.1743	0.1293	1.7277	4.7500e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		472.8300	472.8300	0.0148		473.1988
Total	**0.2194**	**1.4012**	**2.0675**	**8.2500e-003**	**0.5442**	**0.0108**	**0.5551**	**0.1464**	**0.0102**	**0.1566**		**846.8177**	**846.8177**	**0.0352**		**847.6977**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	0.3200	1.3867	17.1199	0.0261		0.0427	0.0427		0.0427	0.0427	0.0000	2,530.5350	2,530.5350	0.8184		2,550.9956
Total	**0.3200**	**1.3867**	**17.1199**	**0.0261**	**2.3486**	**0.0427**	**2.3913**	**1.2910**	**0.0427**	**1.3337**	**0.0000**	**2,530.5350**	**2,530.5350**	**0.8184**		**2,550.9956**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.1743	0.1293	1.7277	4.7500e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		472.8300	472.8300	0.0148		473.1988
Total	**0.2194**	**1.4012**	**2.0675**	**8.2500e-003**	**0.5442**	**0.0108**	**0.5551**	**0.1464**	**0.0102**	**0.1566**		**846.8177**	**846.8177**	**0.0352**		**847.6977**

3.3 BTR Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.2095	2.1052	2.2797	3.1100e-003		0.1331	0.1331		0.1225	0.1225		300.7685	300.7685	0.0973		303.2004
Total	**0.2095**	**2.1052**	**2.2797**	**3.1100e-003**	**0.0000**	**0.1331**	**0.1331**	**0.0000**	**0.1225**	**0.1225**		**300.7685**	**300.7685**	**0.0973**		**303.2004**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.1162	0.0862	1.1518	3.1700e-003	0.3010	2.4700e-003	0.3035	0.0798	2.2800e-003	0.0821		315.2200	315.2200	9.8400e-003		315.4659
Total	**0.1613**	**1.3581**	**1.4916**	**6.6700e-003**	**0.3937**	**9.6000e-003**	**0.4033**	**0.1065**	**9.1000e-003**	**0.1156**		**689.2077**	**689.2077**	**0.0303**		**689.9648**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0380	0.1646	2.3421	3.1100e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	300.7685	300.7685	0.0973		303.2004
Total	**0.0380**	**0.1646**	**2.3421**	**3.1100e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**300.7685**	**300.7685**	**0.0973**		**303.2004**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989

Worker	0.1162	0.0862	1.1518	3.1700e-003	0.3010	2.4700e-003	0.3035	0.0798	2.2800e-003	0.0821		315.2200	315.2200	9.8400e-003		315.4659
Total	**0.1613**	**1.3581**	**1.4916**	**6.6700e-003**	**0.3937**	**9.6000e-003**	**0.4033**	**0.1065**	**9.1000e-003**	**0.1156**		**689.2077**	**689.2077**	**0.0303**		**689.9648**

3.4 BTR Access Road Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					24.0883	0.0000	24.0883	13.2409	0.0000	13.2409			0.0000			0.0000
Off-Road	6.1359	63.4001	38.7165	0.0672		3.2199	3.2199		2.9623	2.9623		6,512.9178	6,512.9178	2.1064		6,565.5780
Total	**6.1359**	**63.4001**	**38.7165**	**0.0672**	**24.0883**	**3.2199**	**27.3082**	**13.2409**	**2.9623**	**16.2032**		**6,512.9178**	**6,512.9178**	**2.1064**		**6,565.5780**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.2324	0.1724	2.3036	6.3300e-003	0.6021	4.9400e-003	0.6070	0.1597	4.5500e-003	0.1642		630.4400	630.4400	0.0197		630.9318
Total	**0.2775**	**1.4443**	**2.6434**	**9.8300e-003**	**0.6948**	**0.0121**	**0.7068**	**0.1863**	**0.0114**	**0.1977**		**1,004.4277**	**1,004.4277**	**0.0401**		**1,005.4306**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3945	0.0000	9.3945	5.1640	0.0000	5.1640			0.0000			0.0000
Off-Road	0.8243	3.5718	40.3747	0.0672		0.1099	0.1099		0.1099	0.1099	0.0000	6,512.9178	6,512.9178	2.1064		6,565.5780
Total	**0.8243**	**3.5718**	**40.3747**	**0.0672**	**9.3945**	**0.1099**	**9.5044**	**5.1640**	**0.1099**	**5.2739**	**0.0000**	**6,512.9178**	**6,512.9178**	**2.1064**		**6,565.5780**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.2324	0.1724	2.3036	6.3300e-003	0.6021	4.9400e-003	0.6070	0.1597	4.5500e-003	0.1642		630.4400	630.4400	0.0197		630.9318
Total	**0.2775**	**1.4443**	**2.6434**	**9.8300e-003**	**0.6948**	**0.0121**	**0.7068**	**0.1863**	**0.0114**	**0.1977**		**1,004.4277**	**1,004.4277**	**0.0401**		**1,005.4306**

3.5 Dewatering Activities - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Off-Road	5.0781	42.3485	45.1506	0.0789		2.4864	2.4864		2.4864	2.4864		7,476.4148	7,476.4148	0.4473		7,487.5972
Total	**5.0781**	**42.3485**	**45.1506**	**0.0789**		**2.4864**	**2.4864**		**2.4864**	**2.4864**		**7,476.4148**	**7,476.4148**	**0.4473**		**7,487.5972**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1743	0.1293	1.7277	4.7500e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		472.8300	472.8300	0.0148		473.1988
Total	**0.1743**	**0.1293**	**1.7277**	**4.7500e-003**	**0.4516**	**3.7100e-003**	**0.4553**	**0.1197**	**3.4200e-003**	**0.1232**		**472.8300**	**472.8300**	**0.0148**		**473.1988**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0789		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0789**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1743	0.1293	1.7277	4.7500e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		472.8300	472.8300	0.0148		473.1988
Total	**0.1743**	**0.1293**	**1.7277**	**4.7500e-003**	**0.4516**	**3.7100e-003**	**0.4553**	**0.1197**	**3.4200e-003**	**0.1232**		**472.8300**	**472.8300**	**0.0148**		**473.1988**

3.6 Paving Haul Roads - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6783	7.0328	7.3260	0.0114		0.3764	0.3764		0.3463	0.3463		1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3595**	**7.0328**	**7.3260**	**0.0114**		**0.3764**	**0.3764**		**0.3463**	**0.3463**		**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0349	0.0259	0.3455	9.5000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		94.5660	94.5660	2.9500e-003		94.6398
Total	**0.0349**	**0.0259**	**0.3455**	**9.5000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**94.5660**	**94.5660**	**2.9500e-003**		**94.6398**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1402	0.6077	8.6478	0.0114		0.0187	0.0187		0.0187	0.0187	0.0000	1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8214**	**0.6077**	**8.6478**	**0.0114**		**0.0187**	**0.0187**		**0.0187**	**0.0187**	**0.0000**	**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0349	0.0259	0.3455	9.5000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		94.5660	94.5660	2.9500e-003		94.6398
Total	**0.0349**	**0.0259**	**0.3455**	**9.5000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**94.5660**	**94.5660**	**2.9500e-003**		**94.6398**

3.7 Culvert Crossing Repair - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0588	0.3682	0.3085	7.1000e-004		0.0143	0.0143		0.0143	0.0143		50.5163	50.5163	5.2400e-003		50.6474
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7400**	**0.3682**	**0.3085**	**7.1000e-004**		**0.0143**	**0.0143**		**0.0143**	**0.0143**		**50.5163**	**50.5163**	**5.2400e-003**		**50.6474**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0930	0.0690	0.9214	2.5300e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		252.1760	252.1760	7.8700e-003		252.3727

Total	**0.0930**	**0.0690**	**0.9214**	**2.5300e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**252.1760**	**252.1760**	**7.8700e-003**		**252.3727**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	7.1000e-004		0.0000	0.0000		0.0000	0.0000	0.0000	50.5163	50.5163	5.2400e-003		50.6474
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6812**	**0.0000**	**0.0000**	**7.1000e-004**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**50.5163**	**50.5163**	**5.2400e-003**		**50.6474**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0930	0.0690	0.9214	2.5300e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		252.1760	252.1760	7.8700e-003		252.3727
Total	**0.0930**	**0.0690**	**0.9214**	**2.5300e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**252.1760**	**252.1760**	**7.8700e-003**		**252.3727**

3.8 BTR Grading and Hauling - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					24.0883	0.0000	24.0883	13.2409	0.0000	13.2409			0.0000			0.0000
Off-Road	6.1359	63.4001	38.7165	0.0672		3.2199	3.2199		2.9623	2.9623		6,512.9178	6,512.9178	2.1064		6,565.5780
Total	**6.1359**	**63.4001**	**38.7165**	**0.0672**	**24.0883**	**3.2199**	**27.3082**	**13.2409**	**2.9623**	**16.2032**		**6,512.9178**	**6,512.9178**	**2.1064**		**6,565.5780**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.5578	0.4137	5.5286	0.0152	1.4450	0.0119	1.4569	0.3832	0.0109	0.3941		1,513.0559	1,513.0559	0.0472		1,514.2362
Total	**0.6029**	**1.6857**	**5.8684**	**0.0187**	**1.5377**	**0.0190**	**1.5567**	**0.4099**	**0.0178**	**0.4276**		**1,887.0437**	**1,887.0437**	**0.0677**		**1,888.7351**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					9.3945	0.0000	9.3945	5.1640	0.0000	5.1640			0.0000			0.0000
Off-Road	0.8243	3.5718	40.3747	0.0672		0.1099	0.1099		0.1099	0.1099	0.0000	6,512.9178	6,512.9178	2.1064		6,565.5780
Total	**0.8243**	**3.5718**	**40.3747**	**0.0672**	**9.3945**	**0.1099**	**9.5044**	**5.1640**	**0.1099**	**5.2739**	**0.0000**	**6,512.9178**	**6,512.9178**	**2.1064**		**6,565.5780**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.5578	0.4137	5.5286	0.0152	1.4450	0.0119	1.4569	0.3832	0.0109	0.3941		1,513.0559	1,513.0559	0.0472		1,514.2362
Total	**0.6029**	**1.6857**	**5.8684**	**0.0187**	**1.5377**	**0.0190**	**1.5567**	**0.4099**	**0.0178**	**0.4276**		**1,887.0437**	**1,887.0437**	**0.0677**		**1,888.7351**

3.9 SPS Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					24.0883	0.0000	24.0883	13.2409	0.0000	13.2409			0.0000			0.0000
Off-Road	5.1560	53.7496	25.6452	0.0465		2.7524	2.7524		2.5322	2.5322		4,512.4441	4,512.4441	1.4594		4,548.9295
Total	**5.1560**	**53.7496**	**25.6452**	**0.0465**	**24.0883**	**2.7524**	**26.8407**	**13.2409**	**2.5322**	**15.7731**		**4,512.4441**	**4,512.4441**	**1.4594**		**4,548.9295**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2905	0.2155	2.8795	7.9100e-003	0.7526	6.1800e-003	0.7588	0.1996	5.6900e-003	0.2053		788.0500	788.0500	0.0246		788.6647
Total	**0.2905**	**0.2155**	**2.8795**	**7.9100e-003**	**0.7526**	**6.1800e-003**	**0.7588**	**0.1996**	**5.6900e-003**	**0.2053**		**788.0500**	**788.0500**	**0.0246**		**788.6647**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3945	0.0000	9.3945	5.1640	0.0000	5.1640			0.0000			0.0000
Off-Road	0.5701	2.4706	24.7026	0.0465		0.0760	0.0760		0.0760	0.0760	0.0000	4,512.4441	4,512.4441	1.4594		4,548.9295
Total	**0.5701**	**2.4706**	**24.7026**	**0.0465**	**9.3945**	**0.0760**	**9.4705**	**5.1640**	**0.0760**	**5.2400**	**0.0000**	**4,512.4441**	**4,512.4441**	**1.4594**		**4,548.9295**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2905	0.2155	2.8795	7.9100e-003	0.7526	6.1800e-003	0.7588	0.1996	5.6900e-003	0.2053		788.0500	788.0500	0.0246		788.6647
Total	**0.2905**	**0.2155**	**2.8795**	**7.9100e-003**	**0.7526**	**6.1800e-003**	**0.7588**	**0.1996**	**5.6900e-003**	**0.2053**		**788.0500**	**788.0500**	**0.0246**		**788.6647**

3.10 SPS Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.0512	52.6970	24.5054	0.0450		2.6858	2.6858		2.4710	2.4710		4,362.0598	4,362.0598	1.4108		4,397.3293
Total	**5.0512**	**52.6970**	**24.5054**	**0.0450**		**2.6858**	**2.6858**		**2.4710**	**2.4710**		**4,362.0598**	**4,362.0598**	**1.4108**		**4,397.3293**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Vendor	0.0386	1.1309	0.2984	2.8900e-003	0.0733	5.6900e-003	0.0790	0.0211	5.4400e-003	0.0265		308.3031	308.3031	0.0181		308.7543
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0386**	**1.1309**	**0.2984**	**2.8900e-003**	**0.0733**	**5.6900e-003**	**0.0790**	**0.0211**	**5.4400e-003**	**0.0265**		**308.3031**	**308.3031**	**0.0181**		**308.7543**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5511	2.3883	23.5315	0.0450		0.0735	0.0735		0.0735	0.0735	0.0000	4,362.0598	4,362.0598	1.4108		4,397.3293
Total	**0.5511**	**2.3883**	**23.5315**	**0.0450**		**0.0735**	**0.0735**		**0.0735**	**0.0735**	**0.0000**	**4,362.0598**	**4,362.0598**	**1.4108**		**4,397.3293**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0386	1.1309	0.2984	2.8900e-003	0.0733	5.6900e-003	0.0790	0.0211	5.4400e-003	0.0265		308.3031	308.3031	0.0181		308.7543
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0386**	**1.1309**	**0.2984**	**2.8900e-003**	**0.0733**	**5.6900e-003**	**0.0790**	**0.0211**	**5.4400e-003**	**0.0265**		**308.3031**	**308.3031**	**0.0181**		**308.7543**

3.11 Seasonal Stockpile/Crushing - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3712	11.4881	12.6172	0.0198		0.7034	0.7034		0.6821	0.6821		1,889.1017	1,889.1017	0.2787		1,896.0703
Total	**1.3712**	**11.4881**	**12.6172**	**0.0198**		**0.7034**	**0.7034**		**0.6821**	**0.6821**		**1,889.1017**	**1,889.1017**	**0.2787**		**1,896.0703**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0930	0.0690	0.9214	2.5300e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		252.1760	252.1760	7.8700e-003		252.3727
Total	**0.0930**	**0.0690**	**0.9214**	**2.5300e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**252.1760**	**252.1760**	**7.8700e-003**		**252.3727**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2119	0.9182	13.0670	0.0198		0.0283	0.0283		0.0283	0.0283	0.0000	1,889.1017	1,889.1017	0.2787		1,896.0703
Total	**0.2119**	**0.9182**	**13.0670**	**0.0198**		**0.0283**	**0.0283**		**0.0283**	**0.0283**	**0.0000**	**1,889.1017**	**1,889.1017**	**0.2787**		**1,896.0703**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0930	0.0690	0.9214	2.5300e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		252.1760	252.1760	7.8700e-003		252.3727
Total	**0.0930**	**0.0690**	**0.9214**	**2.5300e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**252.1760**	**252.1760**	**7.8700e-003**		**252.3727**

3.12 SPS Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6783	7.0328	7.3260	0.0114		0.3764	0.3764		0.3463	0.3463		1,103.8667	1,103.8667	0.3570		1,112.7920

Paving	0.3275					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0058**	**7.0328**	**7.3260**	**0.0114**		**0.3764**	**0.3764**		**0.3463**	**0.3463**		**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0581	0.0431	0.5759	1.5800e-003	0.1505	1.2400e-003	0.1518	0.0399	1.1400e-003	0.0411		157.6100	157.6100	4.9200e-003		157.7329
Total	**0.0581**	**0.0431**	**0.5759**	**1.5800e-003**	**0.1505**	**1.2400e-003**	**0.1518**	**0.0399**	**1.1400e-003**	**0.0411**		**157.6100**	**157.6100**	**4.9200e-003**		**157.7329**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1402	0.6077	8.6478	0.0114		0.0187	0.0187		0.0187	0.0187	0.0000	1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.3275					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.4677**	**0.6077**	**8.6478**	**0.0114**		**0.0187**	**0.0187**		**0.0187**	**0.0187**	**0.0000**	**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0581	0.0431	0.5759	1.5800e-003	0.1505	1.2400e-003	0.1518	0.0399	1.1400e-003	0.0411		157.6100	157.6100	4.9200e-003		157.7329
Total	**0.0581**	**0.0431**	**0.5759**	**1.5800e-003**	**0.1505**	**1.2400e-003**	**0.1518**	**0.0399**	**1.1400e-003**	**0.0411**		**157.6100**	**157.6100**	**4.9200e-003**		**157.7329**

3.13 Slope Protection Activity - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.2095	2.1052	2.2797	3.1100e-003		0.1331	0.1331		0.1225	0.1225		300.7685	300.7685	0.0973		303.2004
Total	**0.2095**	**2.1052**	**2.2797**	**3.1100e-003**	**0.0000**	**0.1331**	**0.1331**	**0.0000**	**0.1225**	**0.1225**		**300.7685**	**300.7685**	**0.0973**		**303.2004**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0380	0.1646	2.3421	3.1100e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	300.7685	300.7685	0.0973		303.2004
Total	**0.0380**	**0.1646**	**2.3421**	**3.1100e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**300.7685**	**300.7685**	**0.0973**		**303.2004**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.14 Hydroblasting for Cement Slurry - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3991	3.4786	3.7055	6.5800e-003		0.1962	0.1962		0.1962	0.1962		623.0346	623.0346	0.0351		623.9116
Total	**0.3991**	**3.4786**	**3.7055**	**6.5800e-003**		**0.1962**	**0.1962**		**0.1962**	**0.1962**		**623.0346**	**623.0346**	**0.0351**		**623.9116**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0349	0.0259	0.3455	9.5000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		94.5660	94.5660	2.9500e-003		94.6398
Total	**0.0349**	**0.0259**	**0.3455**	**9.5000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**94.5660**	**94.5660**	**2.9500e-003**		**94.6398**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0658	0.2850	4.0564	6.5800e-003		8.7700e-003	8.7700e-003		8.7700e-003	8.7700e-003	0.0000	623.0346	623.0346	0.0351		623.9116
Total	**0.0658**	**0.2850**	**4.0564**	**6.5800e-003**		**8.7700e-003**	**8.7700e-003**		**8.7700e-003**	**8.7700e-003**	**0.0000**	**623.0346**	**623.0346**	**0.0351**		**623.9116**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0349	0.0259	0.3455	9.5000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		94.5660	94.5660	2.9500e-003		94.6398
Total	**0.0349**	**0.0259**	**0.3455**	**9.5000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**94.5660**	**94.5660**	**2.9500e-003**		**94.6398**

3.15 Sluicegate Repair - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**0.0000**			**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**0.0000**			**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0
User Defined Industrial	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907
User Defined Industrial	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					

Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Unmitigated	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Landscaping	7.0000e-005	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**		**1.7500e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-005	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**		**1.7500e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Big Tujunga Sediment Removal IS-MND - Los Angeles-South Coast County, Annual

Big Tujunga Sediment Removal IS-MND

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	90.00	0.00	0
Other Asphalt Surfaces	6.50	Acre	6.50	283,140.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	541	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Adjusted CO2 IF reflects RPS for SCE.

Land Use - Lot acreage: Big Tujunga Reservoir Area: 68 acres

Maple SRS: 22 acres

Construction Phase - Schedule based on Data Needs

Off-road Equipment - 4 Excavators, 4 Rubber Tired Dozers, 4 Tractors

Off-road Equipment - 4 Excavators, 4 Rubber Tired Dozers, 4 tractors

Off-road Equipment - 1 Tractor

Off-road Equipment - 1 Cement and Mortar Mixer

Off-road Equipment - Pumps (4) are electrical and powered by a generator.

Off-road Equipment - 1 Generator Set

Off-road Equipment - 1 Paver, 1 Paving Equipment, 1 Roller

Off-road Equipment - 1 Generator set, 1 crushing/proc., 2 tractors

Off-road Equipment - 1 tractor

Off-road Equipment - All hand tools

Off-road Equipment - 4 Rubber Tired Dozers, 4 tractors

Off-road Equipment - 4 Rubber tired dozers, 4 tractors

Off-road Equipment - 1 paver, 1 paving equipm, 1 roller

Off-road Equipment - 1 Excavator, 1 Rubber Tired Dozer, 4 Tractor/Loaders

Trips and VMT - Worker Trips from County engineers. Water truck trips accounted for in vendor trips. 2 water tenders trucking water from offsite

Grading -

Road Dust -

Area Coating - No Painting

Energy Use -

Construction Off-road Equipment Mitigation - Tier 4 Final and electrical pumps

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	16988	0
tblConstEquipMitigation	FuelType	Diesel	Electrical
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	17.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	24.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	1,550.00	79.00
tblConstructionPhase	NumDays	155.00	26.00
tblConstructionPhase	NumDays	155.00	25.00
tblConstructionPhase	NumDays	155.00	131.00
tblConstructionPhase	NumDays	155.00	131.00
tblConstructionPhase	NumDays	110.00	52.00
tblConstructionPhase	NumDays	110.00	25.00
tblConstructionPhase	NumDays	110.00	25.00
tblConstructionPhase	NumDays	60.00	27.00
tblConstructionPhase	NumDays	60.00	11.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
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tblConstructionPhase	NumDaysWeek	5.00	6.00
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tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00

tblConstructionPhase	NumDaysWeek	5.00	6.00
tblLandUse	LotAcreage	0.00	90.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	541
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
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tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	46.00	10.00
tblTripsAndVMT	WorkerTripNumber	15.00	30.00
tblTripsAndVMT	WorkerTripNumber	10.00	16.00
tblTripsAndVMT	WorkerTripNumber	8.00	10.00
tblTripsAndVMT	WorkerTripNumber	3.00	0.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00
tblTripsAndVMT	WorkerTripNumber	3.00	20.00
tblTripsAndVMT	WorkerTripNumber	30.00	40.00
tblTripsAndVMT	WorkerTripNumber	10.00	30.00
tblTripsAndVMT	WorkerTripNumber	8.00	6.00
tblTripsAndVMT	WorkerTripNumber	3.00	16.00

tblTripsAndVMT	WorkerTripNumber	30.00	96.00
tblTripsAndVMT	WorkerTripNumber	20.00	50.00
tblTripsAndVMT	WorkerTripNumber	119.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	1.3529	12.8387	8.4824	0.0159	3.7325	0.6589	4.3913	1.9967	0.6125	2.6092	0.0000	1,401.7941	1,401.7941	0.3358	0.0000	1,410.1898
Maximum	**1.3529**	**12.8387**	**8.4824**	**0.0159**	**3.7325**	**0.6589**	**4.3913**	**1.9967**	**0.6125**	**2.6092**	**0.0000**	**1,401.7941**	**1,401.7941**	**0.3358**	**0.0000**	**1,410.1898**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.2445	0.8404	7.4102	0.0159	1.5743	0.0211	1.5954	0.8104	0.0210	0.8314	0.0000	1,225.4482	1,225.4482	0.3253	0.0000	1,233.5801
Maximum	**0.2445**	**0.8404**	**7.4102**	**0.0159**	**1.5743**	**0.0211**	**1.5954**	**0.8104**	**0.0210**	**0.8314**	**0.0000**	**1,225.4482**	**1,225.4482**	**0.3253**	**0.0000**	**1,233.5801**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**81.93**	**93.45**	**12.64**	**0.00**	**57.82**	**96.79**	**63.67**	**59.41**	**96.57**	**68.14**	**0.00**	**12.58**	**12.58**	**3.14**	**0.00**	**12.52**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	1-1-2020	3-31-2020	0.3453	0.0448
2	4-1-2020	6-30-2020	4.9191	0.3287
3	7-1-2020	9-30-2020	7.6131	0.5947
		Highest	7.6131	0.5947

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0183	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.9000e-004	1.9000e-004	0.0000	0.0000	2.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0183**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**0.0000**	**2.0000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Area	0.0183	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.9000e-004	1.9000e-004	0.0000	0.0000	2.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0183**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**0.0000**	**2.0000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	SPS Site Preparation	Site Preparation	1/1/2020	1/31/2020	6	27	
2	BTR Site Preparation	Site Preparation	4/1/2020	4/13/2020	6	11	
3	BTR Access Road Grading	Grading	4/16/2020	5/14/2020	6	25	
4	Dewatering Activities	Trenching	4/16/2020	6/15/2020	6	52	
5	Paving Haul Roads	Paving	4/16/2020	5/14/2020	6	25	
6	Culvert Crossing Repair	Paving	4/16/2020	5/14/2020	6	25	
7	BTR Grading and Hauling	Grading	5/15/2020	10/14/2020	6	131	
8	SPS Grading	Grading	5/15/2020	10/14/2020	6	131	
9	SPS Construction	Building Construction	7/15/2020	10/14/2020	6	79	
10	Seasonal Stockpile/Crushing	Trenching	8/15/2020	10/14/2020	6	52	
11	SPS Paving	Paving	8/15/2020	10/14/2020	6	52	
12	Slope Protection Activity	Grading	9/15/2020	10/14/2020	6	26	

13	Hydroblasting for Cement Slurry	Trenching	9/15/2020	10/14/2020	6	26	
14	Sluicegate Repair	Trenching	9/15/2020	10/14/2020	6	26	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 6.5

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
SPS Site Preparation	Concrete/Industrial Saws	0	8.00	81	0.73
SPS Site Preparation	Excavators	1	8.00	158	0.38
SPS Site Preparation	Rubber Tired Dozers	1	8.00	247	0.40
SPS Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
BTR Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
BTR Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
BTR Access Road Grading	Air Compressors	0	6.00	78	0.48
BTR Access Road Grading	Excavators	4	8.00	158	0.38
BTR Access Road Grading	Graders	0	8.00	187	0.41
BTR Access Road Grading	Rubber Tired Dozers	4	8.00	247	0.40
BTR Access Road Grading	Scrapers	0	8.00	367	0.48
BTR Access Road Grading	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Dewatering Activities	Cranes	0	7.00	231	0.29
Dewatering Activities	Forklifts	0	8.00	89	0.20
Dewatering Activities	Generator Sets	0	8.00	84	0.74
Dewatering Activities	Pumps	4	24.00	84	0.74
Dewatering Activities	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Dewatering Activities	Welders	0	8.00	46	0.45
Paving Haul Roads	Excavators	0	8.00	158	0.38
Paving Haul Roads	Graders	0	8.00	187	0.41

Paving Haul Roads	Pavers	1	8.00	130	0.42
Paving Haul Roads	Paving Equipment	1	8.00	132	0.36
Paving Haul Roads	Rollers	1	8.00	80	0.38
Paving Haul Roads	Rubber Tired Dozers	0	8.00	247	0.40
Paving Haul Roads	Scrapers	0	8.00	367	0.48
Paving Haul Roads	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Culvert Crossing Repair	Cement and Mortar Mixers	1	8.00	9	0.56
Culvert Crossing Repair	Pavers	0	8.00	130	0.42
Culvert Crossing Repair	Paving Equipment	0	8.00	132	0.36
Culvert Crossing Repair	Rollers	0	8.00	80	0.38
BTR Grading and Hauling	Excavators	4	8.00	158	0.38
BTR Grading and Hauling	Graders	0	8.00	187	0.41
BTR Grading and Hauling	Rubber Tired Dozers	4	8.00	247	0.40
BTR Grading and Hauling	Scrapers	0	8.00	367	0.48
BTR Grading and Hauling	Tractors/Loaders/Backhoes	4	8.00	97	0.37
SPS Grading	Excavators	0	8.00	158	0.38
SPS Grading	Graders	0	8.00	187	0.41
SPS Grading	Rubber Tired Dozers	4	8.00	247	0.40
SPS Grading	Scrapers	0	8.00	367	0.48
SPS Grading	Tractors/Loaders/Backhoes	4	8.00	97	0.37
SPS Construction	Cranes	0	7.00	231	0.29
SPS Construction	Forklifts	0	8.00	89	0.20
SPS Construction	Generator Sets	0	8.00	84	0.74
SPS Construction	Rubber Tired Dozers	4	8.00	247	0.40
SPS Construction	Tractors/Loaders/Backhoes	4	7.00	97	0.37
SPS Construction	Welders	0	8.00	46	0.45
Seasonal Stockpile/Crushing	Crushing/Proc. Equipment	1	8.00	85	0.78
Seasonal Stockpile/Crushing	Generator Sets	1	8.00	84	0.74
Seasonal Stockpile/Crushing	Tractors/Loaders/Backhoes	2	8.00	97	0.37
SPS Paving	Pavers	1	8.00	130	0.42

SPS Paving	Paving Equipment	1	8.00	132	0.36
SPS Paving	Rollers	1	8.00	80	0.38
Slope Protection Activity	Excavators	0	8.00	158	0.38
Slope Protection Activity	Graders	0	8.00	187	0.41
Slope Protection Activity	Rubber Tired Dozers	0	8.00	247	0.40
Slope Protection Activity	Scrapers	0	8.00	367	0.48
Slope Protection Activity	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Hydroblasting for Cement Slurry	Generator Sets	1	8.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
SPS Site Preparation	6	30.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
BTR Site Preparation	1	20.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
BTR Access Road Grading	12	40.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
Dewatering Activities	4	30.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving Haul Roads	3	6.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Culvert Crossing Repair	1	16.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
BTR Grading and Hauling	12	96.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
SPS Grading	8	50.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
SPS Construction	8	0.00	10.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Seasonal Stockpile/Crushing	4	16.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
SPS Paving	3	10.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Slope Protection Activity	1	0.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Hydroblasting for Cement Slurry	1	6.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Sluicegate Repair			0.00	0.00	19.80	7.90				

3.1 Mitigation Measures Construction

Use Alternative Fuel for Construction Equipment

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 SPS Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0813	0.0000	0.0813	0.0447	0.0000	0.0447	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0292	0.2992	0.2230	3.5000e-004		0.0163	0.0163		0.0150	0.0150	0.0000	30.9915	30.9915	0.0100	0.0000	31.2420
Total	**0.0292**	**0.2992**	**0.2230**	**3.5000e-004**	**0.0813**	**0.0163**	**0.0976**	**0.0447**	**0.0150**	**0.0597**	**0.0000**	**30.9915**	**30.9915**	**0.0100**	**0.0000**	**31.2420**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.2000e-004	0.0176	4.7800e-003	5.0000e-005	1.2300e-003	1.0000e-004	1.3300e-003	3.6000e-004	9.0000e-005	4.5000e-004	0.0000	4.5413	4.5413	2.6000e-004	0.0000	4.5477
Worker	2.3800e-003	1.9900e-003	0.0218	6.0000e-005	5.9800e-003	5.0000e-005	6.0300e-003	1.5900e-003	5.0000e-005	1.6300e-003	0.0000	5.5424	5.5424	1.7000e-004	0.0000	5.5467
Total	**3.0000e-003**	**0.0196**	**0.0266**	**1.1000e-004**	**7.2100e-003**	**1.5000e-004**	**7.3600e-003**	**1.9500e-003**	**1.4000e-004**	**2.0800e-003**	**0.0000**	**10.0837**	**10.0837**	**4.3000e-004**	**0.0000**	**10.0944**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0317	0.0000	0.0317	0.0174	0.0000	0.0174	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.3200e-003	0.0187	0.2311	3.5000e-004		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	30.9914	30.9914	0.0100	0.0000	31.2420
Total	**4.3200e-003**	**0.0187**	**0.2311**	**3.5000e-004**	**0.0317**	**5.8000e-004**	**0.0323**	**0.0174**	**5.8000e-004**	**0.0180**	**0.0000**	**30.9914**	**30.9914**	**0.0100**	**0.0000**	**31.2420**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.2000e-004	0.0176	4.7800e-003	5.0000e-005	1.2300e-003	1.0000e-004	1.3300e-003	3.6000e-004	9.0000e-005	4.5000e-004	0.0000	4.5413	4.5413	2.6000e-004	0.0000	4.5477
Worker	2.3800e-003	1.9900e-003	0.0218	6.0000e-005	5.9800e-003	5.0000e-005	6.0300e-003	1.5900e-003	5.0000e-005	1.6300e-003	0.0000	5.5424	5.5424	1.7000e-004	0.0000	5.5467
Total	**3.0000e-003**	**0.0196**	**0.0266**	**1.1000e-004**	**7.2100e-003**	**1.5000e-004**	**7.3600e-003**	**1.9500e-003**	**1.4000e-004**	**2.0800e-003**	**0.0000**	**10.0837**	**10.0837**	**4.3000e-004**	**0.0000**	**10.0944**

3.3 BTR Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.1500e-003	0.0116	0.0125	2.0000e-005		7.3000e-004	7.3000e-004		6.7000e-004	6.7000e-004	0.0000	1.5007	1.5007	4.9000e-004	0.0000	1.5128
Total	**1.1500e-003**	**0.0116**	**0.0125**	**2.0000e-005**	**0.0000**	**7.3000e-004**	**7.3000e-004**	**0.0000**	**6.7000e-004**	**6.7000e-004**	**0.0000**	**1.5007**	**1.5007**	**4.9000e-004**	**0.0000**	**1.5128**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.5000e-004	7.1700e-003	1.9500e-003	2.0000e-005	5.0000e-004	4.0000e-005	5.4000e-004	1.4000e-004	4.0000e-005	1.8000e-004	0.0000	1.8501	1.8501	1.0000e-004	0.0000	1.8528
Worker	6.5000e-004	5.4000e-004	5.9200e-003	2.0000e-005	1.6200e-003	1.0000e-005	1.6400e-003	4.3000e-004	1.0000e-005	4.4000e-004	0.0000	1.5054	1.5054	5.0000e-005	0.0000	1.5065
Total	**9.0000e-004**	**7.7100e-003**	**7.8700e-003**	**4.0000e-005**	**2.1200e-003**	**5.0000e-005**	**2.1800e-003**	**5.7000e-004**	**5.0000e-005**	**6.2000e-004**	**0.0000**	**3.3555**	**3.3555**	**1.5000e-004**	**0.0000**	**3.3593**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1000e-004	9.1000e-004	0.0129	2.0000e-005		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	1.5007	1.5007	4.9000e-004	0.0000	1.5128
Total	**2.1000e-004**	**9.1000e-004**	**0.0129**	**2.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**1.5007**	**1.5007**	**4.9000e-004**	**0.0000**	**1.5128**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.5000e-004	7.1700e-003	1.9500e-003	2.0000e-005	5.0000e-004	4.0000e-005	5.4000e-004	1.4000e-004	4.0000e-005	1.8000e-004	0.0000	1.8501	1.8501	1.0000e-004	0.0000	1.8528
Worker	6.5000e-004	5.4000e-004	5.9200e-003	2.0000e-005	1.6200e-003	1.0000e-005	1.6400e-003	4.3000e-004	1.0000e-005	4.4000e-004	0.0000	1.5054	1.5054	5.0000e-005	0.0000	1.5065
Total	**9.0000e-004**	**7.7100e-003**	**7.8700e-003**	**4.0000e-005**	**2.1200e-003**	**5.0000e-005**	**2.1800e-003**	**5.7000e-004**	**5.0000e-005**	**6.2000e-004**	**0.0000**	**3.3555**	**3.3555**	**1.5000e-004**	**0.0000**	**3.3593**

3.4 BTR Access Road Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3011	0.0000	0.3011	0.1655	0.0000	0.1655	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0767	0.7925	0.4840	8.4000e-004		0.0403	0.0403		0.0370	0.0370	0.0000	73.8552	73.8552	0.0239	0.0000	74.4524
Total	**0.0767**	**0.7925**	**0.4840**	**8.4000e-004**	**0.3011**	**0.0403**	**0.3414**	**0.1655**	**0.0370**	**0.2025**	**0.0000**	**73.8552**	**73.8552**	**0.0239**	**0.0000**	**74.4524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.7000e-004	0.0163	4.4200e-003	4.0000e-005	1.1400e-003	9.0000e-005	1.2300e-003	3.3000e-004	9.0000e-005	4.1000e-004	0.0000	4.2049	4.2049	2.4000e-004	0.0000	4.2108
Worker	2.9400e-003	2.4500e-003	0.0269	8.0000e-005	7.3800e-003	6.0000e-005	7.4400e-003	1.9600e-003	6.0000e-005	2.0200e-003	0.0000	6.8425	6.8425	2.1000e-004	0.0000	6.8478
Total	**3.5100e-003**	**0.0188**	**0.0313**	**1.2000e-004**	**8.5200e-003**	**1.5000e-004**	**8.6700e-003**	**2.2900e-003**	**1.5000e-004**	**2.4300e-003**	**0.0000**	**11.0474**	**11.0474**	**4.5000e-004**	**0.0000**	**11.0586**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1174	0.0000	0.1174	0.0646	0.0000	0.0646	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0103	0.0447	0.5047	8.4000e-004		1.3700e-003	1.3700e-003		1.3700e-003	1.3700e-003	0.0000	73.8552	73.8552	0.0239	0.0000	74.4523
Total	**0.0103**	**0.0447**	**0.5047**	**8.4000e-004**	**0.1174**	**1.3700e-003**	**0.1188**	**0.0646**	**1.3700e-003**	**0.0659**	**0.0000**	**73.8552**	**73.8552**	**0.0239**	**0.0000**	**74.4523**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	5.7000e-004	0.0163	4.4200e-003	4.0000e-005	1.1400e-003	9.0000e-005	1.2300e-003	3.3000e-004	9.0000e-005	4.1000e-004	0.0000	4.2049	4.2049	2.4000e-004	0.0000	4.2108
Worker	2.9400e-003	2.4500e-003	0.0269	8.0000e-005	7.3800e-003	6.0000e-005	7.4400e-003	1.9600e-003	6.0000e-005	2.0200e-003	0.0000	6.8425	6.8425	2.1000e-004	0.0000	6.8478
Total	**3.5100e-003**	**0.0188**	**0.0313**	**1.2000e-004**	**8.5200e-003**	**1.5000e-004**	**8.6700e-003**	**2.2900e-003**	**1.5000e-004**	**2.4300e-003**	**0.0000**	**11.0474**	**11.0474**	**4.5000e-004**	**0.0000**	**11.0586**

3.5 Dewatering Activities - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1320	1.1011	1.1739	2.0500e-003		0.0647	0.0647		0.0647	0.0647	0.0000	176.3447	176.3447	0.0106	0.0000	176.6085
Total	**0.1320**	**1.1011**	**1.1739**	**2.0500e-003**		**0.0647**	**0.0647**		**0.0647**	**0.0647**	**0.0000**	**176.3447**	**176.3447**	**0.0106**	**0.0000**	**176.6085**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.5800e-003	3.8300e-003	0.0420	1.2000e-004	0.0115	1.0000e-004	0.0116	3.0600e-003	9.0000e-005	3.1500e-003	0.0000	10.6743	10.6743	3.3000e-004	0.0000	10.6826
Total	**4.5800e-003**	**3.8300e-003**	**0.0420**	**1.2000e-004**	**0.0115**	**1.0000e-004**	**0.0116**	**3.0600e-003**	**9.0000e-005**	**3.1500e-003**	**0.0000**	**10.6743**	**10.6743**	**3.3000e-004**	**0.0000**	**10.6826**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	2.0500e-003		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**2.0500e-003**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.5800e-003	3.8300e-003	0.0420	1.2000e-004	0.0115	1.0000e-004	0.0116	3.0600e-003	9.0000e-005	3.1500e-003	0.0000	10.6743	10.6743	3.3000e-004	0.0000	10.6826
Total	**4.5800e-003**	**3.8300e-003**	**0.0420**	**1.2000e-004**	**0.0115**	**1.0000e-004**	**0.0116**	**3.0600e-003**	**9.0000e-005**	**3.1500e-003**	**0.0000**	**10.6743**	**10.6743**	**3.3000e-004**	**0.0000**	**10.6826**

3.6 Paving Haul Roads - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.4800e-003	0.0879	0.0916	1.4000e-004		4.7000e-003	4.7000e-003		4.3300e-003	4.3300e-003	0.0000	12.5176	12.5176	4.0500e-003	0.0000	12.6189
Paving	8.5200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0170**	**0.0879**	**0.0916**	**1.4000e-004**		**4.7000e-003**	**4.7000e-003**		**4.3300e-003**	**4.3300e-003**	**0.0000**	**12.5176**	**12.5176**	**4.0500e-003**	**0.0000**	**12.6189**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	3.7000e-004	4.0400e-003	1.0000e-005	1.1100e-003	1.0000e-005	1.1200e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	1.0264	1.0264	3.0000e-005	0.0000	1.0272
Total	**4.4000e-004**	**3.7000e-004**	**4.0400e-003**	**1.0000e-005**	**1.1100e-003**	**1.0000e-005**	**1.1200e-003**	**2.9000e-004**	**1.0000e-005**	**3.0000e-004**	**0.0000**	**1.0264**	**1.0264**	**3.0000e-005**	**0.0000**	**1.0272**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.7500e-003	7.6000e-003	0.1081	1.4000e-004		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004	0.0000	12.5176	12.5176	4.0500e-003	0.0000	12.6188

Paving	8.5200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0103**	**7.6000e-003**	**0.1081**	**1.4000e-004**		**2.3000e-004**	**2.3000e-004**		**2.3000e-004**	**2.3000e-004**	**0.0000**	**12.5176**	**12.5176**	**4.0500e-003**	**0.0000**	**12.6188**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	3.7000e-004	4.0400e-003	1.0000e-005	1.1100e-003	1.0000e-005	1.1200e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	1.0264	1.0264	3.0000e-005	0.0000	1.0272
Total	**4.4000e-004**	**3.7000e-004**	**4.0400e-003**	**1.0000e-005**	**1.1100e-003**	**1.0000e-005**	**1.1200e-003**	**2.9000e-004**	**1.0000e-005**	**3.0000e-004**	**0.0000**	**1.0264**	**1.0264**	**3.0000e-005**	**0.0000**	**1.0272**

3.7 Culvert Crossing Repair - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.3000e-004	4.6000e-003	3.8600e-003	1.0000e-005		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004	0.0000	0.5729	0.5729	6.0000e-005	0.0000	0.5743
Paving	8.5200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.2500e-003**	**4.6000e-003**	**3.8600e-003**	**1.0000e-005**		**1.8000e-004**	**1.8000e-004**		**1.8000e-004**	**1.8000e-004**	**0.0000**	**0.5729**	**0.5729**	**6.0000e-005**	**0.0000**	**0.5743**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1700e-003	9.8000e-004	0.0108	3.0000e-005	2.9500e-003	2.0000e-005	2.9800e-003	7.8000e-004	2.0000e-005	8.1000e-004	0.0000	2.7370	2.7370	9.0000e-005	0.0000	2.7391
Total	**1.1700e-003**	**9.8000e-004**	**0.0108**	**3.0000e-005**	**2.9500e-003**	**2.0000e-005**	**2.9800e-003**	**7.8000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.7370**	**2.7370**	**9.0000e-005**	**0.0000**	**2.7391**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	1.0000e-005		0.0000	0.0000		0.0000	0.0000	0.0000	0.5728	0.5728	6.0000e-005	0.0000	0.5743
Paving	8.5200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**8.5200e-003**	**0.0000**	**0.0000**	**1.0000e-005**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.5728**	**0.5728**	**6.0000e-005**	**0.0000**	**0.5743**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1700e-003	9.8000e-004	0.0108	3.0000e-005	2.9500e-003	2.0000e-005	2.9800e-003	7.8000e-004	2.0000e-005	8.1000e-004	0.0000	2.7370	2.7370	9.0000e-005	0.0000	2.7391
Total	**1.1700e-003**	**9.8000e-004**	**0.0108**	**3.0000e-005**	**2.9500e-003**	**2.0000e-005**	**2.9800e-003**	**7.8000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.7370**	**2.7370**	**9.0000e-005**	**0.0000**	**2.7391**

3.8 BTR Grading and Hauling - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5778	0.0000	1.5778	0.8673	0.0000	0.8673	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.4019	4.1527	2.5359	4.4000e-003		0.2109	0.2109		0.1940	0.1940	0.0000	387.0015	387.0015	0.1252	0.0000	390.1306
Total	**0.4019**	**4.1527**	**2.5359**	**4.4000e-003**	**1.5778**	**0.2109**	**1.7887**	**0.8673**	**0.1940**	**1.0613**	**0.0000**	**387.0015**	**387.0015**	**0.1252**	**0.0000**	**390.1306**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-003	0.0854	0.0232	2.3000e-004	5.9700e-003	4.7000e-004	6.4400e-003	1.7200e-003	4.5000e-004	2.1700e-003	0.0000	22.0335	22.0335	1.2400e-003	0.0000	22.0646

Worker	0.0369	0.0308	0.3386	9.5000e-004	0.0928	7.8000e-004	0.0936	0.0246	7.2000e-004	0.0254	0.0000	86.0512	86.0512	2.6800e-003	0.0000	86.1181
Total	**0.0399**	**0.1163**	**0.3617**	**1.1800e-003**	**0.0988**	**1.2500e-003**	**0.1000**	**0.0264**	**1.1700e-003**	**0.0275**	**0.0000**	**108.0847**	**108.0847**	**3.9200e-003**	**0.0000**	**108.1828**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6153	0.0000	0.6153	0.3382	0.0000	0.3382	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0540	0.2340	2.6445	4.4000e-003		7.2000e-003	7.2000e-003		7.2000e-003	7.2000e-003	0.0000	387.0010	387.0010	0.1252	0.0000	390.1301
Total	**0.0540**	**0.2340**	**2.6445**	**4.4000e-003**	**0.6153**	**7.2000e-003**	**0.6225**	**0.3382**	**7.2000e-003**	**0.3454**	**0.0000**	**387.0010**	**387.0010**	**0.1252**	**0.0000**	**390.1301**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-003	0.0854	0.0232	2.3000e-004	5.9700e-003	4.7000e-004	6.4400e-003	1.7200e-003	4.5000e-004	2.1700e-003	0.0000	22.0335	22.0335	1.2400e-003	0.0000	22.0646
Worker	0.0369	0.0308	0.3386	9.5000e-004	0.0928	7.8000e-004	0.0936	0.0246	7.2000e-004	0.0254	0.0000	86.0512	86.0512	2.6800e-003	0.0000	86.1181
Total	**0.0399**	**0.1163**	**0.3617**	**1.1800e-003**	**0.0988**	**1.2500e-003**	**0.1000**	**0.0264**	**1.1700e-003**	**0.0275**	**0.0000**	**108.0847**	**108.0847**	**3.9200e-003**	**0.0000**	**108.1828**

3.9 SPS Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5778	0.0000	1.5778	0.8673	0.0000	0.8673	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3377	3.5206	1.6798	3.0500e-003		0.1803	0.1803		0.1659	0.1659	0.0000	268.1321	268.1321	0.0867	0.0000	270.3001
Total	**0.3377**	**3.5206**	**1.6798**	**3.0500e-003**	**1.5778**	**0.1803**	**1.7581**	**0.8673**	**0.1659**	**1.0331**	**0.0000**	**268.1321**	**268.1321**	**0.0867**	**0.0000**	**270.3001**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0192	0.0161	0.1763	5.0000e-004	0.0483	4.0000e-004	0.0487	0.0128	3.7000e-004	0.0132	0.0000	44.8183	44.8183	1.3900e-003	0.0000	44.8532
Total	**0.0192**	**0.0161**	**0.1763**	**5.0000e-004**	**0.0483**	**4.0000e-004**	**0.0487**	**0.0128**	**3.7000e-004**	**0.0132**	**0.0000**	**44.8183**	**44.8183**	**1.3900e-003**	**0.0000**	**44.8532**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Fugitive Dust					0.6153	0.0000	0.6153	0.3382	0.0000	0.3382	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0373	0.1618	1.6180	3.0500e-003		4.9800e-003	4.9800e-003		4.9800e-003	4.9800e-003	0.0000	268.1318	268.1318	0.0867	0.0000	270.2998
Total	**0.0373**	**0.1618**	**1.6180**	**3.0500e-003**	**0.6153**	**4.9800e-003**	**0.6203**	**0.3382**	**4.9800e-003**	**0.3432**	**0.0000**	**268.1318**	**268.1318**	**0.0867**	**0.0000**	**270.2998**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0192	0.0161	0.1763	5.0000e-004	0.0483	4.0000e-004	0.0487	0.0128	3.7000e-004	0.0132	0.0000	44.8183	44.8183	1.3900e-003	0.0000	44.8532
Total	**0.0192**	**0.0161**	**0.1763**	**5.0000e-004**	**0.0483**	**4.0000e-004**	**0.0487**	**0.0128**	**3.7000e-004**	**0.0132**	**0.0000**	**44.8183**	**44.8183**	**1.3900e-003**	**0.0000**	**44.8532**

3.10 SPS Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1995	2.0815	0.9680	1.7800e-003		0.1061	0.1061		0.0976	0.0976	0.0000	156.3092	156.3092	0.0506	0.0000	157.5730
Total	**0.1995**	**2.0815**	**0.9680**	**1.7800e-003**		**0.1061**	**0.1061**		**0.0976**	**0.0976**	**0.0000**	**156.3092**	**156.3092**	**0.0506**	**0.0000**	**157.5730**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5500e-003	0.0456	0.0124	1.1000e-004	2.8500e-003	2.3000e-004	3.0700e-003	8.2000e-004	2.2000e-004	1.0400e-003	0.0000	10.9337	10.9337	6.6000e-004	0.0000	10.9503
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5500e-003**	**0.0456**	**0.0124**	**1.1000e-004**	**2.8500e-003**	**2.3000e-004**	**3.0700e-003**	**8.2000e-004**	**2.2000e-004**	**1.0400e-003**	**0.0000**	**10.9337**	**10.9337**	**6.6000e-004**	**0.0000**	**10.9503**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0218	0.0943	0.9295	1.7800e-003		2.9000e-003	2.9000e-003		2.9000e-003	2.9000e-003	0.0000	156.3090	156.3090	0.0506	0.0000	157.5728
Total	**0.0218**	**0.0943**	**0.9295**	**1.7800e-003**		**2.9000e-003**	**2.9000e-003**		**2.9000e-003**	**2.9000e-003**	**0.0000**	**156.3090**	**156.3090**	**0.0506**	**0.0000**	**157.5728**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5500e-003	0.0456	0.0124	1.1000e-004	2.8500e-003	2.3000e-004	3.0700e-003	8.2000e-004	2.2000e-004	1.0400e-003	0.0000	10.9337	10.9337	6.6000e-004	0.0000	10.9503
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5500e-003**	**0.0456**	**0.0124**	**1.1000e-004**	**2.8500e-003**	**2.3000e-004**	**3.0700e-003**	**8.2000e-004**	**2.2000e-004**	**1.0400e-003**	**0.0000**	**10.9337**	**10.9337**	**6.6000e-004**	**0.0000**	**10.9503**

3.11 Seasonal Stockpile/Crushing - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0357	0.2987	0.3281	5.1000e-004		0.0183	0.0183		0.0177	0.0177	0.0000	44.5579	44.5579	6.5700e-003	0.0000	44.7222
Total	**0.0357**	**0.2987**	**0.3281**	**5.1000e-004**		**0.0183**	**0.0183**		**0.0177**	**0.0177**	**0.0000**	**44.5579**	**44.5579**	**6.5700e-003**	**0.0000**	**44.7222**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4400e-003	2.0400e-003	0.0224	6.0000e-005	6.1400e-003	5.0000e-005	6.1900e-003	1.6300e-003	5.0000e-005	1.6800e-003	0.0000	5.6930	5.6930	1.8000e-004	0.0000	5.6974
Total	**2.4400e-003**	**2.0400e-003**	**0.0224**	**6.0000e-005**	**6.1400e-003**	**5.0000e-005**	**6.1900e-003**	**1.6300e-003**	**5.0000e-005**	**1.6800e-003**	**0.0000**	**5.6930**	**5.6930**	**1.8000e-004**	**0.0000**	**5.6974**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.5100e-003	0.0239	0.3397	5.1000e-004		7.3000e-004	7.3000e-004		7.3000e-004	7.3000e-004	0.0000	44.5578	44.5578	6.5700e-003	0.0000	44.7222
Total	**5.5100e-003**	**0.0239**	**0.3397**	**5.1000e-004**		**7.3000e-004**	**7.3000e-004**		**7.3000e-004**	**7.3000e-004**	**0.0000**	**44.5578**	**44.5578**	**6.5700e-003**	**0.0000**	**44.7222**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4400e-003	2.0400e-003	0.0224	6.0000e-005	6.1400e-003	5.0000e-005	6.1900e-003	1.6300e-003	5.0000e-005	1.6800e-003	0.0000	5.6930	5.6930	1.8000e-004	0.0000	5.6974

Total	**2.4400e-003**	**2.0400e-003**	**0.0224**	**6.0000e-005**	**6.1400e-003**	**5.0000e-005**	**6.1900e-003**	**1.6300e-003**	**5.0000e-005**	**1.6800e-003**	**0.0000**	**5.6930**	**5.6930**	**1.8000e-004**	**0.0000**	**5.6974**

3.12 SPS Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0176	0.1829	0.1905	3.0000e-004		9.7900e-003	9.7900e-003		9.0000e-003	9.0000e-003	0.0000	26.0367	26.0367	8.4200e-003	0.0000	26.2472
Paving	8.5200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0262**	**0.1829**	**0.1905**	**3.0000e-004**		**9.7900e-003**	**9.7900e-003**		**9.0000e-003**	**9.0000e-003**	**0.0000**	**26.0367**	**26.0367**	**8.4200e-003**	**0.0000**	**26.2472**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5300e-003	1.2800e-003	0.0140	4.0000e-005	3.8400e-003	3.0000e-005	3.8700e-003	1.0200e-003	3.0000e-005	1.0500e-003	0.0000	3.5581	3.5581	1.1000e-004	0.0000	3.5609
Total	**1.5300e-003**	**1.2800e-003**	**0.0140**	**4.0000e-005**	**3.8400e-003**	**3.0000e-005**	**3.8700e-003**	**1.0200e-003**	**3.0000e-005**	**1.0500e-003**	**0.0000**	**3.5581**	**3.5581**	**1.1000e-004**	**0.0000**	**3.5609**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.6500e-003	0.0158	0.2248	3.0000e-004		4.9000e-004	4.9000e-004		4.9000e-004	4.9000e-004	0.0000	26.0367	26.0367	8.4200e-003	0.0000	26.2472
Paving	8.5200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0122**	**0.0158**	**0.2248**	**3.0000e-004**		**4.9000e-004**	**4.9000e-004**		**4.9000e-004**	**4.9000e-004**	**0.0000**	**26.0367**	**26.0367**	**8.4200e-003**	**0.0000**	**26.2472**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5300e-003	1.2800e-003	0.0140	4.0000e-005	3.8400e-003	3.0000e-005	3.8700e-003	1.0200e-003	3.0000e-005	1.0500e-003	0.0000	3.5581	3.5581	1.1000e-004	0.0000	3.5609
Total	**1.5300e-003**	**1.2800e-003**	**0.0140**	**4.0000e-005**	**3.8400e-003**	**3.0000e-005**	**3.8700e-003**	**1.0200e-003**	**3.0000e-005**	**1.0500e-003**	**0.0000**	**3.5581**	**3.5581**	**1.1000e-004**	**0.0000**	**3.5609**

3.13 Slope Protection Activity - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7200e-003	0.0274	0.0296	4.0000e-005		1.7300e-003	1.7300e-003		1.5900e-003	1.5900e-003	0.0000	3.5471	3.5471	1.1500e-003	0.0000	3.5758
Total	**2.7200e-003**	**0.0274**	**0.0296**	**4.0000e-005**	**0.0000**	**1.7300e-003**	**1.7300e-003**	**0.0000**	**1.5900e-003**	**1.5900e-003**	**0.0000**	**3.5471**	**3.5471**	**1.1500e-003**	**0.0000**	**3.5758**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.9000e-004	2.1400e-003	0.0305	4.0000e-005		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005	0.0000	3.5471	3.5471	1.1500e-003	0.0000	3.5758
Total	**4.9000e-004**	**2.1400e-003**	**0.0305**	**4.0000e-005**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**3.5471**	**3.5471**	**1.1500e-003**	**0.0000**	**3.5758**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.14 Hydroblasting for Cement Slurry - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.1900e-003	0.0452	0.0482	9.0000e-005		2.5500e-003	2.5500e-003		2.5500e-003	2.5500e-003	0.0000	7.3477	7.3477	4.1000e-004	0.0000	7.3580
Total	**5.1900e-003**	**0.0452**	**0.0482**	**9.0000e-005**		**2.5500e-003**	**2.5500e-003**		**2.5500e-003**	**2.5500e-003**	**0.0000**	**7.3477**	**7.3477**	**4.1000e-004**	**0.0000**	**7.3580**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6000e-004	3.8000e-004	4.2000e-003	1.0000e-005	1.1500e-003	1.0000e-005	1.1600e-003	3.1000e-004	1.0000e-005	3.1000e-004	0.0000	1.0674	1.0674	3.0000e-005	0.0000	1.0683
Total	**4.6000e-004**	**3.8000e-004**	**4.2000e-003**	**1.0000e-005**	**1.1500e-003**	**1.0000e-005**	**1.1600e-003**	**3.1000e-004**	**1.0000e-005**	**3.1000e-004**	**0.0000**	**1.0674**	**1.0674**	**3.0000e-005**	**0.0000**	**1.0683**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.6000e-004	3.7100e-003	0.0527	9.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	7.3477	7.3477	4.1000e-004	0.0000	7.3580
Total	**8.6000e-004**	**3.7100e-003**	**0.0527**	**9.0000e-005**		**1.1000e-004**	**1.1000e-004**		**1.1000e-004**	**1.1000e-004**	**0.0000**	**7.3477**	**7.3477**	**4.1000e-004**	**0.0000**	**7.3580**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6000e-004	3.8000e-004	4.2000e-003	1.0000e-005	1.1500e-003	1.0000e-005	1.1600e-003	3.1000e-004	1.0000e-005	3.1000e-004	0.0000	1.0674	1.0674	3.0000e-005	0.0000	1.0683
Total	**4.6000e-004**	**3.8000e-004**	**4.2000e-003**	**1.0000e-005**	**1.1500e-003**	**1.0000e-005**	**1.1600e-003**	**3.1000e-004**	**1.0000e-005**	**3.1000e-004**	**0.0000**	**1.0674**	**1.0674**	**3.0000e-005**	**0.0000**	**1.0683**

3.15 Sluicegate Repair - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-...	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0
User Defined Industrial	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH

Other Asphalt Surfaces	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907
User Defined Industrial	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0183	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.9000e-004	1.9000e-004	0.0000	0.0000	2.0000e-004
Unmitigated	0.0183	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.9000e-004	1.9000e-004	0.0000	0.0000	2.0000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					

Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0183					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.9000e-004	1.9000e-004	0.0000	0.0000	2.0000e-004
Total	**0.0183**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**0.0000**	**2.0000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0183					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.9000e-004	1.9000e-004	0.0000	0.0000	2.0000e-004
Total	**0.0183**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**0.0000**	**2.0000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000

Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e

Land Use	tons	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Big Tujunga Sediment Removal IS-MND Offroad Trucks

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	90.00	0.00	0
Other Asphalt Surfaces	6.50	Acre	6.50	283,140.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	541	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Adjusted CO2 IF reflect RPS for SCE.

Land Use - Lot acreage: Big Tujunga Reservoir Area: 68 acres
Maple SRS: 22 acres

Construction Phase - Schedule based on Data Needs

Off-road Equipment - 4 Excavators, 4 Rubber Tired Dozers, 4 Tractors

Off-road Equipment - 4 Excavators, 4 Rubber Tired Dozers, 4 tractors, 7 off-highway trucks to account for 56 workhours (based on VMT and mph for offroad trucks/truck capacity) at 511 HP

Off-road Equipment - 1 Tractor

Off-road Equipment - 1 Cement and Mortar Mixer

Off-road Equipment - Pumps (4) are electrical and powered by a generator.

Off-road Equipment - 1 Generator Set

Off-road Equipment - 1 Paver, 1 Paving Equipment, 1 Roller

Off-road Equipment - 1 Generator set, 1 crushing/proc., 2 tractors

Off-road Equipment - 1 tractor

Off-road Equipment - All hand tools

Off-road Equipment - 4 Rubber Tired Dozers, 4 tractors

Off-road Equipment - 4 Rubber tired dozers, 4 tractors

Off-road Equipment - 1 paver, 1 paving equipm, 1 roller

Off-road Equipment - 1 Excavator, 1 Rubber Tired Dozer, 4 Tractor/Loaders

Trips and VMT - Worker trips from County engineers. Water truck trips accounted for in vendor trips. 2 water tenders trucking water from offsite

Grading -

Road Dust -

Area Coating - No Painting

Energy Use -

Construction Off-road Equipment Mitigation - Tier 4 Final and electrical pumps

Operational Off-Road Equipment -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	16988	0
tblConstEquipMitigation	FuelType	Diesel	Electrical
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	17.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	24.00

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblConstructionPhase	NumDays	155.00	25.00
tblConstructionPhase	NumDays	155.00	131.00
tblConstructionPhase	NumDays	155.00	131.00
tblConstructionPhase	NumDays	110.00	52.00
tblConstructionPhase	NumDays	110.00	25.00
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tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00

tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblLandUse	LotAcreage	0.00	90.00
tblOffRoadEquipment	HorsePower	402.00	511.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00

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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	541
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	46.00	10.00
tblTripsAndVMT	WorkerTripNumber	15.00	30.00
tblTripsAndVMT	WorkerTripNumber	10.00	16.00
tblTripsAndVMT	WorkerTripNumber	8.00	10.00
tblTripsAndVMT	WorkerTripNumber	3.00	0.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00

tblTripsAndVMT	WorkerTripNumber	3.00	20.00
tblTripsAndVMT	WorkerTripNumber	30.00	40.00
tblTripsAndVMT	WorkerTripNumber	10.00	30.00
tblTripsAndVMT	WorkerTripNumber	8.00	6.00
tblTripsAndVMT	WorkerTripNumber	3.00	16.00
tblTripsAndVMT	WorkerTripNumber	48.00	96.00
tblTripsAndVMT	WorkerTripNumber	20.00	50.00
tblTripsAndVMT	WorkerTripNumber	119.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	28.0704	270.6748	173.4419	0.3500	51.0413	12.9712	64.0125	27.2456	11.9847	39.2304	0.0000	34,011.4152	34,011.4152	9.5354	0.0000	34,249.8001
Maximum	**28.0704**	**270.6748**	**173.4419**	**0.3500**	**51.0413**	**12.9712**	**64.0125**	**27.2456**	**11.9847**	**39.2304**	**0.0000**	**34,011.4152**	**34,011.4152**	**9.5354**	**0.0000**	**34,249.8001**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					

2020	5.4223	20.0488	179.5198	0.3500	21.6535	0.5484	22.2019	11.0917	0.5460	11.6377	0.0000	34,011.4152	34,011.4152	9.5354	0.0000	34,249.8000
Maximum	**5.4223**	**20.0488**	**179.5198**	**0.3500**	**21.6535**	**0.5484**	**22.2019**	**11.0917**	**0.5460**	**11.6377**	**0.0000**	**34,011.4152**	**34,011.4152**	**9.5354**	**0.0000**	**34,249.8000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**80.68**	**92.59**	**-3.50**	**0.00**	**57.58**	**95.77**	**65.32**	**59.29**	**95.44**	**70.33**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**	**0.0000**	**1.7500e-003**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003

Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**	**0.0000**	**1.7500e-003**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	SPS Site Preparation	Site Preparation	1/1/2020	1/31/2020	6	27	
2	BTR Site Preparation	Site Preparation	4/1/2020	4/13/2020	6	11	
3	BTR Access Road Grading	Grading	4/16/2020	5/14/2020	6	25	
4	Dewatering Activities	Trenching	4/16/2020	6/15/2020	6	52	
5	Paving Haul Roads	Paving	4/16/2020	5/14/2020	6	25	
6	Culvert Crossing Repair	Paving	4/16/2020	5/14/2020	6	25	
7	BTR Grading and Hauling	Grading	5/15/2020	10/14/2020	6	131	
8	SPS Grading	Grading	5/15/2020	10/14/2020	6	131	
9	SPS Construction	Building Construction	7/15/2020	10/14/2020	6	79	
10	Seasonal Stockpile/Crushing	Trenching	8/15/2020	10/14/2020	6	52	
11	SPS Paving	Paving	8/15/2020	10/14/2020	6	52	
12	Slope Protection Activity	Grading	9/15/2020	10/14/2020	6	26	
13	Hydroblasting for Cement Slurry	Trenching	9/15/2020	10/14/2020	6	26	
14	Sluicegate Repair	Trenching	9/15/2020	10/14/2020	6	26	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 6.5

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
SPS Site Preparation	Concrete/Industrial Saws	0	8.00	81	0.73
SPS Site Preparation	Excavators	1	8.00	158	0.38
SPS Site Preparation	Off-Highway Trucks	0		402	0.38
SPS Site Preparation	Rubber Tired Dozers	1	8.00	247	0.40
SPS Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
BTR Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
BTR Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
BTR Access Road Grading	Air Compressors	0	6.00	78	0.48
BTR Access Road Grading	Excavators	4	8.00	158	0.38
BTR Access Road Grading	Graders	0	8.00	187	0.41
BTR Access Road Grading	Rubber Tired Dozers	4	8.00	247	0.40
BTR Access Road Grading	Scrapers	0	8.00	367	0.48
BTR Access Road Grading	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Dewatering Activities	Cranes	0	7.00	231	0.29
Dewatering Activities	Forklifts	0	8.00	89	0.20
Dewatering Activities	Generator Sets	0	8.00	84	0.74
Dewatering Activities	Pumps	4	24.00	84	0.74
Dewatering Activities	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Dewatering Activities	Welders	0	8.00	46	0.45
Paving Haul Roads	Excavators	0	8.00	158	0.38
Paving Haul Roads	Graders	0	8.00	187	0.41
Paving Haul Roads	Pavers	1	8.00	130	0.42
Paving Haul Roads	Paving Equipment	1	8.00	132	0.36
Paving Haul Roads	Rollers	1	8.00	80	0.38
Paving Haul Roads	Rubber Tired Dozers	0	8.00	247	0.40

Paving Haul Roads	Scrapers	0	8.00	367	0.48
Paving Haul Roads	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Culvert Crossing Repair	Cement and Mortar Mixers	1	8.00	9	0.56
Culvert Crossing Repair	Pavers	0	8.00	130	0.42
Culvert Crossing Repair	Paving Equipment	0	8.00	132	0.36
Culvert Crossing Repair	Rollers	0	8.00	80	0.38
BTR Grading and Hauling	Excavators	4	8.00	158	0.38
BTR Grading and Hauling	Graders	0	8.00	187	0.41
BTR Grading and Hauling	Off-Highway Trucks	7	8.00	511	0.38
BTR Grading and Hauling	Rubber Tired Dozers	4	8.00	247	0.40
BTR Grading and Hauling	Scrapers	0	8.00	367	0.48
BTR Grading and Hauling	Tractors/Loaders/Backhoes	4	8.00	97	0.37
SPS Grading	Excavators	0	8.00	158	0.38
SPS Grading	Graders	0	8.00	187	0.41
SPS Grading	Rubber Tired Dozers	4	8.00	247	0.40
SPS Grading	Scrapers	0	8.00	367	0.48
SPS Grading	Tractors/Loaders/Backhoes	4	8.00	97	0.37
SPS Construction	Cranes	0	7.00	231	0.29
SPS Construction	Forklifts	0	8.00	89	0.20
SPS Construction	Generator Sets	0	8.00	84	0.74
SPS Construction	Rubber Tired Dozers	4	8.00	247	0.40
SPS Construction	Tractors/Loaders/Backhoes	4	7.00	97	0.37
SPS Construction	Welders	0	8.00	46	0.45
Seasonal Stockpile/Crushing	Crushing/Proc. Equipment	1	8.00	85	0.78
Seasonal Stockpile/Crushing	Generator Sets	1	8.00	84	0.74
Seasonal Stockpile/Crushing	Tractors/Loaders/Backhoes	2	8.00	97	0.37
SPS Paving	Pavers	1	8.00	130	0.42
SPS Paving	Paving Equipment	1	8.00	132	0.36
SPS Paving	Rollers	1	8.00	80	0.38
Slope Protection Activity	Excavators	0	8.00	158	0.38

Slope Protection Activity	Graders	0	8.00	187	0.41
Slope Protection Activity	Rubber Tired Dozers	0	8.00	247	0.40
Slope Protection Activity	Scrapers	0	8.00	367	0.48
Slope Protection Activity	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Hydroblasting for Cement Slurry	Generator Sets	1	8.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
SPS Site Preparation	6	30.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
BTR Site Preparation	1	20.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
BTR Access Road Grading	12	40.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
Dewatering Activities	4	30.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving Haul Roads	3	6.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Culvert Crossing Repair	1	16.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
BTR Grading and Hauling	19	96.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
SPS Grading	8	50.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
SPS Construction	8	0.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
Seasonal Stockpile/Crushing	4	16.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
SPS Paving	3	10.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Slope Protection Activity	1	0.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Hydroblasting for Cement Slurry	1	6.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Sluicegate Repair			0.00	0.00	19.80	7.90				

3.1 Mitigation Measures Construction

Use Alternative Fuel for Construction Equipment

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 SPS Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	2.1625	22.1655	16.5182	0.0261		1.2043	1.2043		1.1080	1.1080		2,530.5350	2,530.5350	0.8184		2,550.9956
Total	**2.1625**	**22.1655**	**16.5182**	**0.0261**	**6.0221**	**1.2043**	**7.2264**	**3.3102**	**1.1080**	**4.4182**		**2,530.5350**	**2,530.5350**	**0.8184**		**2,550.9956**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.1957	0.1432	1.5709	4.4700e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		445.1209	445.1209	0.0138		445.4670
Total	**0.2425**	**1.4232**	**1.9388**	**7.9000e-003**	**0.5442**	**0.0109**	**0.5551**	**0.1464**	**0.0103**	**0.1567**		**811.5330**	**811.5330**	**0.0354**		**812.4179**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	0.3200	1.3867	17.1199	0.0261		0.0427	0.0427		0.0427	0.0427	0.0000	2,530.5350	2,530.5350	0.8184		2,550.9956
Total	**0.3200**	**1.3867**	**17.1199**	**0.0261**	**2.3486**	**0.0427**	**2.3913**	**1.2910**	**0.0427**	**1.3337**	**0.0000**	**2,530.5350**	**2,530.5350**	**0.8184**		**2,550.9956**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.1957	0.1432	1.5709	4.4700e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		445.1209	445.1209	0.0138		445.4670
Total	**0.2425**	**1.4232**	**1.9388**	**7.9000e-003**	**0.5442**	**0.0109**	**0.5551**	**0.1464**	**0.0103**	**0.1567**		**811.5330**	**811.5330**	**0.0354**		**812.4179**

3.3 BTR Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.2095	2.1052	2.2797	3.1100e-003		0.1331	0.1331		0.1225	0.1225		300.7685	300.7685	0.0973		303.2004

Total	**0.2095**	**2.1052**	**2.2797**	**3.1100e-003**	**0.0000**	**0.1331**	**0.1331**	**0.0000**	**0.1225**	**0.1225**		**300.7685**	**300.7685**	**0.0973**		**303.2004**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.1305	0.0955	1.0473	2.9800e-003	0.3010	2.4700e-003	0.3035	0.0798	2.2800e-003	0.0821		296.7473	296.7473	9.2300e-003		296.9780
Total	**0.1773**	**1.3755**	**1.4152**	**6.4100e-003**	**0.3937**	**9.6800e-003**	**0.4034**	**0.1065**	**9.1700e-003**	**0.1157**		**663.1594**	**663.1594**	**0.0308**		**663.9289**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0380	0.1646	2.3421	3.1100e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	300.7685	300.7685	0.0973		303.2004
Total	**0.0380**	**0.1646**	**2.3421**	**3.1100e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**300.7685**	**300.7685**	**0.0973**		**303.2004**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.1305	0.0955	1.0473	2.9800e-003	0.3010	2.4700e-003	0.3035	0.0798	2.2800e-003	0.0821		296.7473	296.7473	9.2300e-003		296.9780
Total	**0.1773**	**1.3755**	**1.4152**	**6.4100e-003**	**0.3937**	**9.6800e-003**	**0.4034**	**0.1065**	**9.1700e-003**	**0.1157**		**663.1594**	**663.1594**	**0.0308**		**663.9289**

3.4 BTR Access Road Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					24.0883	0.0000	24.0883	13.2409	0.0000	13.2409			0.0000			0.0000
Off-Road	6.1359	63.4001	38.7165	0.0672		3.2199	3.2199		2.9623	2.9623		6,512.9178	6,512.9178	2.1064		6,565.5780
Total	**6.1359**	**63.4001**	**38.7165**	**0.0672**	**24.0883**	**3.2199**	**27.3082**	**13.2409**	**2.9623**	**16.2032**		**6,512.9178**	**6,512.9178**	**2.1064**		**6,565.5780**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.2610	0.1909	2.0946	5.9600e-003	0.6021	4.9400e-003	0.6070	0.1597	4.5500e-003	0.1642		593.4946	593.4946	0.0185		593.9560
Total	**0.3078**	**1.4709**	**2.4625**	**9.3900e-003**	**0.6948**	**0.0122**	**0.7069**	**0.1863**	**0.0114**	**0.1978**		**959.9067**	**959.9067**	**0.0400**		**960.9069**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3945	0.0000	9.3945	5.1640	0.0000	5.1640			0.0000			0.0000
Off-Road	0.8243	3.5718	40.3747	0.0672		0.1099	0.1099		0.1099	0.1099	0.0000	6,512.9178	6,512.9178	2.1064		6,565.5780
Total	**0.8243**	**3.5718**	**40.3747**	**0.0672**	**9.3945**	**0.1099**	**9.5044**	**5.1640**	**0.1099**	**5.2739**	**0.0000**	**6,512.9178**	**6,512.9178**	**2.1064**		**6,565.5780**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.2610	0.1909	2.0946	5.9600e-003	0.6021	4.9400e-003	0.6070	0.1597	4.5500e-003	0.1642		593.4946	593.4946	0.0185		593.9560

Total	**0.3078**	**1.4709**	**2.4625**	**9.3900e-003**	**0.6948**	**0.0122**	**0.7069**	**0.1863**	**0.0114**	**0.1978**		**959.9067**	**959.9067**	**0.0400**		**960.9069**

3.5 Dewatering Activities - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.0781	42.3485	45.1506	0.0789		2.4864	2.4864		2.4864	2.4864		7,476.4148	7,476.4148	0.4473		7,487.5972
Total	**5.0781**	**42.3485**	**45.1506**	**0.0789**		**2.4864**	**2.4864**		**2.4864**	**2.4864**		**7,476.4148**	**7,476.4148**	**0.4473**		**7,487.5972**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1957	0.1432	1.5709	4.4700e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		445.1209	445.1209	0.0138		445.4670
Total	**0.1957**	**0.1432**	**1.5709**	**4.4700e-003**	**0.4516**	**3.7100e-003**	**0.4553**	**0.1197**	**3.4200e-003**	**0.1232**		**445.1209**	**445.1209**	**0.0138**		**445.4670**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0789		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0789**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1957	0.1432	1.5709	4.4700e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		445.1209	445.1209	0.0138		445.4670
Total	**0.1957**	**0.1432**	**1.5709**	**4.4700e-003**	**0.4516**	**3.7100e-003**	**0.4553**	**0.1197**	**3.4200e-003**	**0.1232**		**445.1209**	**445.1209**	**0.0138**		**445.4670**

3.6 Paving Haul Roads - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	0.6783	7.0328	7.3260	0.0114		0.3764	0.3764		0.3463	0.3463		1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3595**	**7.0328**	**7.3260**	**0.0114**		**0.3764**	**0.3764**		**0.3463**	**0.3463**		**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0392	0.0286	0.3142	8.9000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		89.0242	89.0242	2.7700e-003		89.0934
Total	**0.0392**	**0.0286**	**0.3142**	**8.9000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**89.0242**	**89.0242**	**2.7700e-003**		**89.0934**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1402	0.6077	8.6478	0.0114		0.0187	0.0187		0.0187	0.0187	0.0000	1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8214**	**0.6077**	**8.6478**	**0.0114**		**0.0187**	**0.0187**		**0.0187**	**0.0187**	**0.0000**	**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0392	0.0286	0.3142	8.9000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		89.0242	89.0242	2.7700e-003		89.0934
Total	**0.0392**	**0.0286**	**0.3142**	**8.9000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**89.0242**	**89.0242**	**2.7700e-003**		**89.0934**

3.7 Culvert Crossing Repair - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0588	0.3682	0.3085	7.1000e-004		0.0143	0.0143		0.0143	0.0143		50.5163	50.5163	5.2400e-003		50.6474
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7400**	**0.3682**	**0.3085**	**7.1000e-004**		**0.0143**	**0.0143**		**0.0143**	**0.0143**		**50.5163**	**50.5163**	**5.2400e-003**		**50.6474**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1044	0.0764	0.8378	2.3800e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		237.3978	237.3978	7.3800e-003		237.5824
Total	**0.1044**	**0.0764**	**0.8378**	**2.3800e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**237.3978**	**237.3978**	**7.3800e-003**		**237.5824**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	7.1000e-004		0.0000	0.0000		0.0000	0.0000	0.0000	50.5163	50.5163	5.2400e-003		50.6474
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6812**	**0.0000**	**0.0000**	**7.1000e-004**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**50.5163**	**50.5163**	**5.2400e-003**		**50.6474**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1044	0.0764	0.8378	2.3800e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		237.3978	237.3978	7.3800e-003		237.5824
Total	**0.1044**	**0.0764**	**0.8378**	**2.3800e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**237.3978**	**237.3978**	**7.3800e-003**		**237.5824**

3.8 BTR Grading and Hauling - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					24.0883	0.0000	24.0883	13.2409	0.0000	13.2409			0.0000			0.0000
Off-Road	13.6228	136.7141	87.3062	0.1842		6.0875	6.0875		5.6005	5.6005		17,846.2649	17,846.2649	5.7718		17,990.5609
Total	**13.6228**	**136.7141**	**87.3062**	**0.1842**	**24.0883**	**6.0875**	**30.1758**	**13.2409**	**5.6005**	**18.8414**		**17,846.2649**	**17,846.2649**	**5.7718**		**17,990.5609**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.6264	0.4582	5.0269	0.0143	1.4450	0.0119	1.4569	0.3832	0.0109	0.3941		1,424.3869	1,424.3869	0.0443		1,425.4944
Total	**0.6732**	**1.7382**	**5.3949**	**0.0177**	**1.5377**	**0.0191**	**1.5567**	**0.4099**	**0.0178**	**0.4277**		**1,790.7990**	**1,790.7990**	**0.0659**		**1,792.4453**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3945	0.0000	9.3945	5.1640	0.0000	5.1640			0.0000			0.0000
Off-Road	2.2627	9.8049	93.1158	0.1842		0.3017	0.3017		0.3017	0.3017	0.0000	17,846.2648	17,846.2648	5.7718		17,990.5609
Total	**2.2627**	**9.8049**	**93.1158**	**0.1842**	**9.3945**	**0.3017**	**9.6961**	**5.1640**	**0.3017**	**5.4656**	**0.0000**	**17,846.2648**	**17,846.2648**	**5.7718**		**17,990.5609**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.6264	0.4582	5.0269	0.0143	1.4450	0.0119	1.4569	0.3832	0.0109	0.3941		1,424.3869	1,424.3869	0.0443		1,425.4944
Total	**0.6732**	**1.7382**	**5.3949**	**0.0177**	**1.5377**	**0.0191**	**1.5567**	**0.4099**	**0.0178**	**0.4277**		**1,790.7990**	**1,790.7990**	**0.0659**		**1,792.4453**

3.9 SPS Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					24.0883	0.0000	24.0883	13.2409	0.0000	13.2409			0.0000			0.0000
Off-Road	5.1560	53.7496	25.6452	0.0465		2.7524	2.7524		2.5322	2.5322		4,512.4441	4,512.4441	1.4594		4,548.9295
Total	**5.1560**	**53.7496**	**25.6452**	**0.0465**	**24.0883**	**2.7524**	**26.8407**	**13.2409**	**2.5322**	**15.7731**		**4,512.4441**	**4,512.4441**	**1.4594**		**4,548.9295**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3262	0.2386	2.6182	7.4500e-003	0.7526	6.1800e-003	0.7588	0.1996	5.6900e-003	0.2053		741.8682	741.8682	0.0231		742.4450
Total	**0.3262**	**0.2386**	**2.6182**	**7.4500e-003**	**0.7526**	**6.1800e-003**	**0.7588**	**0.1996**	**5.6900e-003**	**0.2053**		**741.8682**	**741.8682**	**0.0231**		**742.4450**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3945	0.0000	9.3945	5.1640	0.0000	5.1640			0.0000			0.0000

Off-Road	0.5701	2.4706	24.7026	0.0465		0.0760	0.0760		0.0760	0.0760	0.0000	4,512.4441	4,512.4441	1.4594		4,548.9295
Total	**0.5701**	**2.4706**	**24.7026**	**0.0465**	**9.3945**	**0.0760**	**9.4705**	**5.1640**	**0.0760**	**5.2400**	**0.0000**	**4,512.4441**	**4,512.4441**	**1.4594**		**4,548.9295**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3262	0.2386	2.6182	7.4500e-003	0.7526	6.1800e-003	0.7588	0.1996	5.6900e-003	0.2053		741.8682	741.8682	0.0231		742.4450
Total	**0.3262**	**0.2386**	**2.6182**	**7.4500e-003**	**0.7526**	**6.1800e-003**	**0.7588**	**0.1996**	**5.6900e-003**	**0.2053**		**741.8682**	**741.8682**	**0.0231**		**742.4450**

3.10 SPS Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.0512	52.6970	24.5054	0.0450		2.6858	2.6858		2.4710	2.4710		4,362.0598	4,362.0598	1.4108		4,397.3293
Total	**5.0512**	**52.6970**	**24.5054**	**0.0450**		**2.6858**	**2.6858**		**2.4710**	**2.4710**		**4,362.0598**	**4,362.0598**	**1.4108**		**4,397.3293**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0468**	**1.2800**	**0.3679**	**3.4300e-003**	**0.0927**	**7.2100e-003**	**0.0999**	**0.0267**	**6.8900e-003**	**0.0336**		**366.4121**	**366.4121**	**0.0216**		**366.9509**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5511	2.3883	23.5315	0.0450		0.0735	0.0735		0.0735	0.0735	0.0000	4,362.0598	4,362.0598	1.4108		4,397.3293
Total	**0.5511**	**2.3883**	**23.5315**	**0.0450**		**0.0735**	**0.0735**		**0.0735**	**0.0735**	**0.0000**	**4,362.0598**	**4,362.0598**	**1.4108**		**4,397.3293**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0468	1.2800	0.3679	3.4300e-003	0.0927	7.2100e-003	0.0999	0.0267	6.8900e-003	0.0336		366.4121	366.4121	0.0216		366.9509
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0468**	**1.2800**	**0.3679**	**3.4300e-003**	**0.0927**	**7.2100e-003**	**0.0999**	**0.0267**	**6.8900e-003**	**0.0336**		**366.4121**	**366.4121**	**0.0216**		**366.9509**

3.11 Seasonal Stockpile/Crushing - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Off-Road	1.3712	11.4881	12.6172	0.0198		0.7034	0.7034		0.6821	0.6821		1,889.1017	1,889.1017	0.2787		1,896.0703
Total	**1.3712**	**11.4881**	**12.6172**	**0.0198**		**0.7034**	**0.7034**		**0.6821**	**0.6821**		**1,889.1017**	**1,889.1017**	**0.2787**		**1,896.0703**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Worker	0.1044	0.0764	0.8378	2.3800e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		237.3978	237.3978	7.3800e-003		237.5824
Total	**0.1044**	**0.0764**	**0.8378**	**2.3800e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**237.3978**	**237.3978**	**7.3800e-003**		**237.5824**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2119	0.9182	13.0670	0.0198		0.0283	0.0283		0.0283	0.0283	0.0000	1,889.1017	1,889.1017	0.2787		1,896.0703
Total	**0.2119**	**0.9182**	**13.0670**	**0.0198**		**0.0283**	**0.0283**		**0.0283**	**0.0283**	**0.0000**	**1,889.1017**	**1,889.1017**	**0.2787**		**1,896.0703**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1044	0.0764	0.8378	2.3800e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		237.3978	237.3978	7.3800e-003		237.5824
Total	**0.1044**	**0.0764**	**0.8378**	**2.3800e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**237.3978**	**237.3978**	**7.3800e-003**		**237.5824**

3.12 SPS Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6783	7.0328	7.3260	0.0114		0.3764	0.3764		0.3463	0.3463		1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.3275					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0058**	**7.0328**	**7.3260**	**0.0114**		**0.3764**	**0.3764**		**0.3463**	**0.3463**		**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0653	0.0477	0.5236	1.4900e-003	0.1505	1.2400e-003	0.1518	0.0399	1.1400e-003	0.0411		148.3736	148.3736	4.6100e-003		148.4890
Total	**0.0653**	**0.0477**	**0.5236**	**1.4900e-003**	**0.1505**	**1.2400e-003**	**0.1518**	**0.0399**	**1.1400e-003**	**0.0411**		**148.3736**	**148.3736**	**4.6100e-003**		**148.4890**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Off-Road	0.1402	0.6077	8.6478	0.0114		0.0187	0.0187		0.0187	0.0187	0.0000	1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.3275					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.4677**	**0.6077**	**8.6478**	**0.0114**		**0.0187**	**0.0187**		**0.0187**	**0.0187**	**0.0000**	**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0653	0.0477	0.5236	1.4900e-003	0.1505	1.2400e-003	0.1518	0.0399	1.1400e-003	0.0411		148.3736	148.3736	4.6100e-003		148.4890
Total	**0.0653**	**0.0477**	**0.5236**	**1.4900e-003**	**0.1505**	**1.2400e-003**	**0.1518**	**0.0399**	**1.1400e-003**	**0.0411**		**148.3736**	**148.3736**	**4.6100e-003**		**148.4890**

3.13 Slope Protection Activity - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.2095	2.1052	2.2797	3.1100e-003		0.1331	0.1331		0.1225	0.1225		300.7685	300.7685	0.0973		303.2004

Total	**0.2095**	**2.1052**	**2.2797**	**3.1100e-003**	**0.0000**	**0.1331**	**0.1331**	**0.0000**	**0.1225**	**0.1225**		**300.7685**	**300.7685**	**0.0973**		**303.2004**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0380	0.1646	2.3421	3.1100e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	300.7685	300.7685	0.0973		303.2004
Total	**0.0380**	**0.1646**	**2.3421**	**3.1100e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**300.7685**	**300.7685**	**0.0973**		**303.2004**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.14 Hydroblasting for Cement Slurry - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3991	3.4786	3.7055	6.5800e-003		0.1962	0.1962		0.1962	0.1962		623.0346	623.0346	0.0351		623.9116
Total	**0.3991**	**3.4786**	**3.7055**	**6.5800e-003**		**0.1962**	**0.1962**		**0.1962**	**0.1962**		**623.0346**	**623.0346**	**0.0351**		**623.9116**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0392	0.0286	0.3142	8.9000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		89.0242	89.0242	2.7700e-003		89.0934
Total	**0.0392**	**0.0286**	**0.3142**	**8.9000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**89.0242**	**89.0242**	**2.7700e-003**		**89.0934**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0658	0.2850	4.0564	6.5800e-003		8.7700e-003	8.7700e-003		8.7700e-003	8.7700e-003	0.0000	623.0346	623.0346	0.0351		623.9116
Total	**0.0658**	**0.2850**	**4.0564**	**6.5800e-003**		**8.7700e-003**	**8.7700e-003**		**8.7700e-003**	**8.7700e-003**	**0.0000**	**623.0346**	**623.0346**	**0.0351**		**623.9116**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0392	0.0286	0.3142	8.9000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		89.0242	89.0242	2.7700e-003		89.0934

Total	**0.0392**	**0.0286**	**0.3142**	**8.9000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**89.0242**	**89.0242**	**2.7700e-003**		**89.0934**

3.15 Sluicegate Repair - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**0.0000**			**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**0.0000**			**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0
User Defined Industrial	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907
User Defined Industrial	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Unmitigated	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-005	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**		**1.7500e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-005	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**		**1.7500e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Big Tujunga Sediment Removal IS-MND Offroad Trucks

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	90.00	0.00	0
Other Asphalt Surfaces	6.50	Acre	6.50	283,140.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	541	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Adjusted CO2 IF reflect RPS for SCE.

Land Use - Lot acreage: Big Tujunga Reservoir Area: 68 acres
Maple SRS: 22 acres

Construction Phase - Schedule based on Data Needs

Off-road Equipment - 4 Excavators, 4 Rubber Tired Dozers, 4 Tractors

Off-road Equipment - 4 Excavators, 4 Rubber Tired Dozers, 4 tractors, 7 off-highway trucks to account for 56 workhours (based on VMT and mph for offroad trucks/truck capacity) at 511 HP

Off-road Equipment - 1 Tractor

Off-road Equipment - 1 Cement and Mortar Mixer

Off-road Equipment - Pumps (4) are electrical and powered by a generator.

Off-road Equipment - 1 Generator Set

Off-road Equipment - 1 Paver, 1 Paving Equipment, 1 Roller

Off-road Equipment - 1 Generator set, 1 crushing/proc., 2 tractors

Off-road Equipment - 1 tractor

Off-road Equipment - All hand tools

Off-road Equipment - 4 Rubber Tired Dozers, 4 tractors

Off-road Equipment - 4 Rubber tired dozers, 4 tractors

Off-road Equipment - 1 paver, 1 paving equipm, 1 roller

Off-road Equipment - 1 Excavator, 1 Rubber Tired Dozer, 4 Tractor/Loaders

Trips and VMT - Worker trips from County engineers. Water truck trips accounted for in vendor trips. 2 water tenders trucking water from offsite

Grading -

Road Dust -

Area Coating - No Painting

Energy Use -

Construction Off-road Equipment Mitigation - Tier 4 Final and electrical pumps

Operational Off-Road Equipment -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	16988	0
tblConstEquipMitigation	FuelType	Diesel	Electrical
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	17.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	24.00

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00

tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblLandUse	LotAcreage	0.00	90.00
tblOffRoadEquipment	HorsePower	402.00	511.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
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tblProjectCharacteristics	CO2IntensityFactor	702.44	541
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
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tblTripsAndVMT	VendorTripNumber	46.00	10.00
tblTripsAndVMT	WorkerTripNumber	15.00	30.00
tblTripsAndVMT	WorkerTripNumber	10.00	16.00
tblTripsAndVMT	WorkerTripNumber	8.00	10.00
tblTripsAndVMT	WorkerTripNumber	3.00	0.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00

tblTripsAndVMT	WorkerTripNumber	3.00	20.00
tblTripsAndVMT	WorkerTripNumber	30.00	40.00
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tblTripsAndVMT	WorkerTripNumber	3.00	16.00
tblTripsAndVMT	WorkerTripNumber	48.00	96.00
tblTripsAndVMT	WorkerTripNumber	20.00	50.00
tblTripsAndVMT	WorkerTripNumber	119.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	27.9399	270.5763	174.3159	0.3518	51.0413	12.9710	64.0123	27.2456	11.9846	39.2302	0.0000	34,190.9736	34,190.9736	9.5386	0.0000	34,429.4380
Maximum	**27.9399**	**270.5763**	**174.3159**	**0.3518**	**51.0413**	**12.9710**	**64.0123**	**27.2456**	**11.9846**	**39.2302**	**0.0000**	**34,190.9736**	**34,190.9736**	**9.5386**	**0.0000**	**34,429.4380**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					

2020	5.2918	19.9502	180.3938	0.3518	21.6535	0.5482	22.2017	11.0917	0.5459	11.6376	0.0000	34,190.9736	34,190.9736	9.5386	0.0000	34,429.4380
Maximum	**5.2918**	**19.9502**	**180.3938**	**0.3518**	**21.6535**	**0.5482**	**22.2017**	**11.0917**	**0.5459**	**11.6376**	**0.0000**	**34,190.9736**	**34,190.9736**	**9.5386**	**0.0000**	**34,429.4380**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**81.06**	**92.63**	**-3.49**	**0.00**	**57.58**	**95.77**	**65.32**	**59.29**	**95.45**	**70.34**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**	**0.0000**	**1.7500e-003**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003

Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**	**0.0000**	**1.7500e-003**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	SPS Site Preparation	Site Preparation	1/1/2020	1/31/2020	6	27	
2	BTR Site Preparation	Site Preparation	4/1/2020	4/13/2020	6	11	
3	BTR Access Road Grading	Grading	4/16/2020	5/14/2020	6	25	
4	Dewatering Activities	Trenching	4/16/2020	6/15/2020	6	52	
5	Paving Haul Roads	Paving	4/16/2020	5/14/2020	6	25	
6	Culvert Crossing Repair	Paving	4/16/2020	5/14/2020	6	25	
7	BTR Grading and Hauling	Grading	5/15/2020	10/14/2020	6	131	
8	SPS Grading	Grading	5/15/2020	10/14/2020	6	131	
9	SPS Construction	Building Construction	7/15/2020	10/14/2020	6	79	
10	Seasonal Stockpile/Crushing	Trenching	8/15/2020	10/14/2020	6	52	
11	SPS Paving	Paving	8/15/2020	10/14/2020	6	52	
12	Slope Protection Activity	Grading	9/15/2020	10/14/2020	6	26	
13	Hydroblasting for Cement Slurry	Trenching	9/15/2020	10/14/2020	6	26	
14	Sluicegate Repair	Trenching	9/15/2020	10/14/2020	6	26	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 6.5

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
SPS Site Preparation	Concrete/Industrial Saws	0	8.00	81	0.73
SPS Site Preparation	Excavators	1	8.00	158	0.38
SPS Site Preparation	Off-Highway Trucks	0		402	0.38
SPS Site Preparation	Rubber Tired Dozers	1	8.00	247	0.40
SPS Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
BTR Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
BTR Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
BTR Access Road Grading	Air Compressors	0	6.00	78	0.48
BTR Access Road Grading	Excavators	4	8.00	158	0.38
BTR Access Road Grading	Graders	0	8.00	187	0.41
BTR Access Road Grading	Rubber Tired Dozers	4	8.00	247	0.40
BTR Access Road Grading	Scrapers	0	8.00	367	0.48
BTR Access Road Grading	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Dewatering Activities	Cranes	0	7.00	231	0.29
Dewatering Activities	Forklifts	0	8.00	89	0.20
Dewatering Activities	Generator Sets	0	8.00	84	0.74
Dewatering Activities	Pumps	4	24.00	84	0.74
Dewatering Activities	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Dewatering Activities	Welders	0	8.00	46	0.45
Paving Haul Roads	Excavators	0	8.00	158	0.38
Paving Haul Roads	Graders	0	8.00	187	0.41
Paving Haul Roads	Pavers	1	8.00	130	0.42
Paving Haul Roads	Paving Equipment	1	8.00	132	0.36
Paving Haul Roads	Rollers	1	8.00	80	0.38
Paving Haul Roads	Rubber Tired Dozers	0	8.00	247	0.40

Paving Haul Roads	Scrapers	0	8.00	367	0.48
Paving Haul Roads	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Culvert Crossing Repair	Cement and Mortar Mixers	1	8.00	9	0.56
Culvert Crossing Repair	Pavers	0	8.00	130	0.42
Culvert Crossing Repair	Paving Equipment	0	8.00	132	0.36
Culvert Crossing Repair	Rollers	0	8.00	80	0.38
BTR Grading and Hauling	Excavators	4	8.00	158	0.38
BTR Grading and Hauling	Graders	0	8.00	187	0.41
BTR Grading and Hauling	Off-Highway Trucks	7	8.00	511	0.38
BTR Grading and Hauling	Rubber Tired Dozers	4	8.00	247	0.40
BTR Grading and Hauling	Scrapers	0	8.00	367	0.48
BTR Grading and Hauling	Tractors/Loaders/Backhoes	4	8.00	97	0.37
SPS Grading	Excavators	0	8.00	158	0.38
SPS Grading	Graders	0	8.00	187	0.41
SPS Grading	Rubber Tired Dozers	4	8.00	247	0.40
SPS Grading	Scrapers	0	8.00	367	0.48
SPS Grading	Tractors/Loaders/Backhoes	4	8.00	97	0.37
SPS Construction	Cranes	0	7.00	231	0.29
SPS Construction	Forklifts	0	8.00	89	0.20
SPS Construction	Generator Sets	0	8.00	84	0.74
SPS Construction	Rubber Tired Dozers	4	8.00	247	0.40
SPS Construction	Tractors/Loaders/Backhoes	4	7.00	97	0.37
SPS Construction	Welders	0	8.00	46	0.45
Seasonal Stockpile/Crushing	Crushing/Proc. Equipment	1	8.00	85	0.78
Seasonal Stockpile/Crushing	Generator Sets	1	8.00	84	0.74
Seasonal Stockpile/Crushing	Tractors/Loaders/Backhoes	2	8.00	97	0.37
SPS Paving	Pavers	1	8.00	130	0.42
SPS Paving	Paving Equipment	1	8.00	132	0.36
SPS Paving	Rollers	1	8.00	80	0.38
Slope Protection Activity	Excavators	0	8.00	158	0.38

Slope Protection Activity	Graders	0	8.00	187	0.41
Slope Protection Activity	Rubber Tired Dozers	0	8.00	247	0.40
Slope Protection Activity	Scrapers	0	8.00	367	0.48
Slope Protection Activity	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Hydroblasting for Cement Slurry	Generator Sets	1	8.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
SPS Site Preparation	6	30.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
BTR Site Preparation	1	20.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
BTR Access Road Grading	12	40.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
Dewatering Activities	4	30.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving Haul Roads	3	6.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Culvert Crossing Repair	1	16.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
BTR Grading and Hauling	19	96.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
SPS Grading	8	50.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
SPS Construction	8	0.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
Seasonal Stockpile/Crushing	4	16.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
SPS Paving	3	10.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Slope Protection Activity	1	0.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Hydroblasting for Cement Slurry	1	6.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Sluicegate Repair			0.00	0.00	19.80	7.90				

3.1 Mitigation Measures Construction

Use Alternative Fuel for Construction Equipment

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 SPS Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	2.1625	22.1655	16.5182	0.0261		1.2043	1.2043		1.1080	1.1080		2,530.5350	2,530.5350	0.8184		2,550.9956
Total	**2.1625**	**22.1655**	**16.5182**	**0.0261**	**6.0221**	**1.2043**	**7.2264**	**3.3102**	**1.1080**	**4.4182**		**2,530.5350**	**2,530.5350**	**0.8184**		**2,550.9956**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.1743	0.1293	1.7277	4.7500e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		472.8300	472.8300	0.0148		473.1988
Total	**0.2194**	**1.4012**	**2.0675**	**8.2500e-003**	**0.5442**	**0.0108**	**0.5551**	**0.1464**	**0.0102**	**0.1566**		**846.8177**	**846.8177**	**0.0352**		**847.6977**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	0.3200	1.3867	17.1199	0.0261		0.0427	0.0427		0.0427	0.0427	0.0000	2,530.5350	2,530.5350	0.8184		2,550.9956
Total	**0.3200**	**1.3867**	**17.1199**	**0.0261**	**2.3486**	**0.0427**	**2.3913**	**1.2910**	**0.0427**	**1.3337**	**0.0000**	**2,530.5350**	**2,530.5350**	**0.8184**		**2,550.9956**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.1743	0.1293	1.7277	4.7500e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		472.8300	472.8300	0.0148		473.1988
Total	**0.2194**	**1.4012**	**2.0675**	**8.2500e-003**	**0.5442**	**0.0108**	**0.5551**	**0.1464**	**0.0102**	**0.1566**		**846.8177**	**846.8177**	**0.0352**		**847.6977**

3.3 BTR Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.2095	2.1052	2.2797	3.1100e-003		0.1331	0.1331		0.1225	0.1225		300.7685	300.7685	0.0973		303.2004

Total	**0.2095**	**2.1052**	**2.2797**	**3.1100e-003**	**0.0000**	**0.1331**	**0.1331**	**0.0000**	**0.1225**	**0.1225**		**300.7685**	**300.7685**	**0.0973**		**303.2004**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.1162	0.0862	1.1518	3.1700e-003	0.3010	2.4700e-003	0.3035	0.0798	2.2800e-003	0.0821		315.2200	315.2200	9.8400e-003		315.4659
Total	**0.1613**	**1.3581**	**1.4916**	**6.6700e-003**	**0.3937**	**9.6000e-003**	**0.4033**	**0.1065**	**9.1000e-003**	**0.1156**		**689.2077**	**689.2077**	**0.0303**		**689.9648**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0380	0.1646	2.3421	3.1100e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	300.7685	300.7685	0.0973		303.2004
Total	**0.0380**	**0.1646**	**2.3421**	**3.1100e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**300.7685**	**300.7685**	**0.0973**		**303.2004**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.1162	0.0862	1.1518	3.1700e-003	0.3010	2.4700e-003	0.3035	0.0798	2.2800e-003	0.0821		315.2200	315.2200	9.8400e-003		315.4659
Total	**0.1613**	**1.3581**	**1.4916**	**6.6700e-003**	**0.3937**	**9.6000e-003**	**0.4033**	**0.1065**	**9.1000e-003**	**0.1156**		**689.2077**	**689.2077**	**0.0303**		**689.9648**

3.4 BTR Access Road Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					24.0883	0.0000	24.0883	13.2409	0.0000	13.2409			0.0000			0.0000
Off-Road	6.1359	63.4001	38.7165	0.0672		3.2199	3.2199		2.9623	2.9623		6,512.9178	6,512.9178	2.1064		6,565.5780
Total	**6.1359**	**63.4001**	**38.7165**	**0.0672**	**24.0883**	**3.2199**	**27.3082**	**13.2409**	**2.9623**	**16.2032**		**6,512.9178**	**6,512.9178**	**2.1064**		**6,565.5780**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.2324	0.1724	2.3036	6.3300e-003	0.6021	4.9400e-003	0.6070	0.1597	4.5500e-003	0.1642		630.4400	630.4400	0.0197		630.9318
Total	**0.2775**	**1.4443**	**2.6434**	**9.8300e-003**	**0.6948**	**0.0121**	**0.7068**	**0.1863**	**0.0114**	**0.1977**		**1,004.4277**	**1,004.4277**	**0.0401**		**1,005.4306**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3945	0.0000	9.3945	5.1640	0.0000	5.1640			0.0000			0.0000
Off-Road	0.8243	3.5718	40.3747	0.0672		0.1099	0.1099		0.1099	0.1099	0.0000	6,512.9178	6,512.9178	2.1064		6,565.5780
Total	**0.8243**	**3.5718**	**40.3747**	**0.0672**	**9.3945**	**0.1099**	**9.5044**	**5.1640**	**0.1099**	**5.2739**	**0.0000**	**6,512.9178**	**6,512.9178**	**2.1064**		**6,565.5780**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.2324	0.1724	2.3036	6.3300e-003	0.6021	4.9400e-003	0.6070	0.1597	4.5500e-003	0.1642		630.4400	630.4400	0.0197		630.9318

Total	**0.2775**	**1.4443**	**2.6434**	**9.8300e-003**	**0.6948**	**0.0121**	**0.7068**	**0.1863**	**0.0114**	**0.1977**		**1,004.4277**	**1,004.4277**	**0.0401**		**1,005.4306**

3.5 Dewatering Activities - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.0781	42.3485	45.1506	0.0789		2.4864	2.4864		2.4864	2.4864		7,476.4148	7,476.4148	0.4473		7,487.5972
Total	**5.0781**	**42.3485**	**45.1506**	**0.0789**		**2.4864**	**2.4864**		**2.4864**	**2.4864**		**7,476.4148**	**7,476.4148**	**0.4473**		**7,487.5972**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1743	0.1293	1.7277	4.7500e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		472.8300	472.8300	0.0148		473.1988
Total	**0.1743**	**0.1293**	**1.7277**	**4.7500e-003**	**0.4516**	**3.7100e-003**	**0.4553**	**0.1197**	**3.4200e-003**	**0.1232**		**472.8300**	**472.8300**	**0.0148**		**473.1988**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0789		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0789**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1743	0.1293	1.7277	4.7500e-003	0.4516	3.7100e-003	0.4553	0.1197	3.4200e-003	0.1232		472.8300	472.8300	0.0148		473.1988
Total	**0.1743**	**0.1293**	**1.7277**	**4.7500e-003**	**0.4516**	**3.7100e-003**	**0.4553**	**0.1197**	**3.4200e-003**	**0.1232**		**472.8300**	**472.8300**	**0.0148**		**473.1988**

3.6 Paving Haul Roads - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	0.6783	7.0328	7.3260	0.0114		0.3764	0.3764		0.3463	0.3463		1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3595**	**7.0328**	**7.3260**	**0.0114**		**0.3764**	**0.3764**		**0.3463**	**0.3463**		**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0349	0.0259	0.3455	9.5000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		94.5660	94.5660	2.9500e-003		94.6398
Total	**0.0349**	**0.0259**	**0.3455**	**9.5000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**94.5660**	**94.5660**	**2.9500e-003**		**94.6398**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1402	0.6077	8.6478	0.0114		0.0187	0.0187		0.0187	0.0187	0.0000	1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8214**	**0.6077**	**8.6478**	**0.0114**		**0.0187**	**0.0187**		**0.0187**	**0.0187**	**0.0000**	**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0349	0.0259	0.3455	9.5000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		94.5660	94.5660	2.9500e-003		94.6398
Total	**0.0349**	**0.0259**	**0.3455**	**9.5000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**94.5660**	**94.5660**	**2.9500e-003**		**94.6398**

3.7 Culvert Crossing Repair - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0588	0.3682	0.3085	7.1000e-004		0.0143	0.0143		0.0143	0.0143		50.5163	50.5163	5.2400e-003		50.6474
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7400**	**0.3682**	**0.3085**	**7.1000e-004**		**0.0143**	**0.0143**		**0.0143**	**0.0143**		**50.5163**	**50.5163**	**5.2400e-003**		**50.6474**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0930	0.0690	0.9214	2.5300e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		252.1760	252.1760	7.8700e-003		252.3727
Total	**0.0930**	**0.0690**	**0.9214**	**2.5300e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**252.1760**	**252.1760**	**7.8700e-003**		**252.3727**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	7.1000e-004		0.0000	0.0000		0.0000	0.0000	0.0000	50.5163	50.5163	5.2400e-003		50.6474
Paving	0.6812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6812**	**0.0000**	**0.0000**	**7.1000e-004**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**50.5163**	**50.5163**	**5.2400e-003**		**50.6474**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0930	0.0690	0.9214	2.5300e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		252.1760	252.1760	7.8700e-003		252.3727
Total	**0.0930**	**0.0690**	**0.9214**	**2.5300e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**252.1760**	**252.1760**	**7.8700e-003**		**252.3727**

3.8 BTR Grading and Hauling - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					24.0883	0.0000	24.0883	13.2409	0.0000	13.2409			0.0000			0.0000
Off-Road	13.6228	136.7141	87.3062	0.1842		6.0875	6.0875		5.6005	5.6005		17,846.2649	17,846.2649	5.7718		17,990.5609
Total	**13.6228**	**136.7141**	**87.3062**	**0.1842**	**24.0883**	**6.0875**	**30.1758**	**13.2409**	**5.6005**	**18.8414**		**17,846.2649**	**17,846.2649**	**5.7718**		**17,990.5609**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.5578	0.4137	5.5286	0.0152	1.4450	0.0119	1.4569	0.3832	0.0109	0.3941		1,513.0559	1,513.0559	0.0472		1,514.2362
Total	**0.6029**	**1.6857**	**5.8684**	**0.0187**	**1.5377**	**0.0190**	**1.5567**	**0.4099**	**0.0178**	**0.4276**		**1,887.0437**	**1,887.0437**	**0.0677**		**1,888.7351**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3945	0.0000	9.3945	5.1640	0.0000	5.1640			0.0000			0.0000
Off-Road	2.2627	9.8049	93.1158	0.1842		0.3017	0.3017		0.3017	0.3017	0.0000	17,846.2648	17,846.2648	5.7718		17,990.5609
Total	**2.2627**	**9.8049**	**93.1158**	**0.1842**	**9.3945**	**0.3017**	**9.6961**	**5.1640**	**0.3017**	**5.4656**	**0.0000**	**17,846.2648**	**17,846.2648**	**5.7718**		**17,990.5609**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.5578	0.4137	5.5286	0.0152	1.4450	0.0119	1.4569	0.3832	0.0109	0.3941		1,513.0559	1,513.0559	0.0472		1,514.2362
Total	**0.6029**	**1.6857**	**5.8684**	**0.0187**	**1.5377**	**0.0190**	**1.5567**	**0.4099**	**0.0178**	**0.4276**		**1,887.0437**	**1,887.0437**	**0.0677**		**1,888.7351**

3.9 SPS Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					24.0883	0.0000	24.0883	13.2409	0.0000	13.2409			0.0000			0.0000
Off-Road	5.1560	53.7496	25.6452	0.0465		2.7524	2.7524		2.5322	2.5322		4,512.4441	4,512.4441	1.4594		4,548.9295
Total	**5.1560**	**53.7496**	**25.6452**	**0.0465**	**24.0883**	**2.7524**	**26.8407**	**13.2409**	**2.5322**	**15.7731**		**4,512.4441**	**4,512.4441**	**1.4594**		**4,548.9295**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2905	0.2155	2.8795	7.9100e-003	0.7526	6.1800e-003	0.7588	0.1996	5.6900e-003	0.2053		788.0500	788.0500	0.0246		788.6647
Total	**0.2905**	**0.2155**	**2.8795**	**7.9100e-003**	**0.7526**	**6.1800e-003**	**0.7588**	**0.1996**	**5.6900e-003**	**0.2053**		**788.0500**	**788.0500**	**0.0246**		**788.6647**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.3945	0.0000	9.3945	5.1640	0.0000	5.1640			0.0000			0.0000

Off-Road	0.5701	2.4706	24.7026	0.0465		0.0760	0.0760		0.0760	0.0760	0.0000	4,512.4441	4,512.4441	1.4594		4,548.9295
Total	**0.5701**	**2.4706**	**24.7026**	**0.0465**	**9.3945**	**0.0760**	**9.4705**	**5.1640**	**0.0760**	**5.2400**	**0.0000**	**4,512.4441**	**4,512.4441**	**1.4594**		**4,548.9295**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2905	0.2155	2.8795	7.9100e-003	0.7526	6.1800e-003	0.7588	0.1996	5.6900e-003	0.2053		788.0500	788.0500	0.0246		788.6647
Total	**0.2905**	**0.2155**	**2.8795**	**7.9100e-003**	**0.7526**	**6.1800e-003**	**0.7588**	**0.1996**	**5.6900e-003**	**0.2053**		**788.0500**	**788.0500**	**0.0246**		**788.6647**

3.10 SPS Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.0512	52.6970	24.5054	0.0450		2.6858	2.6858		2.4710	2.4710		4,362.0598	4,362.0598	1.4108		4,397.3293
Total	**5.0512**	**52.6970**	**24.5054**	**0.0450**		**2.6858**	**2.6858**		**2.4710**	**2.4710**		**4,362.0598**	**4,362.0598**	**1.4108**		**4,397.3293**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0451**	**1.2719**	**0.3398**	**3.5000e-003**	**0.0927**	**7.1300e-003**	**0.0998**	**0.0267**	**6.8200e-003**	**0.0335**		**373.9877**	**373.9877**	**0.0205**		**374.4989**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5511	2.3883	23.5315	0.0450		0.0735	0.0735		0.0735	0.0735	0.0000	4,362.0598	4,362.0598	1.4108		4,397.3293
Total	**0.5511**	**2.3883**	**23.5315**	**0.0450**		**0.0735**	**0.0735**		**0.0735**	**0.0735**	**0.0000**	**4,362.0598**	**4,362.0598**	**1.4108**		**4,397.3293**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0451	1.2719	0.3398	3.5000e-003	0.0927	7.1300e-003	0.0998	0.0267	6.8200e-003	0.0335		373.9877	373.9877	0.0205		374.4989
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0451**	**1.2719**	**0.3398**	**3.5000e-003**	**0.0927**	**7.1300e-003**	**0.0998**	**0.0267**	**6.8200e-003**	**0.0335**		**373.9877**	**373.9877**	**0.0205**		**374.4989**

3.11 Seasonal Stockpile/Crushing - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3712	11.4881	12.6172	0.0198		0.7034	0.7034		0.6821	0.6821		1,889.1017	1,889.1017	0.2787		1,896.0703
Total	**1.3712**	**11.4881**	**12.6172**	**0.0198**		**0.7034**	**0.7034**		**0.6821**	**0.6821**		**1,889.1017**	**1,889.1017**	**0.2787**		**1,896.0703**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Worker	0.0930	0.0690	0.9214	2.5300e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		252.1760	252.1760	7.8700e-003		252.3727
Total	**0.0930**	**0.0690**	**0.9214**	**2.5300e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**252.1760**	**252.1760**	**7.8700e-003**		**252.3727**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2119	0.9182	13.0670	0.0198		0.0283	0.0283		0.0283	0.0283	0.0000	1,889.1017	1,889.1017	0.2787		1,896.0703
Total	**0.2119**	**0.9182**	**13.0670**	**0.0198**		**0.0283**	**0.0283**		**0.0283**	**0.0283**	**0.0000**	**1,889.1017**	**1,889.1017**	**0.2787**		**1,896.0703**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0930	0.0690	0.9214	2.5300e-003	0.2408	1.9800e-003	0.2428	0.0639	1.8200e-003	0.0657		252.1760	252.1760	7.8700e-003		252.3727
Total	**0.0930**	**0.0690**	**0.9214**	**2.5300e-003**	**0.2408**	**1.9800e-003**	**0.2428**	**0.0639**	**1.8200e-003**	**0.0657**		**252.1760**	**252.1760**	**7.8700e-003**		**252.3727**

3.12 SPS Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6783	7.0328	7.3260	0.0114		0.3764	0.3764		0.3463	0.3463		1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.3275					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0058**	**7.0328**	**7.3260**	**0.0114**		**0.3764**	**0.3764**		**0.3463**	**0.3463**		**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0581	0.0431	0.5759	1.5800e-003	0.1505	1.2400e-003	0.1518	0.0399	1.1400e-003	0.0411		157.6100	157.6100	4.9200e-003		157.7329
Total	**0.0581**	**0.0431**	**0.5759**	**1.5800e-003**	**0.1505**	**1.2400e-003**	**0.1518**	**0.0399**	**1.1400e-003**	**0.0411**		**157.6100**	**157.6100**	**4.9200e-003**		**157.7329**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Off-Road	0.1402	0.6077	8.6478	0.0114		0.0187	0.0187		0.0187	0.0187	0.0000	1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	0.3275					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.4677**	**0.6077**	**8.6478**	**0.0114**		**0.0187**	**0.0187**		**0.0187**	**0.0187**	**0.0000**	**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0581	0.0431	0.5759	1.5800e-003	0.1505	1.2400e-003	0.1518	0.0399	1.1400e-003	0.0411		157.6100	157.6100	4.9200e-003		157.7329
Total	**0.0581**	**0.0431**	**0.5759**	**1.5800e-003**	**0.1505**	**1.2400e-003**	**0.1518**	**0.0399**	**1.1400e-003**	**0.0411**		**157.6100**	**157.6100**	**4.9200e-003**		**157.7329**

3.13 Slope Protection Activity - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.2095	2.1052	2.2797	3.1100e-003		0.1331	0.1331		0.1225	0.1225		300.7685	300.7685	0.0973		303.2004

Total	**0.2095**	**2.1052**	**2.2797**	**3.1100e-003**	**0.0000**	**0.1331**	**0.1331**	**0.0000**	**0.1225**	**0.1225**		**300.7685**	**300.7685**	**0.0973**		**303.2004**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0380	0.1646	2.3421	3.1100e-003		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	300.7685	300.7685	0.0973		303.2004
Total	**0.0380**	**0.1646**	**2.3421**	**3.1100e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**5.0600e-003**	**5.0600e-003**	**0.0000**	**300.7685**	**300.7685**	**0.0973**		**303.2004**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.14 Hydroblasting for Cement Slurry - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3991	3.4786	3.7055	6.5800e-003		0.1962	0.1962		0.1962	0.1962		623.0346	623.0346	0.0351		623.9116
Total	**0.3991**	**3.4786**	**3.7055**	**6.5800e-003**		**0.1962**	**0.1962**		**0.1962**	**0.1962**		**623.0346**	**623.0346**	**0.0351**		**623.9116**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0349	0.0259	0.3455	9.5000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		94.5660	94.5660	2.9500e-003		94.6398
Total	**0.0349**	**0.0259**	**0.3455**	**9.5000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**94.5660**	**94.5660**	**2.9500e-003**		**94.6398**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0658	0.2850	4.0564	6.5800e-003		8.7700e-003	8.7700e-003		8.7700e-003	8.7700e-003	0.0000	623.0346	623.0346	0.0351		623.9116
Total	**0.0658**	**0.2850**	**4.0564**	**6.5800e-003**		**8.7700e-003**	**8.7700e-003**		**8.7700e-003**	**8.7700e-003**	**0.0000**	**623.0346**	**623.0346**	**0.0351**		**623.9116**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0349	0.0259	0.3455	9.5000e-004	0.0903	7.4000e-004	0.0911	0.0240	6.8000e-004	0.0246		94.5660	94.5660	2.9500e-003		94.6398

Total	**0.0349**	**0.0259**	**0.3455**	**9.5000e-004**	**0.0903**	**7.4000e-004**	**0.0911**	**0.0240**	**6.8000e-004**	**0.0246**		**94.5660**	**94.5660**	**2.9500e-003**		**94.6398**

3.15 Sluicegate Repair - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**0.0000**			**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**0.0000**			**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0
User Defined Industrial	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907
User Defined Industrial	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Unmitigated	0.1004	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-005	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**		**1.7500e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-005	1.0000e-005	7.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.6400e-003	1.6400e-003	0.0000		1.7500e-003
Total	**0.1004**	**1.0000e-005**	**7.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.6400e-003**	**1.6400e-003**	**0.0000**		**1.7500e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Big Tujunga Sediment Removal IS-MND Offroad Trucks

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	90.00	0.00	0
Other Asphalt Surfaces	6.50	Acre	6.50	283,140.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	541	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Adjusted CO2 IF reflect RPS for SCE.

Land Use - Lot acreage: Big Tujunga Reservoir Area: 68 acres
Maple SRS: 22 acres

Construction Phase - Schedule based on Data Needs

Off-road Equipment - 4 Excavators, 4 Rubber Tired Dozers, 4 Tractors

Off-road Equipment - 4 Excavators, 4 Rubber Tired Dozers, 4 tractors, 7 off-highway trucks to account for 56 workhours (based on VMT and mph for offroad trucks/truck capacity) at 511 HP

Off-road Equipment - 1 Tractor

Off-road Equipment - 1 Cement and Mortar Mixer

Off-road Equipment - Pumps (4) are electrical and powered by a generator.

Off-road Equipment - 1 Generator Set

Off-road Equipment - 1 Paver, 1 Paving Equipment, 1 Roller

Off-road Equipment - 1 Generator set, 1 crushing/proc., 2 tractors

Off-road Equipment - 1 tractor

Off-road Equipment - All hand tools

Off-road Equipment - 4 Rubber Tired Dozers, 4 tractors

Off-road Equipment - 4 Rubber tired dozers, 4 tractors

Off-road Equipment - 1 paver, 1 paving equipm, 1 roller

Off-road Equipment - 1 Excavator, 1 Rubber Tired Dozer, 4 Tractor/Loaders

Trips and VMT - Worker trips from County engineers. Water truck trips accounted for in vendor trips. 2 water tenders trucking water from offsite

Grading -

Road Dust -

Area Coating - No Painting

Energy Use -

Construction Off-road Equipment Mitigation - Tier 4 Final and electrical pumps

Operational Off-Road Equipment -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	16988	0
tblConstEquipMitigation	FuelType	Diesel	Electrical
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	17.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	24.00

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblConstructionPhase	NumDays	155.00	131.00
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tblConstructionPhase	NumDays	110.00	25.00
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tblConstructionPhase	NumDays	60.00	27.00
tblConstructionPhase	NumDays	60.00	11.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00

tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblLandUse	LotAcreage	0.00	90.00
tblOffRoadEquipment	HorsePower	402.00	511.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	541
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
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tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	46.00	10.00
tblTripsAndVMT	WorkerTripNumber	15.00	30.00
tblTripsAndVMT	WorkerTripNumber	10.00	16.00
tblTripsAndVMT	WorkerTripNumber	8.00	10.00
tblTripsAndVMT	WorkerTripNumber	3.00	0.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00

tblTripsAndVMT	WorkerTripNumber	3.00	20.00
tblTripsAndVMT	WorkerTripNumber	30.00	40.00
tblTripsAndVMT	WorkerTripNumber	10.00	30.00
tblTripsAndVMT	WorkerTripNumber	8.00	6.00
tblTripsAndVMT	WorkerTripNumber	3.00	16.00
tblTripsAndVMT	WorkerTripNumber	48.00	96.00
tblTripsAndVMT	WorkerTripNumber	20.00	50.00
tblTripsAndVMT	WorkerTripNumber	119.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	1.8436	17.6467	11.6667	0.0236	3.7332	0.8467	4.5799	1.9969	0.7853	2.7822	0.0000	2,077.5821	2,077.5821	0.5537	0.0000	2,091.4250
Maximum	**1.8436**	**17.6467**	**11.6667**	**0.0236**	**3.7332**	**0.8467**	**4.5799**	**1.9969**	**0.7853**	**2.7822**	**0.0000**	**2,077.5821**	**2,077.5821**	**0.5537**	**0.0000**	**2,091.4250**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					

2020	0.3390	1.2545	10.8664	0.0236	1.5750	0.0338	1.6088	0.8106	0.0336	0.8442	0.0000	1,901.2354	1,901.2354	0.5432	0.0000	1,914.8145
Maximum	**0.3390**	**1.2545**	**10.8664**	**0.0236**	**1.5750**	**0.0338**	**1.6088**	**0.8106**	**0.0336**	**0.8442**	**0.0000**	**1,901.2354**	**1,901.2354**	**0.5432**	**0.0000**	**1,914.8145**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**81.61**	**92.89**	**6.86**	**0.00**	**57.81**	**96.01**	**64.87**	**59.41**	**95.72**	**69.66**	**0.00**	**8.49**	**8.49**	**1.91**	**0.00**	**8.44**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2020**	**3-31-2020**	0.3453	0.0448
2	**4-1-2020**	**6-30-2020**	6.5467	0.4832
3	**7-1-2020**	**9-30-2020**	10.8039	0.9021
		Highest	10.8039	0.9021

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0183	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.9000e-004	1.9000e-004	0.0000	0.0000	2.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0183**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**0.0000**	**2.0000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0183	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.9000e-004	1.9000e-004	0.0000	0.0000	2.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0183**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**0.0000**	**2.0000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	SPS Site Preparation	Site Preparation	1/1/2020	1/31/2020	6	27	
2	BTR Site Preparation	Site Preparation	4/1/2020	4/13/2020	6	11	
3	BTR Access Road Grading	Grading	4/16/2020	5/14/2020	6	25	
4	Dewatering Activities	Trenching	4/16/2020	6/15/2020	6	52	
5	Paving Haul Roads	Paving	4/16/2020	5/14/2020	6	25	
6	Culvert Crossing Repair	Paving	4/16/2020	5/14/2020	6	25	

7	BTR Grading and Hauling	Grading	5/15/2020	10/14/2020	6	131	
8	SPS Grading	Grading	5/15/2020	10/14/2020	6	131	
9	SPS Construction	Building Construction	7/15/2020	10/14/2020	6	79	
10	Seasonal Stockpile/Crushing	Trenching	8/15/2020	10/14/2020	6	52	
11	SPS Paving	Paving	8/15/2020	10/14/2020	6	52	
12	Slope Protection Activity	Grading	9/15/2020	10/14/2020	6	26	
13	Hydroblasting for Cement Slurry	Trenching	9/15/2020	10/14/2020	6	26	
14	Sluicegate Repair	Trenching	9/15/2020	10/14/2020	6	26	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 6.5

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
SPS Site Preparation	Concrete/Industrial Saws	0	8.00	81	0.73
SPS Site Preparation	Excavators	1	8.00	158	0.38
SPS Site Preparation	Off-Highway Trucks	0		402	0.38
SPS Site Preparation	Rubber Tired Dozers	1	8.00	247	0.40
SPS Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
BTR Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
BTR Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
BTR Access Road Grading	Air Compressors	0	6.00	78	0.48
BTR Access Road Grading	Excavators	4	8.00	158	0.38
BTR Access Road Grading	Graders	0	8.00	187	0.41
BTR Access Road Grading	Rubber Tired Dozers	4	8.00	247	0.40
BTR Access Road Grading	Scrapers	0	8.00	367	0.48
BTR Access Road Grading	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Dewatering Activities	Cranes	0	7.00	231	0.29

Dewatering Activities	Forklifts	0	8.00	89	0.20
Dewatering Activities	Generator Sets	0	8.00	84	0.74
Dewatering Activities	Pumps	4	24.00	84	0.74
Dewatering Activities	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Dewatering Activities	Welders	0	8.00	46	0.45
Paving Haul Roads	Excavators	0	8.00	158	0.38
Paving Haul Roads	Graders	0	8.00	187	0.41
Paving Haul Roads	Pavers	1	8.00	130	0.42
Paving Haul Roads	Paving Equipment	1	8.00	132	0.36
Paving Haul Roads	Rollers	1	8.00	80	0.38
Paving Haul Roads	Rubber Tired Dozers	0	8.00	247	0.40
Paving Haul Roads	Scrapers	0	8.00	367	0.48
Paving Haul Roads	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Culvert Crossing Repair	Cement and Mortar Mixers	1	8.00	9	0.56
Culvert Crossing Repair	Pavers	0	8.00	130	0.42
Culvert Crossing Repair	Paving Equipment	0	8.00	132	0.36
Culvert Crossing Repair	Rollers	0	8.00	80	0.38
BTR Grading and Hauling	Excavators	4	8.00	158	0.38
BTR Grading and Hauling	Graders	0	8.00	187	0.41
BTR Grading and Hauling	Off-Highway Trucks	7	8.00	511	0.38
BTR Grading and Hauling	Rubber Tired Dozers	4	8.00	247	0.40
BTR Grading and Hauling	Scrapers	0	8.00	367	0.48
BTR Grading and Hauling	Tractors/Loaders/Backhoes	4	8.00	97	0.37
SPS Grading	Excavators	0	8.00	158	0.38
SPS Grading	Graders	0	8.00	187	0.41
SPS Grading	Rubber Tired Dozers	4	8.00	247	0.40
SPS Grading	Scrapers	0	8.00	367	0.48
SPS Grading	Tractors/Loaders/Backhoes	4	8.00	97	0.37
SPS Construction	Cranes	0	7.00	231	0.29
SPS Construction	Forklifts	0	8.00	89	0.20

SPS Construction	Generator Sets	0	8.00	84	0.74
SPS Construction	Rubber Tired Dozers	4	8.00	247	0.40
SPS Construction	Tractors/Loaders/Backhoes	4	7.00	97	0.37
SPS Construction	Welders	0	8.00	46	0.45
Seasonal Stockpile/Crushing	Crushing/Proc. Equipment	1	8.00	85	0.78
Seasonal Stockpile/Crushing	Generator Sets	1	8.00	84	0.74
Seasonal Stockpile/Crushing	Tractors/Loaders/Backhoes	2	8.00	97	0.37
SPS Paving	Pavers	1	8.00	130	0.42
SPS Paving	Paving Equipment	1	8.00	132	0.36
SPS Paving	Rollers	1	8.00	80	0.38
Slope Protection Activity	Excavators	0	8.00	158	0.38
Slope Protection Activity	Graders	0	8.00	187	0.41
Slope Protection Activity	Rubber Tired Dozers	0	8.00	247	0.40
Slope Protection Activity	Scrapers	0	8.00	367	0.48
Slope Protection Activity	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Hydroblasting for Cement Slurry	Generator Sets	1	8.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
SPS Site Preparation	6	30.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
BTR Site Preparation	1	20.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
BTR Access Road Grading	12	40.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
Dewatering Activities	4	30.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving Haul Roads	3	6.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Culvert Crossing Repair	1	16.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
BTR Grading and Hauling	19	96.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
SPS Grading	8	50.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
SPS Construction	8	0.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
Seasonal Stockpile/Crushing	4	16.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT

SPS Paving	3	10.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Slope Protection Activity	1	0.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Hydroblasting for Cement Slurry	1	6.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Sluicegate Repair			0.00	0.00	19.80	7.90				

3.1 Mitigation Measures Construction

Use Alternative Fuel for Construction Equipment

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 SPS Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0813	0.0000	0.0813	0.0447	0.0000	0.0447	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0292	0.2992	0.2230	3.5000e-004		0.0163	0.0163		0.0150	0.0150	0.0000	30.9915	30.9915	0.0100	0.0000	31.2420
Total	**0.0292**	**0.2992**	**0.2230**	**3.5000e-004**	**0.0813**	**0.0163**	**0.0976**	**0.0447**	**0.0150**	**0.0597**	**0.0000**	**30.9915**	**30.9915**	**0.0100**	**0.0000**	**31.2420**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	6.2000e-004	0.0176	4.7800e-003	5.0000e-005	1.2300e-003	1.0000e-004	1.3300e-003	3.6000e-004	9.0000e-005	4.5000e-004	0.0000	4.5413	4.5413	2.6000e-004	0.0000	4.5477
Worker	2.3800e-003	1.9900e-003	0.0218	6.0000e-005	5.9800e-003	5.0000e-005	6.0300e-003	1.5900e-003	5.0000e-005	1.6300e-003	0.0000	5.5424	5.5424	1.7000e-004	0.0000	5.5467
Total	**3.0000e-003**	**0.0196**	**0.0266**	**1.1000e-004**	**7.2100e-003**	**1.5000e-004**	**7.3600e-003**	**1.9500e-003**	**1.4000e-004**	**2.0800e-003**	**0.0000**	**10.0837**	**10.0837**	**4.3000e-004**	**0.0000**	**10.0944**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0317	0.0000	0.0317	0.0174	0.0000	0.0174	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.3200e-003	0.0187	0.2311	3.5000e-004		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	30.9914	30.9914	0.0100	0.0000	31.2420
Total	**4.3200e-003**	**0.0187**	**0.2311**	**3.5000e-004**	**0.0317**	**5.8000e-004**	**0.0323**	**0.0174**	**5.8000e-004**	**0.0180**	**0.0000**	**30.9914**	**30.9914**	**0.0100**	**0.0000**	**31.2420**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.2000e-004	0.0176	4.7800e-003	5.0000e-005	1.2300e-003	1.0000e-004	1.3300e-003	3.6000e-004	9.0000e-005	4.5000e-004	0.0000	4.5413	4.5413	2.6000e-004	0.0000	4.5477
Worker	2.3800e-003	1.9900e-003	0.0218	6.0000e-005	5.9800e-003	5.0000e-005	6.0300e-003	1.5900e-003	5.0000e-005	1.6300e-003	0.0000	5.5424	5.5424	1.7000e-004	0.0000	5.5467
Total	**3.0000e-003**	**0.0196**	**0.0266**	**1.1000e-004**	**7.2100e-003**	**1.5000e-004**	**7.3600e-003**	**1.9500e-003**	**1.4000e-004**	**2.0800e-003**	**0.0000**	**10.0837**	**10.0837**	**4.3000e-004**	**0.0000**	**10.0944**

3.3 BTR Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.1500e-003	0.0116	0.0125	2.0000e-005		7.3000e-004	7.3000e-004		6.7000e-004	6.7000e-004	0.0000	1.5007	1.5007	4.9000e-004	0.0000	1.5128
Total	**1.1500e-003**	**0.0116**	**0.0125**	**2.0000e-005**	**0.0000**	**7.3000e-004**	**7.3000e-004**	**0.0000**	**6.7000e-004**	**6.7000e-004**	**0.0000**	**1.5007**	**1.5007**	**4.9000e-004**	**0.0000**	**1.5128**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.5000e-004	7.1700e-003	1.9500e-003	2.0000e-005	5.0000e-004	4.0000e-005	5.4000e-004	1.4000e-004	4.0000e-005	1.8000e-004	0.0000	1.8501	1.8501	1.0000e-004	0.0000	1.8528
Worker	6.5000e-004	5.4000e-004	5.9200e-003	2.0000e-005	1.6200e-003	1.0000e-005	1.6400e-003	4.3000e-004	1.0000e-005	4.4000e-004	0.0000	1.5054	1.5054	5.0000e-005	0.0000	1.5065
Total	**9.0000e-004**	**7.7100e-003**	**7.8700e-003**	**4.0000e-005**	**2.1200e-003**	**5.0000e-005**	**2.1800e-003**	**5.7000e-004**	**5.0000e-005**	**6.2000e-004**	**0.0000**	**3.3555**	**3.3555**	**1.5000e-004**	**0.0000**	**3.3593**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1000e-004	9.1000e-004	0.0129	2.0000e-005		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	1.5007	1.5007	4.9000e-004	0.0000	1.5128
Total	**2.1000e-004**	**9.1000e-004**	**0.0129**	**2.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**1.5007**	**1.5007**	**4.9000e-004**	**0.0000**	**1.5128**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.5000e-004	7.1700e-003	1.9500e-003	2.0000e-005	5.0000e-004	4.0000e-005	5.4000e-004	1.4000e-004	4.0000e-005	1.8000e-004	0.0000	1.8501	1.8501	1.0000e-004	0.0000	1.8528
Worker	6.5000e-004	5.4000e-004	5.9200e-003	2.0000e-005	1.6200e-003	1.0000e-005	1.6400e-003	4.3000e-004	1.0000e-005	4.4000e-004	0.0000	1.5054	1.5054	5.0000e-005	0.0000	1.5065
Total	**9.0000e-004**	**7.7100e-003**	**7.8700e-003**	**4.0000e-005**	**2.1200e-003**	**5.0000e-005**	**2.1800e-003**	**5.7000e-004**	**5.0000e-005**	**6.2000e-004**	**0.0000**	**3.3555**	**3.3555**	**1.5000e-004**	**0.0000**	**3.3593**

3.4 BTR Access Road Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3011	0.0000	0.3011	0.1655	0.0000	0.1655	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.0767	0.7925	0.4840	8.4000e-004		0.0403	0.0403		0.0370	0.0370	0.0000	73.8552	73.8552	0.0239	0.0000	74.4524
Total	**0.0767**	**0.7925**	**0.4840**	**8.4000e-004**	**0.3011**	**0.0403**	**0.3414**	**0.1655**	**0.0370**	**0.2025**	**0.0000**	**73.8552**	**73.8552**	**0.0239**	**0.0000**	**74.4524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.7000e-004	0.0163	4.4200e-003	4.0000e-005	1.1400e-003	9.0000e-005	1.2300e-003	3.3000e-004	9.0000e-005	4.1000e-004	0.0000	4.2049	4.2049	2.4000e-004	0.0000	4.2108
Worker	2.9400e-003	2.4500e-003	0.0269	8.0000e-005	7.3800e-003	6.0000e-005	7.4400e-003	1.9600e-003	6.0000e-005	2.0200e-003	0.0000	6.8425	6.8425	2.1000e-004	0.0000	6.8478
Total	**3.5100e-003**	**0.0188**	**0.0313**	**1.2000e-004**	**8.5200e-003**	**1.5000e-004**	**8.6700e-003**	**2.2900e-003**	**1.5000e-004**	**2.4300e-003**	**0.0000**	**11.0474**	**11.0474**	**4.5000e-004**	**0.0000**	**11.0586**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1174	0.0000	0.1174	0.0646	0.0000	0.0646	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0103	0.0447	0.5047	8.4000e-004		1.3700e-003	1.3700e-003		1.3700e-003	1.3700e-003	0.0000	73.8552	73.8552	0.0239	0.0000	74.4523
Total	**0.0103**	**0.0447**	**0.5047**	**8.4000e-004**	**0.1174**	**1.3700e-003**	**0.1188**	**0.0646**	**1.3700e-003**	**0.0659**	**0.0000**	**73.8552**	**73.8552**	**0.0239**	**0.0000**	**74.4523**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.7000e-004	0.0163	4.4200e-003	4.0000e-005	1.1400e-003	9.0000e-005	1.2300e-003	3.3000e-004	9.0000e-005	4.1000e-004	0.0000	4.2049	4.2049	2.4000e-004	0.0000	4.2108
Worker	2.9400e-003	2.4500e-003	0.0269	8.0000e-005	7.3800e-003	6.0000e-005	7.4400e-003	1.9600e-003	6.0000e-005	2.0200e-003	0.0000	6.8425	6.8425	2.1000e-004	0.0000	6.8478
Total	**3.5100e-003**	**0.0188**	**0.0313**	**1.2000e-004**	**8.5200e-003**	**1.5000e-004**	**8.6700e-003**	**2.2900e-003**	**1.5000e-004**	**2.4300e-003**	**0.0000**	**11.0474**	**11.0474**	**4.5000e-004**	**0.0000**	**11.0586**

3.5 Dewatering Activities - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1320	1.1011	1.1739	2.0500e-003		0.0647	0.0647		0.0647	0.0647	0.0000	176.3447	176.3447	0.0106	0.0000	176.6085
Total	**0.1320**	**1.1011**	**1.1739**	**2.0500e-003**		**0.0647**	**0.0647**		**0.0647**	**0.0647**	**0.0000**	**176.3447**	**176.3447**	**0.0106**	**0.0000**	**176.6085**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.5800e-003	3.8300e-003	0.0420	1.2000e-004	0.0115	1.0000e-004	0.0116	3.0600e-003	9.0000e-005	3.1500e-003	0.0000	10.6743	10.6743	3.3000e-004	0.0000	10.6826
Total	**4.5800e-003**	**3.8300e-003**	**0.0420**	**1.2000e-004**	**0.0115**	**1.0000e-004**	**0.0116**	**3.0600e-003**	**9.0000e-005**	**3.1500e-003**	**0.0000**	**10.6743**	**10.6743**	**3.3000e-004**	**0.0000**	**10.6826**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	2.0500e-003		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**2.0500e-003**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	4.5800e-003	3.8300e-003	0.0420	1.2000e-004	0.0115	1.0000e-004	0.0116	3.0600e-003	9.0000e-005	3.1500e-003	0.0000	10.6743	10.6743	3.3000e-004	0.0000	10.6826
Total	**4.5800e-003**	**3.8300e-003**	**0.0420**	**1.2000e-004**	**0.0115**	**1.0000e-004**	**0.0116**	**3.0600e-003**	**9.0000e-005**	**3.1500e-003**	**0.0000**	**10.6743**	**10.6743**	**3.3000e-004**	**0.0000**	**10.6826**

3.6 Paving Haul Roads - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.4800e-003	0.0879	0.0916	1.4000e-004		4.7000e-003	4.7000e-003		4.3300e-003	4.3300e-003	0.0000	12.5176	12.5176	4.0500e-003	0.0000	12.6189
Paving	8.5200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0170**	**0.0879**	**0.0916**	**1.4000e-004**		**4.7000e-003**	**4.7000e-003**		**4.3300e-003**	**4.3300e-003**	**0.0000**	**12.5176**	**12.5176**	**4.0500e-003**	**0.0000**	**12.6189**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	3.7000e-004	4.0400e-003	1.0000e-005	1.1100e-003	1.0000e-005	1.1200e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	1.0264	1.0264	3.0000e-005	0.0000	1.0272
Total	**4.4000e-004**	**3.7000e-004**	**4.0400e-003**	**1.0000e-005**	**1.1100e-003**	**1.0000e-005**	**1.1200e-003**	**2.9000e-004**	**1.0000e-005**	**3.0000e-004**	**0.0000**	**1.0264**	**1.0264**	**3.0000e-005**	**0.0000**	**1.0272**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.7500e-003	7.6000e-003	0.1081	1.4000e-004		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004	0.0000	12.5176	12.5176	4.0500e-003	0.0000	12.6188
Paving	8.5200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0103**	**7.6000e-003**	**0.1081**	**1.4000e-004**		**2.3000e-004**	**2.3000e-004**		**2.3000e-004**	**2.3000e-004**	**0.0000**	**12.5176**	**12.5176**	**4.0500e-003**	**0.0000**	**12.6188**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	3.7000e-004	4.0400e-003	1.0000e-005	1.1100e-003	1.0000e-005	1.1200e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	1.0264	1.0264	3.0000e-005	0.0000	1.0272
Total	**4.4000e-004**	**3.7000e-004**	**4.0400e-003**	**1.0000e-005**	**1.1100e-003**	**1.0000e-005**	**1.1200e-003**	**2.9000e-004**	**1.0000e-005**	**3.0000e-004**	**0.0000**	**1.0264**	**1.0264**	**3.0000e-005**	**0.0000**	**1.0272**

3.7 Culvert Crossing Repair - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Off-Road	7.3000e-004	4.6000e-003	3.8600e-003	1.0000e-005		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004	0.0000	0.5729	0.5729	6.0000e-005	0.0000	0.5743
Paving	8.5200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.2500e-003**	**4.6000e-003**	**3.8600e-003**	**1.0000e-005**		**1.8000e-004**	**1.8000e-004**		**1.8000e-004**	**1.8000e-004**	**0.0000**	**0.5729**	**0.5729**	**6.0000e-005**	**0.0000**	**0.5743**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1700e-003	9.8000e-004	0.0108	3.0000e-005	2.9500e-003	2.0000e-005	2.9800e-003	7.8000e-004	2.0000e-005	8.1000e-004	0.0000	2.7370	2.7370	9.0000e-005	0.0000	2.7391
Total	**1.1700e-003**	**9.8000e-004**	**0.0108**	**3.0000e-005**	**2.9500e-003**	**2.0000e-005**	**2.9800e-003**	**7.8000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.7370**	**2.7370**	**9.0000e-005**	**0.0000**	**2.7391**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	1.0000e-005		0.0000	0.0000		0.0000	0.0000	0.0000	0.5728	0.5728	6.0000e-005	0.0000	0.5743
Paving	8.5200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total	**8.5200e-003**	**0.0000**	**0.0000**	**1.0000e-005**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.5728**	**0.5728**	**6.0000e-005**	**0.0000**	**0.5743**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1700e-003	9.8000e-004	0.0108	3.0000e-005	2.9500e-003	2.0000e-005	2.9800e-003	7.8000e-004	2.0000e-005	8.1000e-004	0.0000	2.7370	2.7370	9.0000e-005	0.0000	2.7391
Total	**1.1700e-003**	**9.8000e-004**	**0.0108**	**3.0000e-005**	**2.9500e-003**	**2.0000e-005**	**2.9800e-003**	**7.8000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.7370**	**2.7370**	**9.0000e-005**	**0.0000**	**2.7391**

3.8 BTR Grading and Hauling - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5778	0.0000	1.5778	0.8673	0.0000	0.8673	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.8923	8.9548	5.7186	0.0121		0.3987	0.3987		0.3668	0.3668	0.0000	1,060.4358	1,060.4358	0.3430	0.0000	1,069.0099
Total	**0.8923**	**8.9548**	**5.7186**	**0.0121**	**1.5778**	**0.3987**	**1.9765**	**0.8673**	**0.3668**	**1.2341**	**0.0000**	**1,060.4358**	**1,060.4358**	**0.3430**	**0.0000**	**1,069.0099**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-003	0.0854	0.0232	2.3000e-004	5.9700e-003	4.7000e-004	6.4400e-003	1.7200e-003	4.5000e-004	2.1700e-003	0.0000	22.0335	22.0335	1.2400e-003	0.0000	22.0646
Worker	0.0369	0.0308	0.3386	9.5000e-004	0.0928	7.8000e-004	0.0936	0.0246	7.2000e-004	0.0254	0.0000	86.0512	86.0512	2.6800e-003	0.0000	86.1181
Total	**0.0399**	**0.1163**	**0.3617**	**1.1800e-003**	**0.0988**	**1.2500e-003**	**0.1000**	**0.0264**	**1.1700e-003**	**0.0275**	**0.0000**	**108.0847**	**108.0847**	**3.9200e-003**	**0.0000**	**108.1828**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6153	0.0000	0.6153	0.3382	0.0000	0.3382	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1482	0.6422	6.0991	0.0121		0.0198	0.0198		0.0198	0.0198	0.0000	1,060.4345	1,060.4345	0.3430	0.0000	1,069.0087
Total	**0.1482**	**0.6422**	**6.0991**	**0.0121**	**0.6153**	**0.0198**	**0.6351**	**0.3382**	**0.0198**	**0.3580**	**0.0000**	**1,060.4345**	**1,060.4345**	**0.3430**	**0.0000**	**1,069.0087**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-003	0.0854	0.0232	2.3000e-004	5.9700e-003	4.7000e-004	6.4400e-003	1.7200e-003	4.5000e-004	2.1700e-003	0.0000	22.0335	22.0335	1.2400e-003	0.0000	22.0646
Worker	0.0369	0.0308	0.3386	9.5000e-004	0.0928	7.8000e-004	0.0936	0.0246	7.2000e-004	0.0254	0.0000	86.0512	86.0512	2.6800e-003	0.0000	86.1181
Total	**0.0399**	**0.1163**	**0.3617**	**1.1800e-003**	**0.0988**	**1.2500e-003**	**0.1000**	**0.0264**	**1.1700e-003**	**0.0275**	**0.0000**	**108.0847**	**108.0847**	**3.9200e-003**	**0.0000**	**108.1828**

3.9 SPS Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5778	0.0000	1.5778	0.8673	0.0000	0.8673	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3377	3.5206	1.6798	3.0500e-003		0.1803	0.1803		0.1659	0.1659	0.0000	268.1321	268.1321	0.0867	0.0000	270.3001
Total	**0.3377**	**3.5206**	**1.6798**	**3.0500e-003**	**1.5778**	**0.1803**	**1.7581**	**0.8673**	**0.1659**	**1.0331**	**0.0000**	**268.1321**	**268.1321**	**0.0867**	**0.0000**	**270.3001**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0192	0.0161	0.1763	5.0000e-004	0.0483	4.0000e-004	0.0487	0.0128	3.7000e-004	0.0132	0.0000	44.8183	44.8183	1.3900e-003	0.0000	44.8532

Total	**0.0192**	**0.0161**	**0.1763**	**5.0000e-004**	**0.0483**	**4.0000e-004**	**0.0487**	**0.0128**	**3.7000e-004**	**0.0132**	**0.0000**	**44.8183**	**44.8183**	**1.3900e-003**	**0.0000**	**44.8532**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6153	0.0000	0.6153	0.3382	0.0000	0.3382	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0373	0.1618	1.6180	3.0500e-003		4.9800e-003	4.9800e-003		4.9800e-003	4.9800e-003	0.0000	268.1318	268.1318	0.0867	0.0000	270.2998
Total	**0.0373**	**0.1618**	**1.6180**	**3.0500e-003**	**0.6153**	**4.9800e-003**	**0.6203**	**0.3382**	**4.9800e-003**	**0.3432**	**0.0000**	**268.1318**	**268.1318**	**0.0867**	**0.0000**	**270.2998**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0192	0.0161	0.1763	5.0000e-004	0.0483	4.0000e-004	0.0487	0.0128	3.7000e-004	0.0132	0.0000	44.8183	44.8183	1.3900e-003	0.0000	44.8532
Total	**0.0192**	**0.0161**	**0.1763**	**5.0000e-004**	**0.0483**	**4.0000e-004**	**0.0487**	**0.0128**	**3.7000e-004**	**0.0132**	**0.0000**	**44.8183**	**44.8183**	**1.3900e-003**	**0.0000**	**44.8532**

3.10 SPS Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1995	2.0815	0.9680	1.7800e-003		0.1061	0.1061		0.0976	0.0976	0.0000	156.3092	156.3092	0.0506	0.0000	157.5730
Total	**0.1995**	**2.0815**	**0.9680**	**1.7800e-003**		**0.1061**	**0.1061**		**0.0976**	**0.0976**	**0.0000**	**156.3092**	**156.3092**	**0.0506**	**0.0000**	**157.5730**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8100e-003	0.0515	0.0140	1.4000e-004	3.6000e-003	2.8000e-004	3.8800e-003	1.0400e-003	2.7000e-004	1.3100e-003	0.0000	13.2874	13.2874	7.5000e-004	0.0000	13.3061
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.8100e-003**	**0.0515**	**0.0140**	**1.4000e-004**	**3.6000e-003**	**2.8000e-004**	**3.8800e-003**	**1.0400e-003**	**2.7000e-004**	**1.3100e-003**	**0.0000**	**13.2874**	**13.2874**	**7.5000e-004**	**0.0000**	**13.3061**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Off-Road	0.0218	0.0943	0.9295	1.7800e-003		2.9000e-003	2.9000e-003		2.9000e-003	2.9000e-003	0.0000	156.3090	156.3090	0.0506	0.0000	157.5728
Total	**0.0218**	**0.0943**	**0.9295**	**1.7800e-003**		**2.9000e-003**	**2.9000e-003**		**2.9000e-003**	**2.9000e-003**	**0.0000**	**156.3090**	**156.3090**	**0.0506**	**0.0000**	**157.5728**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8100e-003	0.0515	0.0140	1.4000e-004	3.6000e-003	2.8000e-004	3.8800e-003	1.0400e-003	2.7000e-004	1.3100e-003	0.0000	13.2874	13.2874	7.5000e-004	0.0000	13.3061
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.8100e-003**	**0.0515**	**0.0140**	**1.4000e-004**	**3.6000e-003**	**2.8000e-004**	**3.8800e-003**	**1.0400e-003**	**2.7000e-004**	**1.3100e-003**	**0.0000**	**13.2874**	**13.2874**	**7.5000e-004**	**0.0000**	**13.3061**

3.11 Seasonal Stockpile/Crushing - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0357	0.2987	0.3281	5.1000e-004		0.0183	0.0183		0.0177	0.0177	0.0000	44.5579	44.5579	6.5700e-003	0.0000	44.7222
Total	**0.0357**	**0.2987**	**0.3281**	**5.1000e-004**		**0.0183**	**0.0183**		**0.0177**	**0.0177**	**0.0000**	**44.5579**	**44.5579**	**6.5700e-003**	**0.0000**	**44.7222**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4400e-003	2.0400e-003	0.0224	6.0000e-005	6.1400e-003	5.0000e-005	6.1900e-003	1.6300e-003	5.0000e-005	1.6800e-003	0.0000	5.6930	5.6930	1.8000e-004	0.0000	5.6974
Total	**2.4400e-003**	**2.0400e-003**	**0.0224**	**6.0000e-005**	**6.1400e-003**	**5.0000e-005**	**6.1900e-003**	**1.6300e-003**	**5.0000e-005**	**1.6800e-003**	**0.0000**	**5.6930**	**5.6930**	**1.8000e-004**	**0.0000**	**5.6974**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.5100e-003	0.0239	0.3397	5.1000e-004		7.3000e-004	7.3000e-004		7.3000e-004	7.3000e-004	0.0000	44.5578	44.5578	6.5700e-003	0.0000	44.7222
Total	**5.5100e-003**	**0.0239**	**0.3397**	**5.1000e-004**		**7.3000e-004**	**7.3000e-004**		**7.3000e-004**	**7.3000e-004**	**0.0000**	**44.5578**	**44.5578**	**6.5700e-003**	**0.0000**	**44.7222**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4400e-003	2.0400e-003	0.0224	6.0000e-005	6.1400e-003	5.0000e-005	6.1900e-003	1.6300e-003	5.0000e-005	1.6800e-003	0.0000	5.6930	5.6930	1.8000e-004	0.0000	5.6974
Total	**2.4400e-003**	**2.0400e-003**	**0.0224**	**6.0000e-005**	**6.1400e-003**	**5.0000e-005**	**6.1900e-003**	**1.6300e-003**	**5.0000e-005**	**1.6800e-003**	**0.0000**	**5.6930**	**5.6930**	**1.8000e-004**	**0.0000**	**5.6974**

3.12 SPS Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0176	0.1829	0.1905	3.0000e-004		9.7900e-003	9.7900e-003		9.0000e-003	9.0000e-003	0.0000	26.0367	26.0367	8.4200e-003	0.0000	26.2472
Paving	8.5200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0262**	**0.1829**	**0.1905**	**3.0000e-004**		**9.7900e-003**	**9.7900e-003**		**9.0000e-003**	**9.0000e-003**	**0.0000**	**26.0367**	**26.0367**	**8.4200e-003**	**0.0000**	**26.2472**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5300e-003	1.2800e-003	0.0140	4.0000e-005	3.8400e-003	3.0000e-005	3.8700e-003	1.0200e-003	3.0000e-005	1.0500e-003	0.0000	3.5581	3.5581	1.1000e-004	0.0000	3.5609
Total	**1.5300e-003**	**1.2800e-003**	**0.0140**	**4.0000e-005**	**3.8400e-003**	**3.0000e-005**	**3.8700e-003**	**1.0200e-003**	**3.0000e-005**	**1.0500e-003**	**0.0000**	**3.5581**	**3.5581**	**1.1000e-004**	**0.0000**	**3.5609**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.6500e-003	0.0158	0.2248	3.0000e-004		4.9000e-004	4.9000e-004		4.9000e-004	4.9000e-004	0.0000	26.0367	26.0367	8.4200e-003	0.0000	26.2472
Paving	8.5200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0122**	**0.0158**	**0.2248**	**3.0000e-004**		**4.9000e-004**	**4.9000e-004**		**4.9000e-004**	**4.9000e-004**	**0.0000**	**26.0367**	**26.0367**	**8.4200e-003**	**0.0000**	**26.2472**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5300e-003	1.2800e-003	0.0140	4.0000e-005	3.8400e-003	3.0000e-005	3.8700e-003	1.0200e-003	3.0000e-005	1.0500e-003	0.0000	3.5581	3.5581	1.1000e-004	0.0000	3.5609
Total	**1.5300e-003**	**1.2800e-003**	**0.0140**	**4.0000e-005**	**3.8400e-003**	**3.0000e-005**	**3.8700e-003**	**1.0200e-003**	**3.0000e-005**	**1.0500e-003**	**0.0000**	**3.5581**	**3.5581**	**1.1000e-004**	**0.0000**	**3.5609**

3.13 Slope Protection Activity - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7200e-003	0.0274	0.0296	4.0000e-005		1.7300e-003	1.7300e-003		1.5900e-003	1.5900e-003	0.0000	3.5471	3.5471	1.1500e-003	0.0000	3.5758
Total	**2.7200e-003**	**0.0274**	**0.0296**	**4.0000e-005**	**0.0000**	**1.7300e-003**	**1.7300e-003**	**0.0000**	**1.5900e-003**	**1.5900e-003**	**0.0000**	**3.5471**	**3.5471**	**1.1500e-003**	**0.0000**	**3.5758**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.9000e-004	2.1400e-003	0.0305	4.0000e-005		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005	0.0000	3.5471	3.5471	1.1500e-003	0.0000	3.5758
Total	**4.9000e-004**	**2.1400e-003**	**0.0305**	**4.0000e-005**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**3.5471**	**3.5471**	**1.1500e-003**	**0.0000**	**3.5758**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.14 Hydroblasting for Cement Slurry - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.1900e-003	0.0452	0.0482	9.0000e-005		2.5500e-003	2.5500e-003		2.5500e-003	2.5500e-003	0.0000	7.3477	7.3477	4.1000e-004	0.0000	7.3580

Total	**5.1900e-003**	**0.0452**	**0.0482**	**9.0000e-005**		**2.5500e-003**	**2.5500e-003**		**2.5500e-003**	**2.5500e-003**	**0.0000**	**7.3477**	**7.3477**	**4.1000e-004**	**0.0000**	**7.3580**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6000e-004	3.8000e-004	4.2000e-003	1.0000e-005	1.1500e-003	1.0000e-005	1.1600e-003	3.1000e-004	1.0000e-005	3.1000e-004	0.0000	1.0674	1.0674	3.0000e-005	0.0000	1.0683
Total	**4.6000e-004**	**3.8000e-004**	**4.2000e-003**	**1.0000e-005**	**1.1500e-003**	**1.0000e-005**	**1.1600e-003**	**3.1000e-004**	**1.0000e-005**	**3.1000e-004**	**0.0000**	**1.0674**	**1.0674**	**3.0000e-005**	**0.0000**	**1.0683**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.6000e-004	3.7100e-003	0.0527	9.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	7.3477	7.3477	4.1000e-004	0.0000	7.3580
Total	**8.6000e-004**	**3.7100e-003**	**0.0527**	**9.0000e-005**		**1.1000e-004**	**1.1000e-004**		**1.1000e-004**	**1.1000e-004**	**0.0000**	**7.3477**	**7.3477**	**4.1000e-004**	**0.0000**	**7.3580**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6000e-004	3.8000e-004	4.2000e-003	1.0000e-005	1.1500e-003	1.0000e-005	1.1600e-003	3.1000e-004	1.0000e-005	3.1000e-004	0.0000	1.0674	1.0674	3.0000e-005	0.0000	1.0683
Total	**4.6000e-004**	**3.8000e-004**	**4.2000e-003**	**1.0000e-005**	**1.1500e-003**	**1.0000e-005**	**1.1600e-003**	**3.1000e-004**	**1.0000e-005**	**3.1000e-004**	**0.0000**	**1.0674**	**1.0674**	**3.0000e-005**	**0.0000**	**1.0683**

3.15 Sluicegate Repair - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0
User Defined Industrial	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907
User Defined Industrial	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			

Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0183	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.9000e-004	1.9000e-004	0.0000	0.0000	2.0000e-004
Unmitigated	0.0183	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.9000e-004	1.9000e-004	0.0000	0.0000	2.0000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0183					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.9000e-004	1.9000e-004	0.0000	0.0000	2.0000e-004
Total	**0.0183**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**0.0000**	**2.0000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0183					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.9000e-004	1.9000e-004	0.0000	0.0000	2.0000e-004
Total	**0.0183**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**0.0000**	**2.0000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			

Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Big T Restoration Project- Revegetation/Maple Canyon SPS Closure

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	29.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2026
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	541	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Adjusted CO2 IF reflect RPS for SCE.

Land Use - .

Construction Phase - .

Off-road Equipment - .

Off-road Equipment - 1 Dozer

Trips and VMT - estimates for planting and for water trucks, and worker trips

Grading - All balanced on-site per Revegetation Plan

Energy Use -

Construction Off-road Equipment Mitigation - .

Consumer Products - .

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	80.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblLandUse	LotAcreage	0.00	29.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	541
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	3.00	10.00
tblTripsAndVMT	WorkerTripNumber	3.00	10.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2025	0.7234	7.4442	3.6199	0.0130	6.2653	0.2924	6.5577	3.3768	0.2690	3.6458	0.0000	1,297.8676	1,297.8676	0.2879	0.0000	1,305.0640
2026	0.7208	7.4336	3.5920	0.0140	6.2653	0.2923	6.5576	3.3768	0.2690	3.6458	0.0000	1,429.9711	1,429.9711	0.2874	0.0000	1,435.9187
Maximum	**0.7234**	**7.4442**	**3.6199**	**0.0140**	**6.2653**	**0.2924**	**6.5577**	**3.3768**	**0.2690**	**3.6458**	**0.0000**	**1,429.9711**	**1,429.9711**	**0.2879**	**0.0000**	**1,435.9187**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2025	0.7234	7.4442	3.6199	0.0130	2.5918	0.2924	2.8842	1.3576	0.2690	1.6266	0.0000	1,297.8676	1,297.8676	0.2879	0.0000	1,305.0640
2026	0.7208	7.4336	3.5920	0.0140	2.5918	0.2923	2.8841	1.3576	0.2690	1.6265	0.0000	1,429.9711	1,429.9711	0.2874	0.0000	1,435.9187
Maximum	**0.7234**	**7.4442**	**3.6199**	**0.0140**	**2.5918**	**0.2924**	**2.8842**	**1.3576**	**0.2690**	**1.6266**	**0.0000**	**1,429.9711**	**1,429.9711**	**0.2879**	**0.0000**	**1,435.9187**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**58.63**	**0.00**	**56.02**	**59.80**	**0.00**	**55.39**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/15/2025	1/15/2026	6	80	
2	Planting	Trenching	10/1/2026	12/1/2026	6	53	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor

Site Preparation	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Planting	Rubber Tired Dozers	1	6.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	1	10.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
Planting	1	10.00	20.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	0.6481	6.6312	2.9977	8.5400e-003		0.2901	0.2901		0.2669	0.2669		826.9601	826.9601	0.2675		833.6465
Total	**0.6481**	**6.6312**	**2.9977**	**8.5400e-003**	**6.0221**	**0.2901**	**6.3122**	**3.3102**	**0.2669**	**3.5772**		**826.9601**	**826.9601**	**0.2675**		**833.6465**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0263	0.7837	0.2695	3.2300e-003	0.0927	1.1300e-003	0.0938	0.0267	1.0800e-003	0.0278		346.5192	346.5192	0.0176		346.9583
Worker	0.0490	0.0293	0.3526	1.2500e-003	0.1505	1.0800e-003	0.1516	0.0399	1.0000e-003	0.0409		124.3883	124.3883	2.8400e-003		124.4592
Total	**0.0753**	**0.8130**	**0.6222**	**4.4800e-003**	**0.2432**	**2.2100e-003**	**0.2454**	**0.0666**	**2.0800e-003**	**0.0687**		**470.9075**	**470.9075**	**0.0204**		**471.4175**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	0.6481	6.6312	2.9977	8.5400e-003		0.2901	0.2901		0.2669	0.2669	0.0000	826.9601	826.9601	0.2675		833.6465
Total	**0.6481**	**6.6312**	**2.9977**	**8.5400e-003**	**2.3486**	**0.2901**	**2.6388**	**1.2910**	**0.2669**	**1.5579**	**0.0000**	**826.9601**	**826.9601**	**0.2675**		**833.6465**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0263	0.7837	0.2695	3.2300e-003	0.0927	1.1300e-003	0.0938	0.0267	1.0800e-003	0.0278		346.5192	346.5192	0.0176		346.9583
Worker	0.0490	0.0293	0.3526	1.2500e-003	0.1505	1.0800e-003	0.1516	0.0399	1.0000e-003	0.0409		124.3883	124.3883	2.8400e-003		124.4592

Total	**0.0753**	**0.8130**	**0.6222**	**4.4800e-003**	**0.2432**	**2.2100e-003**	**0.2454**	**0.0666**	**2.0800e-003**	**0.0687**		**470.9075**	**470.9075**	**0.0204**		**471.4175**

3.2 Site Preparation - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	0.6481	6.6312	2.9977	8.5400e-003		0.2901	0.2901		0.2669	0.2669		826.9601	826.9601	0.2675		833.6465
Total	**0.6481**	**6.6312**	**2.9977**	**8.5400e-003**	**6.0221**	**0.2901**	**6.3122**	**3.3102**	**0.2669**	**3.5772**		**826.9601**	**826.9601**	**0.2675**		**833.6465**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0257	0.7754	0.2647	3.2200e-003	0.0927	1.1100e-003	0.0938	0.0267	1.0600e-003	0.0277		344.8414	344.8414	0.0174		345.2753
Worker	0.0470	0.0270	0.3296	1.2000e-003	0.1505	1.0500e-003	0.1516	0.0399	9.6000e-004	0.0409		120.0682	120.0682	2.6000e-003		120.1333
Total	**0.0727**	**0.8024**	**0.5943**	**4.4200e-003**	**0.2432**	**2.1600e-003**	**0.2454**	**0.0666**	**2.0200e-003**	**0.0686**		**464.9096**	**464.9096**	**0.0200**		**465.4085**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	0.6481	6.6312	2.9977	8.5400e-003		0.2901	0.2901		0.2669	0.2669	0.0000	826.9601	826.9601	0.2675		833.6465
Total	**0.6481**	**6.6312**	**2.9977**	**8.5400e-003**	**2.3486**	**0.2901**	**2.6388**	**1.2910**	**0.2669**	**1.5579**	**0.0000**	**826.9601**	**826.9601**	**0.2675**		**833.6465**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0257	0.7754	0.2647	3.2200e-003	0.0927	1.1100e-003	0.0938	0.0267	1.0600e-003	0.0277		344.8414	344.8414	0.0174		345.2753
Worker	0.0470	0.0270	0.3296	1.2000e-003	0.1505	1.0500e-003	0.1516	0.0399	9.6000e-004	0.0409		120.0682	120.0682	2.6000e-003		120.1333
Total	**0.0727**	**0.8024**	**0.5943**	**4.4200e-003**	**0.2432**	**2.1600e-003**	**0.2454**	**0.0666**	**2.0200e-003**	**0.0686**		**464.9096**	**464.9096**	**0.0200**		**465.4085**

3.3 Planting - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	0.4861	4.9734	2.2483	6.4000e-003		0.2176	0.2176		0.2002	0.2002		620.2201	620.2201	0.2006		625.2349
Total	**0.4861**	**4.9734**	**2.2483**	**6.4000e-003**		**0.2176**	**0.2176**		**0.2002**	**0.2002**		**620.2201**	**620.2201**	**0.2006**		**625.2349**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0515	1.5508	0.5294	6.4300e-003	0.1854	2.2200e-003	0.1876	0.0533	2.1200e-003	0.0555		689.6828	689.6828	0.0347		690.5505
Worker	0.0470	0.0270	0.3296	1.2000e-003	0.1505	1.0500e-003	0.1516	0.0399	9.6000e-004	0.0409		120.0682	120.0682	2.6000e-003		120.1333
Total	**0.0985**	**1.5779**	**0.8589**	**7.6300e-003**	**0.3359**	**3.2700e-003**	**0.3391**	**0.0933**	**3.0800e-003**	**0.0963**		**809.7510**	**809.7510**	**0.0373**		**810.6838**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4861	4.9734	2.2483	6.4000e-003		0.2176	0.2176		0.2002	0.2002	0.0000	620.2201	620.2201	0.2006		625.2349
Total	**0.4861**	**4.9734**	**2.2483**	**6.4000e-003**		**0.2176**	**0.2176**		**0.2002**	**0.2002**	**0.0000**	**620.2201**	**620.2201**	**0.2006**		**625.2349**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0515	1.5508	0.5294	6.4300e-003	0.1854	2.2200e-003	0.1876	0.0533	2.1200e-003	0.0555		689.6828	689.6828	0.0347		690.5505
Worker	0.0470	0.0270	0.3296	1.2000e-003	0.1505	1.0500e-003	0.1516	0.0399	9.6000e-004	0.0409		120.0682	120.0682	2.6000e-003		120.1333
Total	**0.0985**	**1.5779**	**0.8589**	**7.6300e-003**	**0.3359**	**3.2700e-003**	**0.3391**	**0.0933**	**3.0800e-003**	**0.0963**		**809.7510**	**809.7510**	**0.0373**		**810.6838**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.544210	0.044379	0.208611	0.117175	0.014456	0.006301	0.020907	0.032661	0.002589	0.001903	0.005267	0.000705	0.000834

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Big T Restoration Project- Revegetation/Maple Canyon SPS Closure

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	29.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2026
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	541	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Adjusted CO2 IF reflect RPS for SCE.

Land Use - .

Construction Phase - .

Off-road Equipment - .

Off-road Equipment - 1 Dozer

Trips and VMT - estimates for planting and for water trucks, and worker trips

Grading - All balanced on-site per Revegetation Plan

Energy Use -

Construction Off-road Equipment Mitigation - .

Consumer Products - .

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	80.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblLandUse	LotAcreage	0.00	29.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	541
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	3.00	10.00
tblTripsAndVMT	WorkerTripNumber	3.00	10.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2025	0.7163	7.4407	3.6399	0.0132	6.2653	0.2923	6.5576	3.3768	0.2690	3.6458	0.0000	1,312.6154	1,312.6154	0.2873	0.0000	1,319.7981
2026	0.7138	7.4304	3.6102	0.0142	6.2653	0.2923	6.5576	3.3768	0.2689	3.6457	0.0000	1,451.3122	1,451.3122	0.2869	0.0000	1,457.2281
Maximum	**0.7163**	**7.4407**	**3.6399**	**0.0142**	**6.2653**	**0.2923**	**6.5576**	**3.3768**	**0.2690**	**3.6458**	**0.0000**	**1,451.3122**	**1,451.3122**	**0.2873**	**0.0000**	**1,457.2281**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2025	0.7163	7.4407	3.6399	0.0132	2.5918	0.2923	2.8841	1.3576	0.2690	1.6265	0.0000	1,312.6154	1,312.6154	0.2873	0.0000	1,319.7981
2026	0.7138	7.4304	3.6102	0.0142	2.5918	0.2923	2.8841	1.3576	0.2689	1.6265	0.0000	1,451.3122	1,451.3122	0.2869	0.0000	1,457.2281
Maximum	**0.7163**	**7.4407**	**3.6399**	**0.0142**	**2.5918**	**0.2923**	**2.8841**	**1.3576**	**0.2690**	**1.6265**	**0.0000**	**1,451.3122**	**1,451.3122**	**0.2873**	**0.0000**	**1,457.2281**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**58.63**	**0.00**	**56.02**	**59.80**	**0.00**	**55.39**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/15/2025	1/15/2026	6	80	
2	Planting	Trenching	10/1/2026	12/1/2026	6	53	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor

Site Preparation	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Planting	Rubber Tired Dozers	1	6.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	1	10.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
Planting	1	10.00	20.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	0.6481	6.6312	2.9977	8.5400e-003		0.2901	0.2901		0.2669	0.2669		826.9601	826.9601	0.2675		833.6465
Total	**0.6481**	**6.6312**	**2.9977**	**8.5400e-003**	**6.0221**	**0.2901**	**6.3122**	**3.3102**	**0.2669**	**3.5772**		**826.9601**	**826.9601**	**0.2675**		**833.6465**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0252	0.7830	0.2516	3.3000e-003	0.0927	1.1000e-003	0.0938	0.0267	1.0500e-003	0.0277		353.5331	353.5331	0.0168		353.9534
Worker	0.0430	0.0265	0.3906	1.3200e-003	0.1505	1.0800e-003	0.1516	0.0399	1.0000e-003	0.0409		132.1221	132.1221	3.0400e-003		132.1981
Total	**0.0682**	**0.8095**	**0.6422**	**4.6200e-003**	**0.2432**	**2.1800e-003**	**0.2454**	**0.0666**	**2.0500e-003**	**0.0686**		**485.6553**	**485.6553**	**0.0199**		**486.1516**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	0.6481	6.6312	2.9977	8.5400e-003		0.2901	0.2901		0.2669	0.2669	0.0000	826.9601	826.9601	0.2675		833.6465
Total	**0.6481**	**6.6312**	**2.9977**	**8.5400e-003**	**2.3486**	**0.2901**	**2.6388**	**1.2910**	**0.2669**	**1.5579**	**0.0000**	**826.9601**	**826.9601**	**0.2675**		**833.6465**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0252	0.7830	0.2516	3.3000e-003	0.0927	1.1000e-003	0.0938	0.0267	1.0500e-003	0.0277		353.5331	353.5331	0.0168		353.9534
Worker	0.0430	0.0265	0.3906	1.3200e-003	0.1505	1.0800e-003	0.1516	0.0399	1.0000e-003	0.0409		132.1221	132.1221	3.0400e-003		132.1981

Total	**0.0682**	**0.8095**	**0.6422**	**4.6200e-003**	**0.2432**	**2.1800e-003**	**0.2454**	**0.0666**	**2.0500e-003**	**0.0686**		**485.6553**	**485.6553**	**0.0199**		**486.1516**

3.2 Site Preparation - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	0.6481	6.6312	2.9977	8.5400e-003		0.2901	0.2901		0.2669	0.2669		826.9601	826.9601	0.2675		833.6465
Total	**0.6481**	**6.6312**	**2.9977**	**8.5400e-003**	**6.0221**	**0.2901**	**6.3122**	**3.3102**	**0.2669**	**3.5772**		**826.9601**	**826.9601**	**0.2675**		**833.6465**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0247	0.7748	0.2472	3.2800e-003	0.0927	1.0800e-003	0.0938	0.0267	1.0300e-003	0.0277		351.7803	351.7803	0.0166		352.1960
Worker	0.0411	0.0244	0.3653	1.2800e-003	0.1505	1.0500e-003	0.1516	0.0399	9.6000e-004	0.0409		127.5316	127.5316	2.7900e-003		127.6013
Total	**0.0658**	**0.7992**	**0.6125**	**4.5600e-003**	**0.2432**	**2.1300e-003**	**0.2453**	**0.0666**	**1.9900e-003**	**0.0686**		**479.3119**	**479.3119**	**0.0194**		**479.7973**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	0.6481	6.6312	2.9977	8.5400e-003		0.2901	0.2901		0.2669	0.2669	0.0000	826.9601	826.9601	0.2675		833.6465
Total	**0.6481**	**6.6312**	**2.9977**	**8.5400e-003**	**2.3486**	**0.2901**	**2.6388**	**1.2910**	**0.2669**	**1.5579**	**0.0000**	**826.9601**	**826.9601**	**0.2675**		**833.6465**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0247	0.7748	0.2472	3.2800e-003	0.0927	1.0800e-003	0.0938	0.0267	1.0300e-003	0.0277		351.7803	351.7803	0.0166		352.1960
Worker	0.0411	0.0244	0.3653	1.2800e-003	0.1505	1.0500e-003	0.1516	0.0399	9.6000e-004	0.0409		127.5316	127.5316	2.7900e-003		127.6013
Total	**0.0658**	**0.7992**	**0.6125**	**4.5600e-003**	**0.2432**	**2.1300e-003**	**0.2453**	**0.0666**	**1.9900e-003**	**0.0686**		**479.3119**	**479.3119**	**0.0194**		**479.7973**

3.3 Planting - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	0.4861	4.9734	2.2483	6.4000e-003		0.2176	0.2176		0.2002	0.2002		620.2201	620.2201	0.2006		625.2349
Total	**0.4861**	**4.9734**	**2.2483**	**6.4000e-003**		**0.2176**	**0.2176**		**0.2002**	**0.2002**		**620.2201**	**620.2201**	**0.2006**		**625.2349**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0494	1.5495	0.4943	6.5600e-003	0.1854	2.1600e-003	0.1875	0.0533	2.0600e-003	0.0554		703.5605	703.5605	0.0333		704.3919
Worker	0.0411	0.0244	0.3653	1.2800e-003	0.1505	1.0500e-003	0.1516	0.0399	9.6000e-004	0.0409		127.5316	127.5316	2.7900e-003		127.6013
Total	**0.0905**	**1.5740**	**0.8596**	**7.8400e-003**	**0.3359**	**3.2100e-003**	**0.3391**	**0.0933**	**3.0200e-003**	**0.0963**		**831.0921**	**831.0921**	**0.0361**		**831.9932**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4861	4.9734	2.2483	6.4000e-003		0.2176	0.2176		0.2002	0.2002	0.0000	620.2201	620.2201	0.2006		625.2349
Total	**0.4861**	**4.9734**	**2.2483**	**6.4000e-003**		**0.2176**	**0.2176**		**0.2002**	**0.2002**	**0.0000**	**620.2201**	**620.2201**	**0.2006**		**625.2349**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0494	1.5495	0.4943	6.5600e-003	0.1854	2.1600e-003	0.1875	0.0533	2.0600e-003	0.0554		703.5605	703.5605	0.0333		704.3919
Worker	0.0411	0.0244	0.3653	1.2800e-003	0.1505	1.0500e-003	0.1516	0.0399	9.6000e-004	0.0409		127.5316	127.5316	2.7900e-003		127.6013
Total	**0.0905**	**1.5740**	**0.8596**	**7.8400e-003**	**0.3359**	**3.2100e-003**	**0.3391**	**0.0933**	**3.0200e-003**	**0.0963**		**831.0921**	**831.0921**	**0.0361**		**831.9932**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.544210	0.044379	0.208611	0.117175	0.014456	0.006301	0.020907	0.032661	0.002589	0.001903	0.005267	0.000705	0.000834

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Big T Restoration Project- Revegetation/Maple Canyon SPS Closure

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	29.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2026
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	541	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Adjusted CO2 IF reflect RPS for SCE.

Land Use - .

Construction Phase - .

Off-road Equipment - .

Off-road Equipment - 1 Dozer

Trips and VMT - estimates for planting and for water trucks, and worker trips

Grading - All balanced on-site per Revegetation Plan

Energy Use -

Construction Off-road Equipment Mitigation - .

Consumer Products - .

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	80.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblLandUse	LotAcreage	0.00	29.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	541
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripLength	7.90	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	3.00	10.00
tblTripsAndVMT	WorkerTripNumber	3.00	10.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2025	0.7163	7.4407	3.6399	0.0132	6.2653	0.2923	6.5576	3.3768	0.2690	3.6458	0.0000	1,312.6154	1,312.6154	0.2873	0.0000	1,319.7981
2026	0.7138	7.4304	3.6102	0.0142	6.2653	0.2923	6.5576	3.3768	0.2689	3.6457	0.0000	1,451.3122	1,451.3122	0.2869	0.0000	1,457.2281
Maximum	**0.7163**	**7.4407**	**3.6399**	**0.0142**	**6.2653**	**0.2923**	**6.5576**	**3.3768**	**0.2690**	**3.6458**	**0.0000**	**1,451.3122**	**1,451.3122**	**0.2873**	**0.0000**	**1,457.2281**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2025	0.7163	7.4407	3.6399	0.0132	2.5918	0.2923	2.8841	1.3576	0.2690	1.6265	0.0000	1,312.6154	1,312.6154	0.2873	0.0000	1,319.7981
2026	0.7138	7.4304	3.6102	0.0142	2.5918	0.2923	2.8841	1.3576	0.2689	1.6265	0.0000	1,451.3122	1,451.3122	0.2869	0.0000	1,457.2281
Maximum	**0.7163**	**7.4407**	**3.6399**	**0.0142**	**2.5918**	**0.2923**	**2.8841**	**1.3576**	**0.2690**	**1.6265**	**0.0000**	**1,451.3122**	**1,451.3122**	**0.2873**	**0.0000**	**1,457.2281**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**58.63**	**0.00**	**56.02**	**59.80**	**0.00**	**55.39**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/15/2025	1/15/2026	6	80	
2	Planting	Trenching	10/1/2026	12/1/2026	6	53	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor

Site Preparation	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Planting	Rubber Tired Dozers	1	6.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	1	10.00	10.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT
Planting	1	10.00	20.00	0.00	19.80	10.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	0.6481	6.6312	2.9977	8.5400e-003		0.2901	0.2901		0.2669	0.2669		826.9601	826.9601	0.2675		833.6465
Total	**0.6481**	**6.6312**	**2.9977**	**8.5400e-003**	**6.0221**	**0.2901**	**6.3122**	**3.3102**	**0.2669**	**3.5772**		**826.9601**	**826.9601**	**0.2675**		**833.6465**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0252	0.7830	0.2516	3.3000e-003	0.0927	1.1000e-003	0.0938	0.0267	1.0500e-003	0.0277		353.5331	353.5331	0.0168		353.9534
Worker	0.0430	0.0265	0.3906	1.3200e-003	0.1505	1.0800e-003	0.1516	0.0399	1.0000e-003	0.0409		132.1221	132.1221	3.0400e-003		132.1981
Total	**0.0682**	**0.8095**	**0.6422**	**4.6200e-003**	**0.2432**	**2.1800e-003**	**0.2454**	**0.0666**	**2.0500e-003**	**0.0686**		**485.6553**	**485.6553**	**0.0199**		**486.1516**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	0.6481	6.6312	2.9977	8.5400e-003		0.2901	0.2901		0.2669	0.2669	0.0000	826.9601	826.9601	0.2675		833.6465
Total	**0.6481**	**6.6312**	**2.9977**	**8.5400e-003**	**2.3486**	**0.2901**	**2.6388**	**1.2910**	**0.2669**	**1.5579**	**0.0000**	**826.9601**	**826.9601**	**0.2675**		**833.6465**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0252	0.7830	0.2516	3.3000e-003	0.0927	1.1000e-003	0.0938	0.0267	1.0500e-003	0.0277		353.5331	353.5331	0.0168		353.9534
Worker	0.0430	0.0265	0.3906	1.3200e-003	0.1505	1.0800e-003	0.1516	0.0399	1.0000e-003	0.0409		132.1221	132.1221	3.0400e-003		132.1981

Total	**0.0682**	**0.8095**	**0.6422**	**4.6200e-003**	**0.2432**	**2.1800e-003**	**0.2454**	**0.0666**	**2.0500e-003**	**0.0686**		**485.6553**	**485.6553**	**0.0199**		**486.1516**

3.2 Site Preparation - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	0.6481	6.6312	2.9977	8.5400e-003		0.2901	0.2901		0.2669	0.2669		826.9601	826.9601	0.2675		833.6465
Total	**0.6481**	**6.6312**	**2.9977**	**8.5400e-003**	**6.0221**	**0.2901**	**6.3122**	**3.3102**	**0.2669**	**3.5772**		**826.9601**	**826.9601**	**0.2675**		**833.6465**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0247	0.7748	0.2472	3.2800e-003	0.0927	1.0800e-003	0.0938	0.0267	1.0300e-003	0.0277		351.7803	351.7803	0.0166		352.1960
Worker	0.0411	0.0244	0.3653	1.2800e-003	0.1505	1.0500e-003	0.1516	0.0399	9.6000e-004	0.0409		127.5316	127.5316	2.7900e-003		127.6013
Total	**0.0658**	**0.7992**	**0.6125**	**4.5600e-003**	**0.2432**	**2.1300e-003**	**0.2453**	**0.0666**	**1.9900e-003**	**0.0686**		**479.3119**	**479.3119**	**0.0194**		**479.7973**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	0.6481	6.6312	2.9977	8.5400e-003		0.2901	0.2901		0.2669	0.2669	0.0000	826.9601	826.9601	0.2675		833.6465
Total	**0.6481**	**6.6312**	**2.9977**	**8.5400e-003**	**2.3486**	**0.2901**	**2.6388**	**1.2910**	**0.2669**	**1.5579**	**0.0000**	**826.9601**	**826.9601**	**0.2675**		**833.6465**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0247	0.7748	0.2472	3.2800e-003	0.0927	1.0800e-003	0.0938	0.0267	1.0300e-003	0.0277		351.7803	351.7803	0.0166		352.1960
Worker	0.0411	0.0244	0.3653	1.2800e-003	0.1505	1.0500e-003	0.1516	0.0399	9.6000e-004	0.0409		127.5316	127.5316	2.7900e-003		127.6013
Total	**0.0658**	**0.7992**	**0.6125**	**4.5600e-003**	**0.2432**	**2.1300e-003**	**0.2453**	**0.0666**	**1.9900e-003**	**0.0686**		**479.3119**	**479.3119**	**0.0194**		**479.7973**

3.3 Planting - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	0.4861	4.9734	2.2483	6.4000e-003		0.2176	0.2176		0.2002	0.2002		620.2201	620.2201	0.2006		625.2349
Total	**0.4861**	**4.9734**	**2.2483**	**6.4000e-003**		**0.2176**	**0.2176**		**0.2002**	**0.2002**		**620.2201**	**620.2201**	**0.2006**		**625.2349**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0494	1.5495	0.4943	6.5600e-003	0.1854	2.1600e-003	0.1875	0.0533	2.0600e-003	0.0554		703.5605	703.5605	0.0333		704.3919
Worker	0.0411	0.0244	0.3653	1.2800e-003	0.1505	1.0500e-003	0.1516	0.0399	9.6000e-004	0.0409		127.5316	127.5316	2.7900e-003		127.6013
Total	**0.0905**	**1.5740**	**0.8596**	**7.8400e-003**	**0.3359**	**3.2100e-003**	**0.3391**	**0.0933**	**3.0200e-003**	**0.0963**		**831.0921**	**831.0921**	**0.0361**		**831.9932**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4861	4.9734	2.2483	6.4000e-003		0.2176	0.2176		0.2002	0.2002	0.0000	620.2201	620.2201	0.2006		625.2349
Total	**0.4861**	**4.9734**	**2.2483**	**6.4000e-003**		**0.2176**	**0.2176**		**0.2002**	**0.2002**	**0.0000**	**620.2201**	**620.2201**	**0.2006**		**625.2349**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0494	1.5495	0.4943	6.5600e-003	0.1854	2.1600e-003	0.1875	0.0533	2.0600e-003	0.0554		703.5605	703.5605	0.0333		704.3919
Worker	0.0411	0.0244	0.3653	1.2800e-003	0.1505	1.0500e-003	0.1516	0.0399	9.6000e-004	0.0409		127.5316	127.5316	2.7900e-003		127.6013
Total	**0.0905**	**1.5740**	**0.8596**	**7.8400e-003**	**0.3359**	**3.2100e-003**	**0.3391**	**0.0933**	**3.0200e-003**	**0.0963**		**831.0921**	**831.0921**	**0.0361**		**831.9932**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.544210	0.044379	0.208611	0.117175	0.014456	0.006301	0.020907	0.032661	0.002589	0.001903	0.005267	0.000705	0.000834

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Summary of Emissions

USING 20 DOUBLE-BOTTOM BELLY DUMP TRUCKS (ON-ROAD TRUCKS)

UNMITIGATED Edited in 2019

Source	VOC (lbs/day)	NOx (lbs/day)	CO (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)
Off-road equipment (exhaust)	25	233	162	30	16
Aggregate processing PM				2	2
Material transfer (batch drops) PM				1	0
On-road truck (exhaust)	2	36	8	0	0
On-road PM				425	44
Storage piles PM				2	2
Total	27	269	170	461	65
SCAQMD significance thresholds	*75*	*100*	*550*	*150*	*55*
Exceeds Threshold?					

Summary of Emissions

USING 20 DOUBLE-BOTTOM BELLY DUMP TRUCKS (ON-ROAD TRUCKS)

MITIGATED Edited in 2019

Source	VOC (lbs/day)	NOx (lbs/day)	CO (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)
Off-road equipment (exhaust)	5	13	123	30	16
Aggregate processing PM				0.2	0
Material transfer (batch drops) PM				1	0
On-road truck (exhaust)	2	36	8	0	0
On-road PM				114	13
Storage piles PM				2	2
Total	7	49	131	148	32
SCAQMD significance thresholds	*75*	*100*	*550*	*150*	*55*
Exceeds Threshold?					

notes: PM10/2.5 for Unmitigated Scenarios taken from Mitigated run since Rule 403 isn't mitigation

SUMMARY OF EMISSIONS USING OFF-ROAD TRUCKS (CAT 745C)

UNMITIGATED

Source	VOC (lbs/day)	NOx (lbs/day)	CO (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)
Off-road equipment (exhaust)	30	278	190	31	17
Aggregate processing PM	0	0	0	2	2
Material transfer (batch drops) PM	0	0	0	1	0
Off-road PM				388	41
Storage piles PM	0	0	0	2	2
Total	30	278	190	424	62
SCAQMD significance thresholds	*75*	*100*	*550*	*150*	*55*
Exceeds Threshold?					

SUMMARY OF EMISSIONS USING OFF-ROAD TRUCKS (CAT 745C)

MITIGATED

Source	VOC (lbs/day)	NOx (lbs/day)	CO (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)
Off-road equipment (exhaust)	6	19	170	31	17
Aggregate processing PM				0.19	0.19
Material transfer (batch drops) PM				1.09	0.16
Off-road PM				109	13
Storage piles PM				2	2
Total	6	19	170	143	32
SCAQMD significance thresholds	*75*	*100*	*550*	*150*	*55*
Exceeds Threshold?					

GHG EMISSIONS

Onroad truck emissions 541 MT/year

Big Tujunga Reservoir Sediment Removal

Fugitive PM10 from Hauling - Existing Roads

Paved road

EF=k(sl)^0.91(W)^1.02

Formula for emission factor (EF)

from USEPA AP-42 13.2.1 Paved Roads

k = particle size multiplier for particle size and units

sL=road surface silt loading (g/m^2) - CalEEMod default

W=average vehicle weight (tons)

For PM10 and lb/VMT, k=0.0022 from AP-42 Table 13.2.1-1

Unpaved road

EF=k(s/12)^ a(W/3)^b

Formula for emission factor (EF)

from USEPA AP-42, 13.2.2.2 Unpaved Roads, for industrial roads

k, a, and b are empirical constants

s=road surface material silt content (%)

W= mean vehicle weight (tons)

For PM10, k=1.5, a=0.9, b=0.45 - from AP-42, Table 13.2.2-2

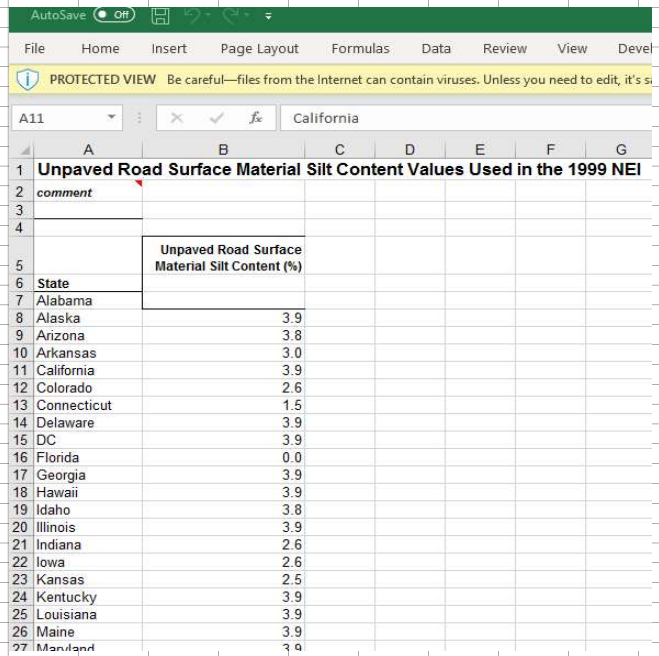
Haul truck weight assumed to be 30 tons

Reservoir to-from SPS						**Emission Factors**							
400	trips daily	EF	k-PM10 #	sL	w				EF	k	s	W	
2.3	miles res to SPS	0.008691	0.0022	0.1	30					1.5	3.9	30	
1.8	paved								1.537398				
0.5	unpaved		Haul truck weight assumed to be			30	tons						
720	VMT/day/paved												
200	VMT/day/unpaved					**Unmitigated Emissions**							
			Paved road				Unpaved road			Total			
			Emissions = EF*VMT										
			6.3	lbs/day			307.5	lbs/day		313.7	lbs/day		

Silt Content updated based on EPA AP42 value

https://www3.epa.gov/ttnchie1/ap42/ch13/related/c13s02-2.html

Reservoir from SPS						**Emission Factors**							
400	trips daily	EF	k-PM10 #	sL	w				EF	k	s	W	
2.8	miles SPS to res	0.003413	0.0022	0.1	12				1.017919	1.5	3.9	12	
1.3	paved												
1.5	unpaved		Haul truck weight assumed to be			12	tons						
520	VMT/day/paved												
600	VMT/day/unpaved					**Unmitigated Emissions**							
			Paved road				Unpaved road			Total			
			Emissions = EF*VMT										
			1.8	lbs/day			610.8	lbs/day		612.5	lbs/day		
Crusher to-from Stockpile													
6	RT daily												
1.0	miles crsh to pile												
0.7	paved												
0.3	unpaved												
1.3	miles pile to crush												
0.7	paved												
0.6	unpaved												
1.4	total paved					**Unmitigated Emissions**							
0.9	total unpaved		Paved road				Unpaved road			Total			
8.4	VMT/day/paved		0.1	lbs/day			8.3	lbs/day		8.4	lbs/day		
5.4	VMT/day/unpaved												
Total Emissions													
	Unmitigated		**8.1**	**lbs/day**			**926.5**	**lbs/day**		**934.6**	**lbs/day**		
	Mitigation												
AFTER	RULE 403	Watering	55	percent reduction			509.6	reduction					
AFTER	**RULE 403**	**Mitigated**	**8.1**	**lbs/day**			**416.9**	**lbs/day**		**425.0**	**lbs/day**		
Conveyor Belt Option													
			0.1				8.3						
		Watering	55	percent reduction			4.6	reduction					
			0.1	**lbs/day**			**3.7**	**lbs/day**		**3.8**	**lbs/day**		



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A11 California

Unpaved Road Surface Material Silt Content Values Used in the 1999 NEI

comment

State	Unpaved Road Surface Material Silt Content (%)
Alabama	
Alaska	3.9
Arizona	3.8
Arkansas	3.0
California	3.9
Colorado	2.6
Connecticut	1.5
Delaware	3.9
DC	3.9
Florida	0.0
Georgia	3.9
Hawaii	3.9
Idaho	3.8
Illinois	3.9
Indiana	2.6
Iowa	2.6
Kansas	2.5
Kentucky	3.9
Louisiana	3.9
Maine	3.9
Maryland	3.9

Big Tujunga Reservoir Sediment Removal

Unmitigated On-road Hauling EMFAC emissions - default fleet

EMFAC 2017

COMPOSITE OF ALL THE TRUCKS THAT ARE ESTIMATED TO OCCUR IN THE YEAR 2020. It doesn't mean all the trucks are engine year 2020, it's a combo of older and newer trucks

On-road
2020 Estimated Seasonal Emission Rates
EMFAC 2007 Vehicle Categories
Summer Season
Los Angeles COUNTY
South Coast AIR BASIN

=EMFAC20	CO_RUNEX	NOx_RUNE	SOx_RUNE	PM10_RUN	PM2_5_RU	CO2_RUNEX
	0.593312	5.701103	0.019454	0.009898	0.00947	2059.196

		Area	CalYr	Season	Veh	Fuel	MdlYr	Speed	Pop	VMT	Trips	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	PM10_RUNEX	PM2_5_RUNEX	CO2_RUNEX	SOx_RUNEX
res-SPS								(Miles/hr)	(Vehicles)	(Miles/day	(Trips/day)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)
400	RT daily	Los Angele	2020	Annual	T7	DSL	2010+	20	0	344256.2	0	0.341815618	7.578341779	1.237746217	0.075810489	0.072530961	2121.066433	0.020038784
5	miles/RT																	
2000	**VMT/day**						**emissions**	**pounds/day**			**Running**	**1.5**	**33.4**	**5.5**	**0.3**	**0.3**	9343.9	**0.1**
3	min idle at res																	
3	min idle at SPS																	
6	min idle/RT											2.39	31.38	32.75	0.02	0.02	6029.45	0.02
2400	min idle/day																	
40.0	**hrs idle/day**						**emissions**	**pounds/day**			**Idling**	**0.2**	**2.8**	**2.9**	**0.00**	**0.00**	531.23	**0.0**
crusher-stockpile																		
6	RT daily																	
2.3	miles/RT																	
13.8	**VMT/day**						**emissions**	**pounds/day**			**Running**	**0.0**	**0.2**	**0.0**	**0.00**	**0.00**	64.47	**0.0**
3	min idle at crush																	
3	min idle at Stock																	
6	min idle/RT																	
36	min idle/day																	
0.6	**hrs idle/day**						**emissions**	**pounds/day**			**Idling**	**0.0**	**0.0**	**0.0**	**0.00**	**0.00**	7.97	**0.0**
								TOTAL				**1.7**	**36.4**	**8.4**	**0.3**	**0.3**	9947.6	**0.1**
												1.7	36.4	8.4	0.3	0.3	9947.6	lbs/day
												120	120	120	120	120	120	days
												0	**2**	**1**	**0**	**0**	541	**MT/year**
conveyor belt total																		**0.0**
												0	2	1	0	0	541	**MT/year**

Big Tujunga Reservoir Sediment Removal

Aggregate Processing and Storage Piles

Aggregate Processing - Crushing and Screening

Emissions

E = EF x TP

E = emissions, pounds/day

EF= emission factor for each process - pounds/ton

TP = throughput - tons/day

Emission factors from USEPA AP-42 - 11.9.2 Crushed Stone Processing and Pulverized Mineral Processing

Table 11.19.2-2 for PM10

Tertiary crushing-controlled	0.00054	lb/ton	0.0024	unc	Per AP-42 Factors not available for PM2.5
Screening-controlled	0.00074	lb/ton	0.0087		conservatively use PM10 factors

TP

CY/day	108	per DPW
tons/CY	1.35	
tons/day	145.8	

Emissions	controlled		uncontrolled	
crushing	0.08	lbs/day	0.35	lbs/day
screening	0.11	lbs/day	1.27	lbs/day
Total	**0.19**	lbs/day	**1.62**	lbs/day

Storage Piles

E=EF x A x (1-C)

E = emissions, pounds/day

EF= emission factor - pounds/acre/day

A = area of storage pile - acres

C = control factor - percent/100

Emission factors from USEPA AP-42

Inactive piles	1.7	lb/acre/day	Per AP-42 Factors not available for PM2.5
Active piles	6.3	lb/acre/day	conservatively use PM10 factors

Areas - assumed for this calculation

Inactive piles	2	acres
Active piles	0.25	acres

Control factor with watering or chemical suppression - suggested by SMAQMD

Inactive piles	0.8		0.5
Active piles	0.8		0.5

Emissions

Inactive piles	0.68	lb/day	1.7
Active piles	0.32	lb/day	0.79
Daily Total	**0.995**		**2.49**
Annual Total	**0.06**		

Big Tujunga Reservoir Sediment Removal										
	Truck Loading - Batch Drop - PM10									
Emissions										
E = EF x TP										
	E = emissions, pounds/day									
	EF=k x (0.0032) x ((U/5)^1.3)/((M/2)^1.4)				pounds/ton		From CalEEMod Appx A (and USEPA AP-42)			
		k = particle size constant								
		U = Wind speed- miles per hour								
		M = Moisture content - percent								
			k for PM10	0.35						
			U=	2.2	m/s	per CalEEMod for climate zone				
			convert to	4.9214	mph					
			M=	16	%	per DPW				
	TP = throughput - tons									
		for CY=	7200	cy/day		per Project plan				
			1.264	tons/CY		per CalEEMod				
		TP=	9102	tons/day						
	EF	5.9696E-05	pounds PM10/ton TP							
	TP	9102	tons TP/day							
	E	0.54	pounds PM10/day		per batch operation (truck load or unload)					
	Project will have		2	batch drops per trip; therefore						
	Batch drop emissions =			**1.09**	pounds per day					
				0.07	tons/year					

Big Tujunga Reservoir Sediment Removal										
	Truck Loading - Batch Drop - PM2.5									
Emissions										
E = EF x TP										
	E = emissions, pounds/day									
	EF=k x (0.0032) x ((U/5)^1.3)/((M/2)^1.4)				pounds/ton		From CalEEMod Appx A (from USEPA AP-42)			
		k = particle size constant								
		U = Wind speed- miles per hour								
		M = Moisture content - percent								
			k for PM2.5	0.053						
			U=	2.2	m/s	per CalEEMod for climate zone				
			convert to	4.9214	mph					
			M=	16	%	per DPW				
	TP = throughput - tons									
		for CY=	7200	cy/day		per Project plan				
			1.264	tons/CY		per CalEEMod				
		TP=	9102	tons/day						
	EF	9.0397E-06	pounds/ton	PM2.5						
	TP	9102	tons/day							
	E	0.08	pounds/day	per batch operation (truck load or unload)						
	Project will have		2	batch drops per trip; therefore						
	Batch drop emissions =			**0.16**	pounds per day					
				0.01	tons/year					

Big Tujunga Reservoir Sediment Removal

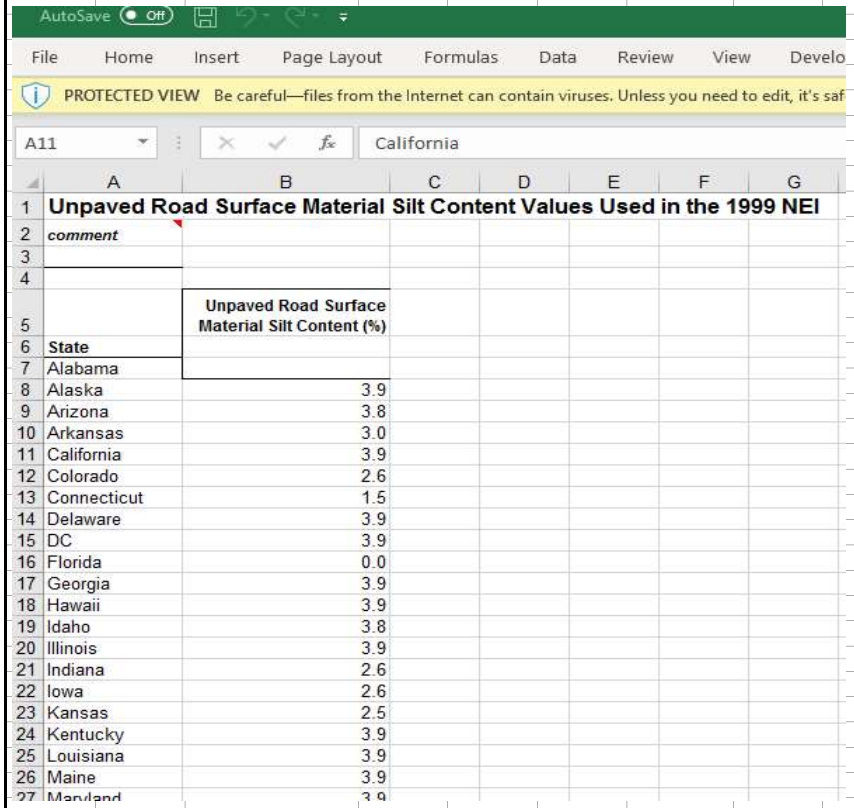
Fugitive PM10 from Hauling - Paved Roads - water to 75% reduction

		Paved road							**Unpaved road**						
		EF=k(sl)^0.91(W)^1.02							EF=k(s/12)^ a(W/3)^b						
		Formula for emission factor (EF)							Formula for emission factor (EF)						
		from USEPA AP-42 13.2.1 Paved Roads							from USEPA AP-42, 13.2.2.2 Unpaved Roads, for industrial roads						
			k = particle size multiplier for particle size and units							k, a, and b are empirical constants					
			sL=road surface silt loading (g/m^2) - CalEEMod default							s=road surface material silt content (%)					
			W=average vehicle weight (tons)							W= mean vehicle weight (tons)					
			For PM10 and lb/VMT, k=0.0022 from AP-42 Table 13.2.1-1							For PM10, k=1.5, a=0.9, b=0.45 - from AP-42, Table 13.2.2-2					
Haul truck weight assumed to be			30	tons											
Reservoir to-from SPS						**Emission Factors**									
400	trips daily	EF	k-PM10 #	sL	w				EF	k	s	W			
2.2	miles res to SPS	0.008691	0.0022	0.1	30				1.537398	1.5	3.9	30			
1.8	paved														
0.40	unpaved		Haul truck weight assumed to be			30	tons								
720	VMT/day/paved														
160	VMT/day/unpaved					**Unmitigated Emissions**								Double bottom dump trucks	CAT745c
			Paved road				Unpaved road			Total			Capacity (cy)	18	32.7
			Emissions = EF*VMT										Trips	400	220
			6.3	#/day			246.0	#/day		252.2	#/day		CY of oil moved/day	7200	7200
Reservoir from SPS						**Emission Factors**									
400	trips daily	EF	k-PM10 #	sL	w				EF	k	s	W			
2.8	miles SPS to res	0.003413	0.0022	0.1	12				1.017919	1.5	3.9	12			
2.4	paved														
0.40	unpaved		Haul truck weight assumed to be			12	tons								
960	VMT/day/paved														
160	VMT/day/unpaved					**Unmitigated Emissions**									
			Paved road				Unpaved road			Total					
			Emissions = EF*VMT												
			3.3	lbs/day			162.9	lbs/day		166.1	lbs/day				
Crusher to-from Stockpile															
6	roundtrips daily														
1.40	miles crush to stockpile														
1	paved														
0.40	unpaved														
1.30	miles stockpile to crush														
0.9	paved														
0.40	unpaved														
1.9	total paved					**Unmitigated Emissions**									
0.8	total unpaved		Paved road				Unpaved road			Total					
11.4	VMT/day/paved		0.1	lbs/day			7.4	lbs/day		7.5	lbs/day				
4.8	VMT/day/unpaved														
Total Emissions															

		Unmitigated		**9.6**	**lbs/day**			**416.2**	**lbs/day**	**425.9**	**lbs/day**	
		Mitigation										
		Watering	75	percent reduction				312.2	reduction			
		Mitigated		**9.6**	**lbs/day**			**104.1**	**lbs/day**	**113.7**	**lbs/day**	**of Fugitive Dust (PM10) per day**
										33.1	lbs/day of other emissions	
										146.8	lbs/day TOTAL PM EMISSIONS	
										150	PM10 threshold	

Silt Content updated based on EPA AP42 value

https://www3.epa.gov/ttnchie1/ap42/ch13/related/c13s02-2.html



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	A	B	C	D	E	F	G
1	**Unpaved Road Surface Material Silt Content Values Used in the 1999 NEI**						
2	*comment*						
3							
4							
5		**Unpaved Road Surface Material Silt Content (%)**					
6	**State**						
7	Alabama						
8	Alaska	3.9					
9	Arizona	3.8					
10	Arkansas	3.0					
11	California	3.9					
12	Colorado	2.6					
13	Connecticut	1.5					
14	Delaware	3.9					
15	DC	3.9					
16	Florida	0.0					
17	Georgia	3.9					
18	Hawaii	3.9					
19	Idaho	3.8					
20	Illinois	3.9					
21	Indiana	2.6					
22	Iowa	2.6					
23	Kansas	2.5					
24	Kentucky	3.9					
25	Louisiana	3.9					
26	Maine	3.9					
27	Maryland	3.9					

Big Tujunga Reservoir Sediment Removal

Fugitive PM2.5 from Hauling - Paved Roads - water to 75% reduction

Paved road

EF=k(sl)^0.91(W)^1.02

Formula for emission factor (EF)

from USEPA AP-42 13.2.1 Paved Roads

k = particle size multiplier for particle size and units

sL=road surface silt loading (g/m^2) - CalEEMod default

W=average vehicle weight (tons)

For PM2.5 and lb/VMT, k=0.00054 from AP-42 Table 13.2.1-1

Unpaved road

EF=k(s/12)^ a(W/3)^b

Formula for emission factor (EF)

from USEPA AP-42, 13.2.2.2 Unpaved Roads, for industrial roads

k, a, and b are empirical constants

s=road surface material silt content (%)

W= mean vehicle weight (tons)

For PM2.5, k=.15, a=0.9, b=0.45 - from AP-42, Table 13.2.2-2

Haul truck weight assumed to be 30 tons

Reservoir to-from SPS

		EF	k-PM10 #	sL	w
400	trips daily				
2.2	miles res to SPS	0.002133	0.00054	0.1	30
1.8	paved				
0.40	unpaved				
720	VMT/day/paved				
160	VMT/day/unpaved				

Haul truck weight assumed to be 30 tons

Emission Factors

EF	k	s	W
0.15374	0.15	3.9	30

Unmitigated Emissions

Paved road	Unpaved road	Total
Emissions = EF*VMT		
1.5 #/day	24.6 #/day	26.1 #/day

Reservoir from SPS

		EF	k-PM10 #	sL	w
400	trips daily				
2.8	miles SPS to res	0.000838	0.00054	0.1	12
2.4	paved				
0.40	unpaved				
960	VMT/day/paved				
160	VMT/day/unpaved				

Haul truck weight assumed to be 12 tons

Emission Factors

EF	k	s	W
0.101792	0.15	3.9	12

Unmitigated Emissions

Paved road	Unpaved road	Total
Emissions = EF*VMT		
0.8 #/day	16.3 #/day	17.1 #/day

Crusher to-from Stockpile

6	RT daily
1.4	miles crsh to pile
1	paved
0.40	unpaved
1.37	miles pile to crush
0.97	paved
0.40	unpaved
1.97	total paved
0.8	total unpaved
11.82	VMT/day/paved
4.8	VMT/day/unpaved

Unmitigated Emissions

Paved road	Unpaved road	Total
0.0 #/day	0.7 #/day	0.8 #/day

Total Emissions

Unmitigated	**2.4 lbs/day**	**41.6 lbs/day**	**44.0 lbs/day**
Mitigation			
Watering 75	percent reduction	31.2 reduction	
Mitigated	**2.4 lbs/day**	**10.4 lbs/day**	**13 lbs/day**

Big Tujunga Reservoir Sediment Removal

Fugitive PM2.5 from Hauling - Paved Roads - water to 75% reduction

Paved road

EF=k(sl)^0.91(W)^1.02

Formula for emission factor (EF)

from USEPA AP-42 13.2.1 Paved Roads

k = particle size multiplier for particle size and units

sL=road surface silt loading (g/m^2) - CalEEMod default

W=average vehicle weight (tons)

For PM2.5 and lb/VMT, k=0.00054 from AP-42 Table 13.2.1-1

Unpaved road

EF=k(s/12)^ a(W/3)^b

Formula for emission factor (EF)

from USEPA AP-42, 13.2.2.2 Unpaved Roads, for industrial roads

k, a, and b are empirical constants

s=road surface material silt content (%)

W= mean vehicle weight (tons)

For PM2.5, k=.15, a=0.9, b=0.45 - from AP-42, Table 13.2.2-2

Haul truck weight assumed to be 30 tons

Reservoir to-from SPS

		EF	k-PM10 #	sL	w
400	trips daily				
2.2	miles res to SPS	0.002133	0.00054	0.1	30
1.8	paved				
0.40	unpaved				
720	VMT/day/paved				
160	VMT/day/unpaved				

Haul truck weight assumed to be 30 tons

Emission Factors

EF	k	s	W
0.15374	0.15	3.9	30

Unmitigated Emissions

Paved road	Unpaved road	Total
Emissions = EF*VMT		
1.5 #/day	24.6 #/day	26.1 #/day

Reservoir from SPS

		EF	k-PM10 #	sL	w
400	trips daily				
2.8	miles SPS to res	0.000838	0.00054	0.1	12
2.4	paved				
0.40	unpaved				
960	VMT/day/paved				
160	VMT/day/unpaved				

Haul truck weight assumed to be 12 tons

Emission Factors

EF	k	s	W
0.101792	0.15	3.9	12

Unmitigated Emissions

Paved road	Unpaved road	Total
Emissions = EF*VMT		
0.8 #/day	16.3 #/day	17.1 #/day

Crusher to-from Stockpile

6	RT daily
1.4	miles crsh to pile
1	paved
0.40	unpaved
1.37	miles pile to crush
0.97	paved
0.40	unpaved
1.97	total paved
0.8	total unpaved
11.82	VMT/day/paved
4.8	VMT/day/unpaved

Unmitigated Emissions

Paved road	Unpaved road	Total
0.0 #/day	0.7 #/day	0.8 #/day

Total Emissions

Unmitigated	**2.4 lbs/day**	**41.6 lbs/day**	**44.0 lbs/day**
Mitigation			
Watering 75	percent reduction	31.2 reduction	
Mitigated	**2.4 lbs/day**	**10.4 lbs/day**	**13 lbs/day**

Big Tujunga Reservoir Sediment Removal

Fugitive PM10 from Hauling - Paved Roads - water to 75% reduction

Paved road
EF=k(sl)^0.91(W)^1.02
Formula for emission factor (EF)
from USEPA AP-42 13.2.1 Paved Roads
k = particle size multiplier for particle size and units
sL=road surface silt loading (g/m^2) - CalEEMod default
W=average vehicle weight (tons)
For PM10 and lb/VMT, k=0.0022 from AP-42 Table 13.2.1-1

Unpaved road
EF=k(s/12)^ a(W/3)^b
Formula for emission factor (EF)
from USEPA AP-42, 13.2.2.2 Unpaved Roads, for industrial roads
k, a, and b are empirical constants
s=road surface material silt content (%)
W= mean vehicle weight (tons)
For PM10, k=1.5, a=0.9, b=0.45 - from AP-42, Table 13.2.2-2

Haul truck weight assumed to be 30 tons

Reservoir to-from SPS

		EF	k-PM10 #	sL	w
220	trips daily				
2.2	miles res to SPS	0.02423	0.0022	0.1	82
1.8	paved				
0.4	unpaved				
396.3303	VMT/day/paved				
88.07339	VMT/day/unpaved				

Haul truck weight assumed to be 30 tons

Emission Factors

EF	k	s	W
2.416734	1.5	3.9	82

Unmitigated Emissions

Paved road	Unpaved road	Total
Emissions = EF*VMT		
9.6 #/day	212.8 #/day	222.5 #/day

	Double bottom dump trucks	CAT745c
Capacity (cy)	18	32.7
Truckloads (roundtrips)	400	220
CY of soil moved/day	7200	7200

Reservoir from SPS

		EF	k-PM10 #	sL	w
220	trips daily				
2.8	miles SPS to res	0.010698	0.0022	0.1	37
2.4	paved				
0.4	unpaved				
528.4404	VMT/day/paved				
88.07339	VMT/day/unpaved				

Haul truck weight assumed to be 12 tons

Emission Factors

EF	k	s	W
1.684955	1.5	3.9	37

Unmitigated Emissions

Paved road	Unpaved road	Total
Emissions = EF*VMT		
5.7 #/day	148.4 #/day	154.1 #/day

	lbs	tons
Empty	73553	37
Full	163942	82
truck trips per hour	50	28
roundtrips	400	220

Crusher to-from Stockpile

6	RT daily
1.40	miles crsh to pile
1	paved
0.4	unpaved
1.37	miles pile to crush
0.97	paved
0.4	unpaved
1.97	total paved
0.8	total unpaved
11.82	VMT/day/paved
4.8	VMT/day/unpaved

Unmitigated Emissions

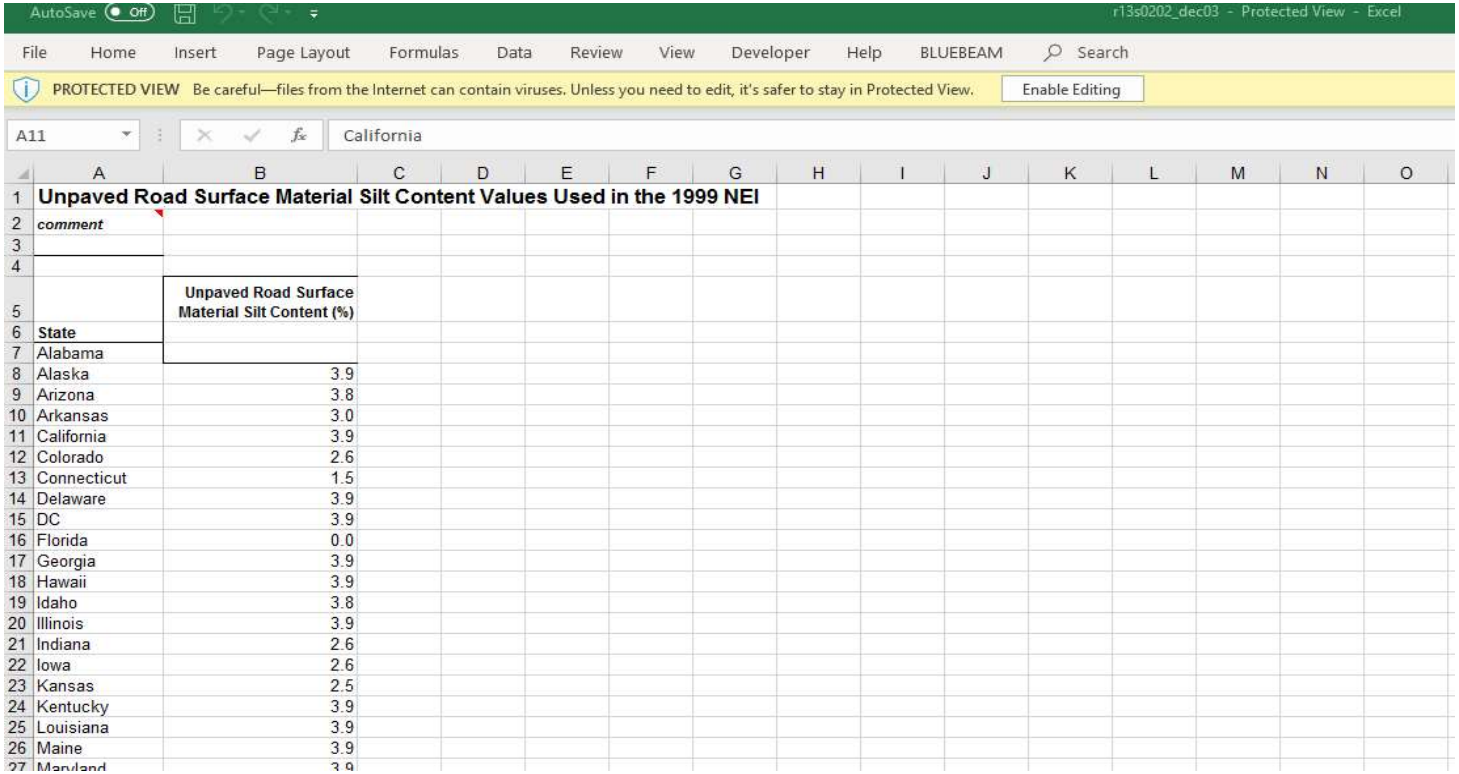
Paved road	Unpaved road	Total
0.3 #/day	11.6 #/day	11.9 #/day

Total Emissions

Unmitigated	**15.5 lbs/day**	**372.9 lbs/day**	**388.4 lbs/day**
Mitigation			
Watering	75 percent reduction	279.6 reduction	
Mitigated	**15.5 lbs/day**	**93.2 lbs/day**	**108.8 lbs/day**

33.1 lbs/day of other emissions
141.9 lbs/day TOTAL PM EMISSIONS
150 PM10 threshold

Silt Content updated based on EPA AP42 value
https://www3.epa.gov/ttnchie1/ap42/ch13/related/c13s02-2.html



AutoSave Off — r13s0202_dec03 - Protected View - Excel

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PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. Enable Editing

A11 California

Unpaved Road Surface Material Silt Content Values Used in the 1999 NEI

comment

State	Unpaved Road Surface Material Silt Content (%)
Alabama	
Alaska	3.9
Arizona	3.8
Arkansas	3.0
California	3.9
Colorado	2.6
Connecticut	1.5
Delaware	3.9
DC	3.9
Florida	0.0
Georgia	3.9
Hawaii	3.9
Idaho	3.8
Illinois	3.9
Indiana	2.6
Iowa	2.6
Kansas	2.5
Kentucky	3.9
Louisiana	3.9
Maine	3.9
Maryland	3.9

Big Tujunga Reservoir Sediment Removal

Fugitive PM2.5 from Hauling - Paved Roads - water to 75% reduction

			Paved road							**Unpaved road**								
			EF=k(sl)^0.91(W)^1.02							EF=k(s/12)^ a(W/3)^b								
			Formula for emission factor (EF)							Formula for emission factor (EF)								
			from USEPA AP-42 13.2.1 Paved Roads							from USEPA AP-42, 13.2.2.2 Unpaved Roads, for industrial roads								
				k = particle size multiplier for particle size and units							k, a, and b are empirical constants							
				sL=road surface silt loading (g/m^2) - CalEEMod default							s=road surface material silt content (%)							
				W=average vehicle weight (tons)							W= mean vehicle weight (tons)							
				For PM2.5 and lb/VMT, k=0.00054 from AP-42 Table 13.2.1-1							For PM2.5, k=.15, a=0.9, b=0.45 - from AP-42, Table 13.2.2-2							
	Haul truck weight assumed to be			30	tons													
	Reservoir to-from SPS						**Emission Factors**											
	220	trips daily	EF	k-PM10 #	sL	w				EF	k	s	W					
	2.2	miles res to SPS	0.005947	0.00054	0.1	82				0.241673	0.15	3.9	82					
	1.8	paved																
	0.4	unpaved		Haul truck weight assumed to be			30	tons										
	396	VMT/day/paved																
	88	VMT/day/unpaved					**Unmitigated Emissions**											
	484	**total VMT**		Paved road				Unpaved road			Total							
	20	mph		Emissions = EF*VMT														
	24.22	**hours of truck usage per day**		2.4	#/day			21.3	#/day		23.6	#/day						
	Reservoir from SPS						**Emission Factors**											
	220	trips daily	EF	k-PM10 #	sL	w				EF	k	s	W					
	2.8	miles SPS to res	0.002626	0.00054	0.1	37				0.168496	0.15	3.9	37					
	2.4	paved																
	0.4	unpaved		Haul truck weight assumed to be			12	tons										
	528.4404	VMT/day/paved																
	88.07339	VMT/day/unpaved					**Unmitigated Emissions**											
	617	**total VMT**		Paved road				Unpaved road			Total							
	20	mph		Emissions = EF*VMT														
	30.83	**hours of truck usage per day**		1.4	lbs/day			14.8	lbs/day		16.2	lbs/day						
	Crusher to-from Stockpile																	
	6	RT daily																
	1.4	miles crsh to pile																
	1	paved																
	0.4	unpaved																
	1.37	miles pile to crush																
	0.97	paved																
	0.4	unpaved																
	1.97	total paved					**Unmitigated Emissions**											
	0.8	total unpaved		Paved road				Unpaved road			Total							
	11.82	VMT/day/paved		0.1	lbs/day			1.2	lbs/day		1.2	lbs/day						
	4.8	VMT/day/unpaved																
	17	**total VMT**																
	20	mph																
	0.8310	**hours of truck usage per day**																
	Total Emissions																	
		Unmitigated		**3.8**	**lbs/day**			**37.3**	**lbs/day**		**41.1**	**lbs/day**						
		Mitigation																
		Watering	75	percent reduction				28.0	reduction									
		Mitigated		**3.8**	**lbs/day**			**9.3**	**lbs/day**		**13.1**	**lbs/day**						
TOTALS	1118	total VMT																
	20	mph																
	56	hours of truck usage per day																
	8	hour day																
	7	**OFFROAD trucks at 8 hours a day**																
	TO USE FOR CALEEMOD																	

APPENDIX B

BIOLOGICAL RESOURCES STUDIES

APPENDIX B-1

BIOLOGICAL CONSTRAINTS LETTER REPORT

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June 20, 2011

Mr. Ramil Parial
Water Resources Division
Department of Public Works
County of Los Angeles
900 South Fremont Avenue
Alhambra, California 91802-1460

VIA EMAIL AND U.S. MAIL
RPARIAL@dpw.lacounty.gov

Subject: Biological Constraints Survey for the Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project in Los Angeles County, California

Dear Mr. Parial:

This Letter Report presents the findings of a biological constraints survey for the Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project in unincorporated Los Angeles County, California. The study area for this survey consists of the proposed sediment removal area within the reservoir, the haul route downstream of Big Tujunga Dam, and the proposed fill areas within the existing Maple Canyon Sediment Placement Site (SPS) with a 100-foot buffer around these areas (Exhibit 1). Project limits were provided by the Los Angeles County Department of Public Works (LACDPW). The purpose of the survey was to evaluate existing biological resources and determine the potential for the occurrence of special status plant and wildlife species or other sensitive biological resources.

PROJECT DESCRIPTION AND LOCATION

The proposed project involves the dewatering of the Big Tujunga Reservoir and the removal of sediment to the nearby Maple Canyon SPS. Sediment from the reservoir will be placed on top of 10 acres of previously filled area and 22 previously undisturbed acres within the SPS. A maximum of 4,400,000 cubic yards of sediment would be removed from the reservoir, with excavation to the original cut template at 2,142.5 feet above mean sea level (msl) to achieve its original design capacity.

The study area extends approximately two river miles upstream and one river mile downstream of Big Tujunga Dam in Big Tujunga Canyon and includes Maple Canyon SPS. The study area is located on the southern edge of the San Gabriel Mountains, within the Angeles National Forest, and is located on the U.S. Geological Survey (USGS) Condor Peak 7.5-minute topographic quadrangle (Exhibit 2). The topography steeply slopes down into the canyon; elevations range from approximately 2,150 to 3,400 feet above msl. Soils in the study area consist of Trigo, granitic substratum-Modjeska families association (5 to 60 percent slopes), Rock outcrop-Chilao family-Haploxerolls, warm association (15 to 120 percent slopes), Typic Xerorthents, warm (55 to 90 percent slopes), and Olete-Kilburn-Etsel families complex (50 to 80 percent slopes) (Exhibit 3). Surrounding land uses include open space.

The *County of Los Angeles General Plan* designates Significant Ecological Areas (SEAs) as ecologically important or fragile land and water areas valuable as plant and animal communities. The study area is not located within any SEAs.

METHODS

BonTerra Consulting Senior Biologist Sam Stewart and Biologist/Regulatory Technician Allison Rudalevige conducted a general plant and wildlife survey within Maple Canyon SPS and areas downstream of the dam on April 14, 2011. Senior Botanist Robert Allen and Consulting Biologist Dave Bramlet conducted a general plant and wildlife survey upstream of the dam on April 20, 2011. Areas upstream of the dam were assessed with binoculars due to access limitations. The California Native Plant Society's (CNPS') Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2011) and the California Department of Fish and Game's (CDFG's) California Natural Diversity Database (CNDDB) (CDFG 2011) were reviewed prior to the survey to identify special status plants, wildlife, and habitats known to occur in the vicinity of the proposed project. Database searches included the USGS Sunland, Condor Peak, Chilao Flat, Burbank, Pasadena, and Mount Wilson 7.5-minute quadrangles.

All species observed were recorded in field notes. Plant species were identified in the field or collected for subsequent identification using keys in Hickman (1993) and Munz (1974). Taxonomy follows Hickman (1993) and current scientific data (e.g., scientific journals) for scientific and common names. Nomenclature for vegetation types generally follows that of *The Vegetation Classification and Mapping Program: List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (CDFG 2003).

Active searches for reptiles and amphibians included lifting, overturning, and carefully replacing rocks and debris. Birds were identified by visual and auditory recognition. Surveys for mammals were conducted during the day and included searching for and identifying diagnostic signs including scat, footprints, scratch-outs, dust bowls, burrows, and trails. Taxonomy and nomenclature for wildlife generally follows Fisher and Case (1997) for amphibians and reptiles, American Ornithologists Union (1998) for birds, and Baker et al. (2003) for mammals.

SURVEY RESULTS

Vegetation Types

The following vegetation types and land covers were observed in the study area: chaparral (with chamise chaparral, scrub oak chaparral, and mixed chaparral subassociations), California annual grassland, willow riparian forest, coast live oak stands, open water, cliff, and developed. Many of these areas were burned in the 2009 Station Fire but are now recovering. Representative photographs of the study area are provided in Attachment A.

Chaparral

Chaparral vegetation is the most common vegetation type within the study area, occurring along most canyon slopes. This vegetation type is highly variable and has been delineated into various subassociations. The following subassociations were observed in the study area: (1) chamise chaparral; (2) scrub oak chaparral; and (3) mixed chaparral. Chamise chaparral occurs along most of the canyon slopes in the study area. This vegetation type has a relatively open canopy and is dominated by the large shrubs chamise (*Adenostoma fasciculatum*) and thick-leaf yerba santa (*Eriodictyon crassifolium*). Scrub oak chaparral occurs on the north-facing slopes in the Maple Canyon SPS. This vegetation type is dominated by scrub oak (*Quercus berberidifolia*) that was previously burned and is currently regrowing. The understory includes species such as California poppy (*Eschscholzia californica*), ripgut brome (*Bromus diandrus*), and foxtail chess (*Bromus madritensis* ssp. *rubens*). Mixed chaparral occurs on canyon slopes throughout the study area. These areas contain a mix of chaparral species and vegetative cover is sparser than in the chamise chaparral with more exposed rock and bare ground present. Most

of the slopes on which this vegetation type is found burned during the Station Fire and shrubs and trees are commonly sprouting from the base. This vegetation type is expected to be impacted during sediment placement activities within Maple Canyon.

California Annual Grassland

California annual grassland occurs between the switchbacks of the access roads near the entrance to the dam facilities and the Maple Canyon SPS. This area has been previously used to deposit sediment from the reservoir. This vegetation type is dominated by a variety of non-native grasses including ripgut brome, foxtail chess, and wild oat (*Avena* sp.). Some scattered California poppy, Spanish broom (*Spartium junceum*), scrub oak, and pine (*Pinus* sp.) are also present. It is difficult to assess the extent to which this vegetation type burned during the Station Fire as annual grasses resprout very quickly after fire. This vegetation type is expected to be impacted during sediment placement activities within Maple Canyon.

Disturbed Freshwater Seep

Disturbed freshwater seep occurs downstream of Big Tujunga Reservoir on the slope north of the canyon bottom. While there is an underlying native component of species such as chamise, thick-leaf yerba santa, cryptantha (*Cryptantha* sp.), and deerweed (*Acmispon glaber* [*Lotus scoparius*]), the area contains a large proportion of non-native species such as Mediterranean schismus (*Schismus barbatus*), fescue (*Festuca* sp. [*Vulpia* sp.]), foxtail chess, ripgut brome, wild oat, red-stemmed filaree (*Erodium cicutarium*), and tree tobacco (*Nicotiana glauca*). The extent to which this vegetation type burned during the Station Fire was difficult to determine during the field survey. No impacts are expected to this vegetation type as it is outside of the proposed excavation limits.

Willow Riparian Forest

Willow riparian forest occurs at the canyon bottom downstream of the dam. This vegetation type is dominated by a mix of arroyo willow (*Salix lasiolepis*) and Goodding's black willow (*Salix gooddingii*) with an understory containing tree tobacco, ripgut brome, and chaparral nightshade (*Solanum xanti*). A few scattered white alder (*Alnus rhombifolia*) and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) are also present. This vegetation type burned during the Station Fire and willow trees are re-sprouting from the base. No impacts are expected to this vegetation type as it is outside of the proposed excavation limits.

Coast Live Oak Stands

A few stands of coast live oak individuals occur in the study area. The stand along the access road between the Maple Canyon SPS and the remainder of the study area has an understory of chamise, yerba santa, Our Lord's candle (*Yucca whipplei*), black sage (*Salvia mellifera*), deerweed, and chaparral nightshade. The stand along the access road downstream of the dam contains a sparse understory of non-native grasses with much bare ground. No significant fire damage to oak trees was noted during the field survey. Vegetation along the proposed haul route is not expected to be impacted. Therefore no impacts are expected to this vegetation type.

Open Water

Open water occurs upstream of Big Tujunga Dam within the reservoir. Water levels were high at the time of the survey and made much of the canyon upstream of the dam inaccessible. Open water downstream of the dam that was flowing through the willow riparian forest is not included

in this category because of the willow canopy and relatively limited extent of open water. The open water category is expected to disappear as the reservoir is dewatered prior to the initiation of project activities. The sediment below this category will be removed from the reservoir area to restore its original capacity.

Cliff

Cliff faces occur on the steep slopes throughout the study area. These areas are rocky and largely unvegetated. No impacts are expected to this vegetation type as it occurs outside of the proposed sediment excavation limits.

Ornamental

Ornamental plantings along the existing roads include common oleander (*Nerium oleander*), gum (*Eucalyptus* sp.), pine, and coast live oak. Vegetation along the proposed haul route is not expected to be impacted. Therefore no impacts are expected to this vegetation type.

Developed

Developed areas occur throughout the lower portion of the study area. This consists of the dam facilities, access roads, debris piles, concrete canyon walls, and riprap.

Additionally, tributaries at the upper end of the Maple Canyon SPS contain small areas of burned riparian herb, sycamore woodland, and willow riparian scrub; however, these areas are just beginning to resprout and therefore are not separated into individual vegetation types. These areas will be reassessed during the project's jurisdictional delineation to determine if they are under the jurisdiction of the resource agencies.

Special Status Vegetation Types

Willow riparian forest is the only vegetation type observed within the study area that would be considered special status by the resource agencies. Because this vegetation type is associated with a streambed feature, a permit from the CDFG would be required prior to disturbing or removing it. Impacts to this vegetation type may also be considered significant under the California Environmental Quality Act (CEQA), and mitigation may be required.

Additionally, while the coast live oak stands within the study area may not warrant mitigation as a vegetation type (due to their scattered distribution and overall limited acreage), removal of these trees may be subject to regulation by the U.S. Forest Service and/or the County of Los Angeles Oak Tree Ordinance.

No impacts to either of these vegetation types are anticipated as they are found outside of the project's disturbance limits.

Special Status Plant and Wildlife Species

Plants or wildlife may be considered to have "special status" due to declining populations, vulnerability to habitat change, or restricted distributions. Certain special status species have been listed as Threatened or Endangered under the California and/or Federal Endangered Species Acts.

Special Status Plants

Several special status plant species are known to occur or have historically occurred in the vicinity of the study area. Four of these species are federally and/or State-listed Threatened or Endangered species: Braunton's milk-vetch (*Astragalus brauntonii*), Nevin's barberry (*Berberis nevinii*), San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*), and slender-horned spineflower (*Dodecahema leptoceras*). Mount Gleason paintbrush (*Castilleja gleasonii*) is a State-listed Rare species. Of these species, potentially suitable habitat exists only for Nevin's barberry within the study area. Any impacts to this species, if present, would be considered significant.

In addition to species formally listed by the resource agencies, multiple species reported in the vicinity of the study area are CNPS List 1B and 2 plant species that may be considered constraints on development according to Section 15380 of the California Environmental Quality Act (CEQA). Potentially suitable habitat exists within the study area for slender mariposa lily (*Calochortus clavatus* var. *gracilis*), Plummer's mariposa lily (*Calochortus plummerae*), Parry's spineflower (*Chorizanthe parryi* var. *parryi*), California saw-grass (*Cladium californicum*), mesa horkelia (*Horkelia cuneata* ssp. *puberula*), California satintail (*Imperata brevifolia*), Davidson's bush-mallow (*Malacothamnus davidsonii*), California muhly (*Muhlenbergia californica*), white rabbit-tobacco (*Pseudognaphalium leucocephalum*), Greata's aster (*Symphyotrichum greatae*), San Bernardino aster (*Symphyotrichum defoliatum*), and Sonoran maiden fern (*Thelypteris puberula* var. *sonorensis*). Impacts on these species would be considered potentially significant depending on the size of the population, if present, relative to populations in the region.

Several of the species listed above are also listed as sensitive species for the Angeles National Forest by the U.S. Forest Service. These include slender mariposa lily, Plummer's mariposa lily, Parry's spineflower, mesa horkelia, California satintail, San Bernardino aster, and Sonoran maiden fern. One species, fragrant pitcher plant (*Lepechinia fragrans*), is listed as a sensitive species by the U.S. Forest Service (USFS), but is not a CNPS List 1B or 2 species.

CNPS Lists 3 and 4 species are not considered project constraints, and typically impacts on these species are considered less than significant and do not require mitigation. A summary of special status plant species is provided in Table 1.

TABLE 1
SPECIAL STATUS PLANT SPECIES
KNOWN TO OCCUR IN THE PROJECT REGION

Species	Status [1]				Likelihood for Occurrence
	USFWS	CDFG	CNPS	USFS	
Astragalus brauntonii Braunton's milk-vetch	FE		List 1B	–	Not expected to occur; outside known range
Berberis nevinii Nevin's barberry	FE	CE	List 1B	–	May occur; potentially suitable habitat present
Calochortus clavatus var. *gracilis* slender mariposa lily	–	–	List 1B	FSS	May occur; potentially suitable habitat present
Calochortus plummerae Plummer's mariposa lily	–	–	List 1B	FSS	May occur; potentially suitable habitat present
Castilleja gleasonii Mount Gleason paintbrush	–	–	List 1B	–	May occur; potentially suitable habitat present
Chorizanthe parryi var. *fernandina* San Fernandino Valley spineflower	FC	CE	List 1B	–	Not expected to occur; outside known range

TABLE 1 (Continued)
SPECIAL STATUS PLANT SPECIES
KNOWN TO OCCUR IN THE PROJECT REGION

Species	Status [1]				Likelihood for Occurrence
	USFWS	CDFG	CNPS	USFS	
Chorizanthe parryi var. *parryi* Parry's spineflower	–	–	List 1B	FSS	May occur; potentially suitable habitat present
Cladium californicum California saw-grass	–	–	List 2	–	May occur; potentially suitable habitat present
Dodecahema leptoceras slender-horned spineflower	FE	CE	List 1B	–	Not expected to occur; no potentially suitable habitat present
Horkelia cuneata ssp. *puberula* mesa horkelia	–	–	List 1B	FSS	May occur; potentially suitable habitat present
Imperata brevifolia California satintail	–	–	List 2	FSS	May occur; potentially suitable habitat present
Lepechinia fragrans fragrant pitcher plant	–	–	–	FSS	May occur; potentially suitable habitat present
Malacothamnus davidsonii Davidson's bush-mallow	–	–	List 1B	–	May occur; potentially suitable habitat present
Pseudognaphalium leucocephalum white rabbit-tobacco	–	–	List 2	–	May occur; potentially suitable habitat present
Symphyotrichum greatae Greata's aster	–	–	List 1B	–	May occur; potentially suitable habitat present
Symphyotrichum defoliatum San Bernardino aster	–	–	List 1B	FSS	May occur; potentially suitable habitat present
Thelypteris puberula var. *sonorensis* Sonoran maiden fern	–	–	List 2	FSS	May occur; potentially suitable habitat present

Status Definitions [1]

Federal (USFWS)
FE Endangered
FT Threatened
FC Candidate

State (CDFG)
CE Endangered
CT Threatened

California Native Plant Society (CNPS)
1A Plants Presumed Extinct in California
1B Plants Rare, Threatened, or Endangered in California/Elsewhere
2 Plants Rare, Threatened, or Endangered in California But More Common Elsewhere
3 Plants About Which We Need More Information – A Review List
4 Plants of Limited Distribution – A Watch List

Special Status Wildlife

Several special status wildlife species are known to occur in the vicinity of the study area (CDFG 2011). Three of these species are federally and/or State-listed Threatened or Endangered species with potentially suitable habitat occurring within the study area: Santa Ana sucker (*Catostomus santaanae*), arroyo toad (*Anaxyrus californicus*), and Sierra Madre yellow-legged frog (*Rana muscosa*). Any impacts on these species, if present, would be considered significant. A fourth species, the American peregrine falcon (*Falco peregrinus anatum*), was recently delisted by the U.S. Fish and Wildlife Service (USFWS) and the State, but it is still considered a State Fully Protected species. Impacts on the American peregrine falcon would only be considered significant if they consisted of impacts on nesting birds or loss of individual birds.

In addition to species formally listed by the resource agencies, additional special status species may occur within the study area that may constrain project activities. Potentially suitable habitat for the following species exists within the survey area: silvery legless lizard (*Anniella pulchra pulchra*), pallid bat (*Antrozous pallidus*), coastal whiptail (*Aspidoscelis tigris stejnegeri*), rosy boa (*Charina trivirgata*), black swift (*Cypseloides niger*), western pond turtle (*Emys marmorata*), western mastiff bat (*Eumops perotis californicus*), arroyo chub (*Gila orcuttii*), silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*), western yellow bat (*Lasiurus xanthinus*), San Diego desert woodrat (*Neotoma lepida intermedia*), big free-tailed bat (*Nyctinomops macrotis*), southern grasshopper mouse (*Onychomys torridus ramona*), coast (San Diego) horned lizard (*Phrynosoma coronatum blainvillii*, Santa Ana speckled dace (*Rhinichthys osculus* ssp. 3), coast range newt (*Taricha torosa torosa*), and two-striped garter snake (*Thamnophis hammondii*). Impacts to these species would be considered potentially significant depending on the size of the population, if present, relative to populations in the region. A summary of special status wildlife species known to occur in the project region is provided in Table 2.

TABLE 2
SPECIAL STATUS WILDLIFE SPECIES
KNOWN TO OCCUR IN PROJECT REGION

Species	Status [1]			Likelihood for Occurrence
	USFWS	CDFG	USFS	
Fish				
Catostomus santaanae Santa Ana sucker	FT	CSC	FSS	May occur; potentially suitable habitat present
Gila orcuttii Arroyo chub	FSC	CSC	FSS	May occur; potentially suitable habitat present
Rhinichthys osculus ssp. 3 Santa Ana speckled dace	FSC	CSC	FSS	May occur; potentially suitable habitat present
Amphibians				
Anaxyrus californicus Arroyo southwestern toad	FE	CSC	–	May occur; potentially suitable habitat present
Rana muscosa Sierra Madre yellow-legged frog	FE	CSC	FSS	May occur; potentially suitable habitat present
Taricha torosa torosa Coast Range newt	–	CSC	–	May occur; potentially suitable habitat present
Reptiles				
Anniella pulchra pulchra Silvery legless lizard	–	CSC	FSS	May occur; potentially suitable habitat present
Aspidoscelis tigris stejnegeri Coastal whiptail	–	SA	–	Observed; suitable habitat present
Charina trivirgata Rosy boa	FSC	–	FSS	May occur; potentially suitable habitat present
Emys marmorata Western pond turtle	FSC	CSC	FSS	May occur; potentially suitable habitat present
Phrynosoma blainvillii Coast (San Diego) horned lizard	FSC	CSC	FSS	May occur; potentially suitable habitat present
Thamnophis hammondii Two-striped garter snake	FSC	CSC	FSS	Observed; suitable habitat present
Birds				
Athene cunicularia Burrowing owl	–	CSC	–	Not expected to occur, no suitable habitat present.
Cypseloides niger Black swift	–	CSC	–	May occur; potentially suitable habitat present

TABLE 2 (Continued)
SPECIAL STATUS WILDLIFE SPECIES
KNOWN TO OCCUR IN PROJECT REGION

Species	Status [1]			Likelihood for Occurrence
	USFWS	CDFG	USFS	
Empidonax traillii extimus Southwestern willow flycatcher	FE	SE	FSS	Not expected to occur; no suitable habitat currently within study area due to recent fire
Falco peregrinus Peregrine falcon	–	CFP SCD	FSS	May occur; potentially suitable habitat present
Polioptila californica californica Coastal California gnatcatcher	FT	CSC	FSS	Not expected to occur, no suitable habitat present.
Vireo bellii pusillus Least Bell's vireo	FE	SE	FSS	Not expected to occur, no suitable habitat present, study area above elevational range
Mammals				
Antrozous pallidus Pallid bat	–	CSC	FSS	May occur; potentially suitable foraging habitat present
Eumops perotis californicus Western mastiff bat	–	CSC	–	May occur; potentially suitable foraging and roosting habitat present
Lasionycteris noctivagans Silver-haired bat	–	SA	–	May occur; potentially suitable foraging and roosting habitat present
Lasiurus cinereus Hoary bat	–	SA	–	May occur; potentially suitable foraging and roosting habitat present
Lasiurus xanthinus Western yellow bat	–	CSC	–	May occur; potentially suitable foraging and roosting habitat present
Lepus californicus bennettii San Diego black-tailed jackrabbit	–	CSC	–	Not expected to occur, no suitable habitat present.
Neotoma lepida intermedia San Diego desert woodrat	–	CSC	–	May occur; potentially suitable foraging habitat present
Nyctinomops macrotis Big free-tailed bat	–	CSC	–	May occur; potentially suitable foraging and roosting habitat present
Onychomys torridus ramona Southern grasshopper mouse	–	CSC	–	May occur; potentially suitable habitat present
Taxidea taxus American badger	–	CSC	–	Not expected to occur, no suitable habitat present.

Legend:

FEDERAL STATUS:

FE Federally Listed Endangered
FT Federally Listed Threatened
FC Federal Candidate
FSC Federal Species of Concern

FOREST SERVICE STATUS:

FSS Forest Service Sensitive Species

STATE STATUS:

SA Special Animal
SE State listed as endangered
ST State listed as threatened
SR State listed as rare
CSC California Department of Fish and Game Species of Concern
CFP California Fully Protected
SCD California (State) Candidate for Delisting

Note: Scientific and common names for wildlife species follow the most current list of Special Animals (July 2009) available from the California Department of Fish and Game (http://www.dfg.ca.gov/biogeodata/cnddb/plants_and_animals.asp).

Other Considerations

Much of the study area contains "Waters of the U.S." and "Waters of the State" that are under the jurisdiction of the U.S. Army Corps of Engineers (USACE), the State Water Quality Control Board, and the CDFG. A delineation of jurisdictional resources is needed in order to obtain regulatory permits prior to performing any work within these areas.

The Migratory Bird Treaty Act (MBTA) protects the nests of all native bird species, including common species such as mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), and house finch (*Carpodacus mexicanus*). Nesting birds have potential to occur in vegetation throughout the study area.

BIOLOGICAL CONSTRAINTS AND RECOMMENDATIONS

The following is a list of recommendations to ensure that the project is consistent with regulations protecting biological resources.

1. There is potential for several special status plant species to occur on the project site. Focused surveys to determine the presence/absence of special status plant species are recommended.

2. Potentially suitable habitat exists for three State and/or federally listed wildlife species: Santa Ana sucker, arroyo toad, and Sierra Madre yellow-legged frog. Focused surveys for these species are recommended to determine if they are present within the study area.

3. Potentially suitable habitat exists for several other special status species, including black swift, peregrine falcon, arroyo chub, Santa Ana speckled dace, silvery legless lizard, coastal whiptail, rosy boa, western pond turtle, coast (San Diego) horned lizard, two-striped garter snake, pallid bat, western mastiff bat, silver-haired bat, hoary bat, western yellow bat, big free-tailed bat, San Diego desert woodrat, and southern grasshopper mouse. The possible presence of these species is not a constraint to project activities, though avoidance/minimization measures may be required.

4. A delineation of jurisdictional resources is recommended to initiate the regulatory permitting process.

5. If oak trees will be removed or disturbed, a permit from the County of Los Angeles and/or USFS may be required.

6. Any vegetation removal activities should be planned outside of the nesting season for birds (generally March 15 through September 15) to ensure compliance with the MBTA. Nesting surveys would be needed prior to vegetation removal within the nesting season, and any active nests would require a buffer that may seriously constrain project activities.

Please contact David Hughes at (626) 351-2000 with any questions related to this report.

Sincerely,

BONTERRA CONSULTING

Ann M. Johnston
Principal, Biological Services

David T. Hughes
Project Manager

Attachment: A – Site Photographs
B – Plant and Wildlife Compendia

cc: Valerie de la Cruz, Water Resources Division
Crystal Franco P.E., Water Resources Division

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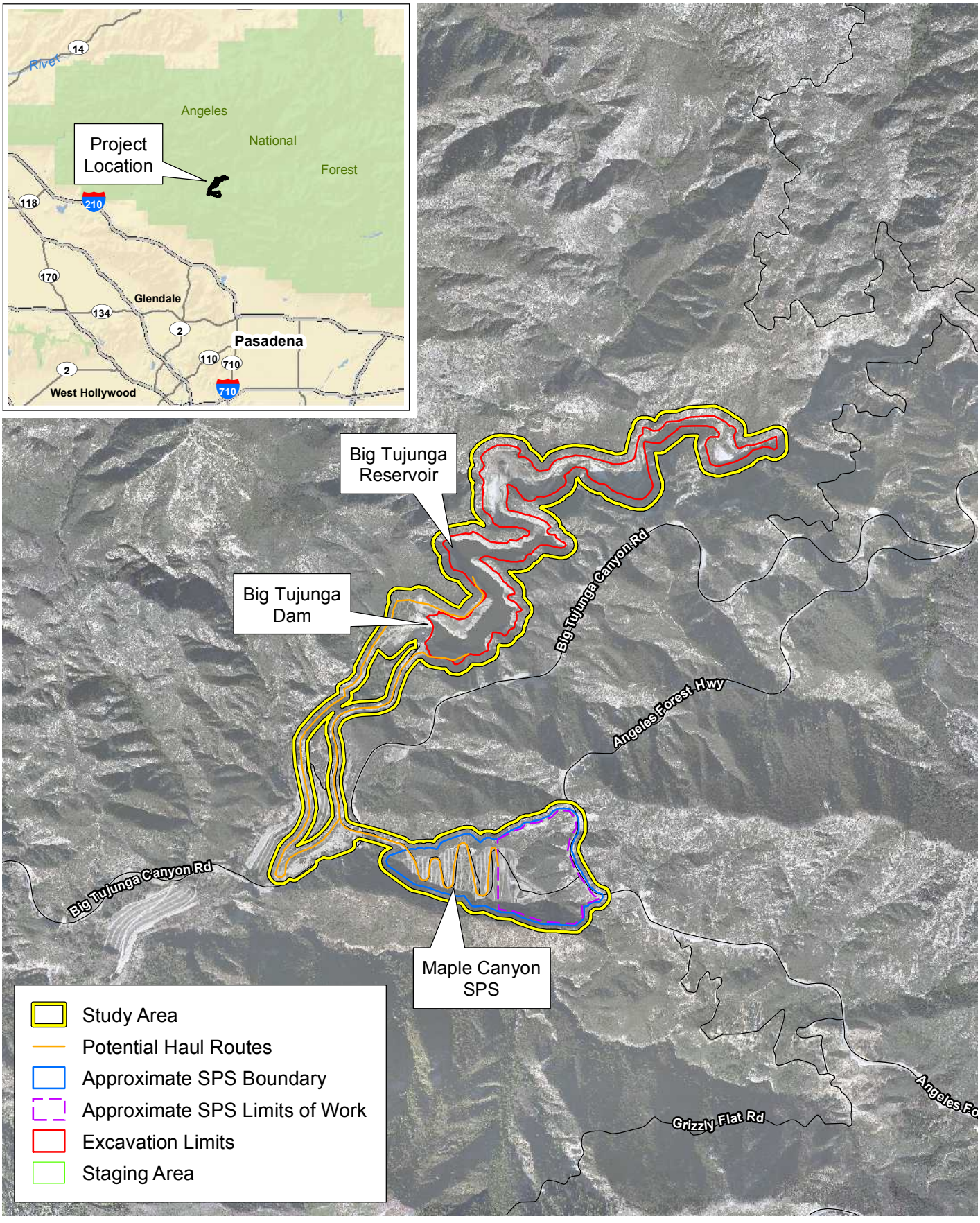

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Project Location

Exhibit 1

Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project

N W E S

2,000 1,000 0 2,000 Feet

BonTerra CONSULTING

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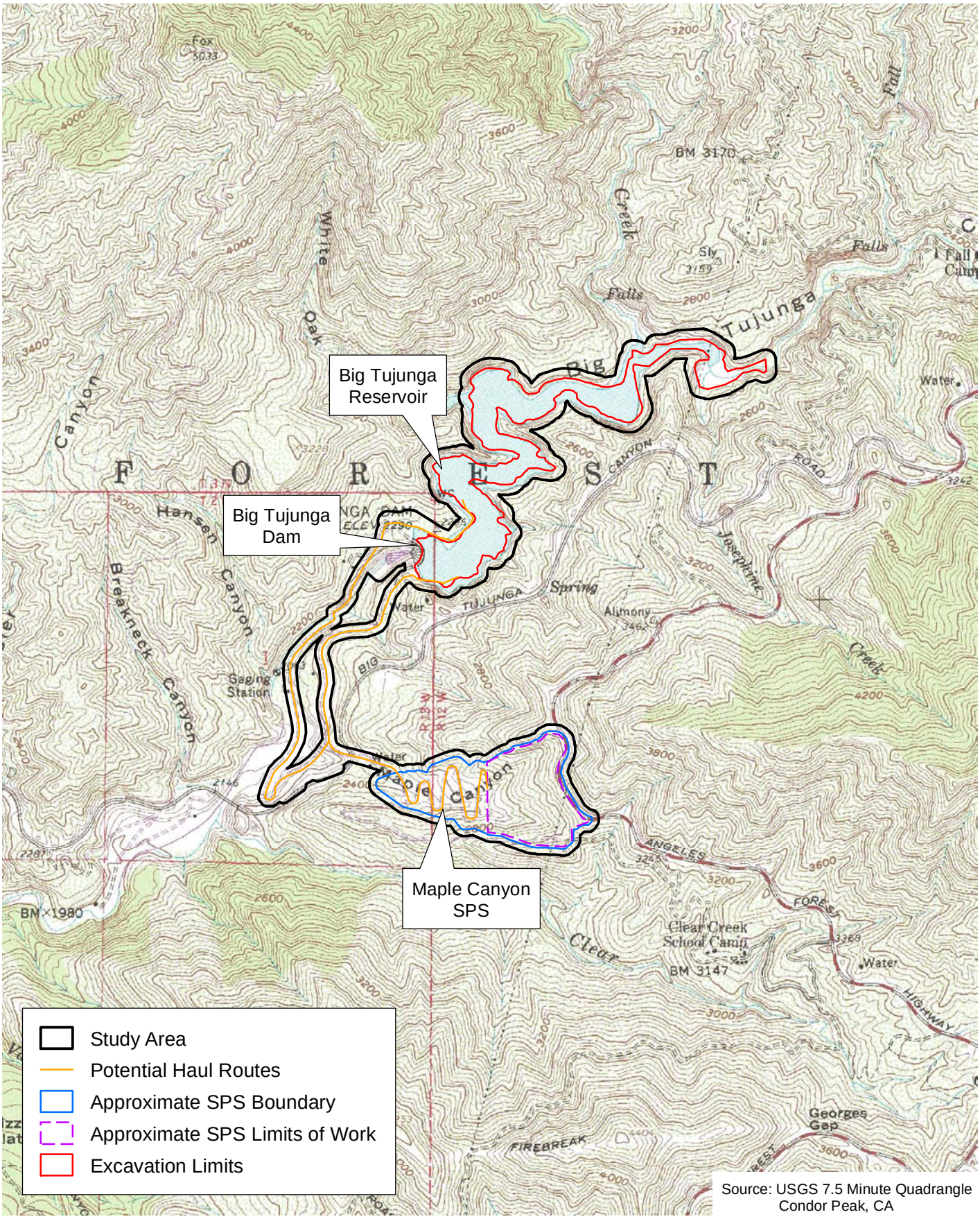

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U.S. Geological Survey 7.5-Minute Quadrangle

Exhibit 2

Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project

N W E S

2,000 1,000 0 2,000 Feet

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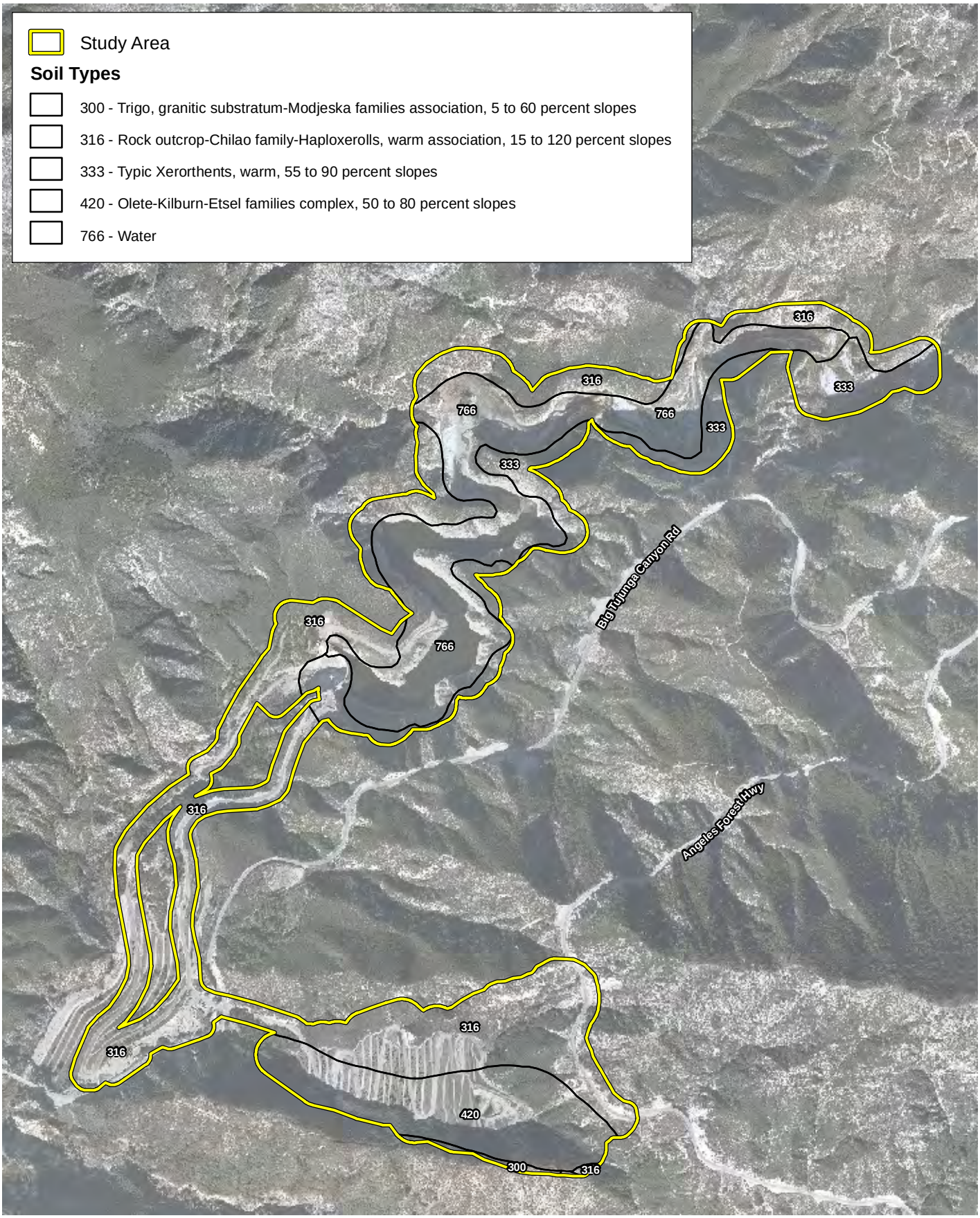

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Soil Types

Exhibit 3

Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project

N W E S

1,200 600 0 1,200 Feet

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ATTACHMENT A

SITE PHOTOGRAPHS



Chamise chaparral vegetation on the slopes near Big Tujunga Dam facing north. Note burn damage to tree at right from Station Fire.



Scrub oak chaparral on the slopes in the Maple Canyon Sediment Placement Site facing east. Note re-sprouting shrubs after Station Fire damage.

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Site Photographs

Attachment A-1

Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project

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California annual grassland in the Maple Canyon Sediment Placement Site facing north.



Willow riparian forest below Big Tujunga Dam facing north. Willow trees are re-sprouting after being burned by Station Fire.

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Site Photographs

Attachment A-2

Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project

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Pine trees along existing haul route. Note fire damage to trees at left.



Overview of Big Tujunga reservoir.

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Site Photographs

Attachment A-3

Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project

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ATTACHMENT B

PLANT AND WILDLIFE COMPENDIA

PLANT COMPENDIUM

"The following compendium is based on a reconnaissance-level survey and should be considered preliminary. Comprehensive plant and wildlife compendia will be provided with focused survey reports"

Species	
***PTERIDOPHYTES* - FERNS AND ALLIES**	
GYMNOSPERMS	
PINACEAE - PINE FAMILY	
Pinus sp.	pine
***ANGIOSPERMAE* - FLOWERING PLANTS**	
DICOTYLEDONES	
ANACARDIACEAE - SUMAC FAMILY	
Malosma laurina	laurel sumac
APOCYNACEAE - DOGBANE FAMILY	
*Nerium oleander**	common oleander
BETULACEAE - BIRCH FAMILY	
Alnus rhombifolia	white alder
BORAGINACEAE - BORAGE FAMILY	
Cryptantha sp.	cryptantha
Emmenanthe penduliflora	whispering bells
Eriodictyon crassifolium	thick-leaf yerba santa
Phacelia minor	wild canterbury-bell
CUCURBITACEAE - GOURD FAMILY	
Marah macrocarpus	chilicothe
ERICACEAE - HEATH FAMILY	
Arctostaphylos sp.	manzanita
FABACEAE (LEGUMINOSAE) - LEGUME FAMILY	
Acmispon glaber [Lotus scoparius]	deerweed
*Spartium junceum**	Spanish broom
FAGACEAE - OAK / BEECH FAMILY	
Quercus agrifolia	coast live oak
Quercus berberidifolia	scrub oak / California scrub oak
GERANIACEAE - GERANIUM FAMILY	
*Erodium cicutarium**	red-stemmed filaree
LAMIACEAE (LABIATAE) - MINT FAMILY	
Salvia mellifera	black sage
MYRTACEAE - MYRTLE FAMILY	
Eucalyptus sp.*	gum
PAPAVERACEAE - POPPY FAMILY	
Dendromecon rigida	bush poppy
Eschscholzia californica	California poppy
POLYGONACEAE - BUCKWHEAT FAMILY	
Eriogonum fasciculatum	California buckwheat
ROSACEAE - ROSE FAMILY	
Adenostoma fasciculatum	chamise
Cercocarpus betuloides var. betuloides	birch-leaf mountain-mahogany

PLANT COMPENDIUM (Continued)

Species	
SALICACEAE - WILLOW FAMILY	
Populus fremontii ssp. *fremontii*	Fremont cottonwood
Salix gooddingii	Goodding's black willow
Salix lasiolepis	arroyo willow
SOLANACEAE - NIGHTSHADE FAMILY	
*Nicotiana glauca**	tree tobacco
Solanum xanti	chaparral nightshade
***MONOCOTYLEDONES* - MONOCOTS**	
AGAVACEAE - CENTURY PLANT FAMILY	
Hesperoyucca whipplei [Yucca whipplei]	Our Lord's candle
POACEAE [GRAMINEAE] - GRASS FAMILY	
Avena spp.*	wild oat
*Bromus diandrus**	ripgut grass
Bromus madritensis ssp. *rubens**	foxtail chess
*Festuca sp. [Vulpia sp.]**	fescue
*Piptatherum miliaceum**	smilo grass / millett ricegrass
*Schismus barbatus**	Mediterranean schismus
* non-native species	

WILDLIFE COMPENDIUM

"The following compendium is based on a reconnaissance-level survey and should be considered preliminary. Comprehensive plant and wildlife compendia will be provided with focused survey reports"

Species	
Birds	
ANATIDAE - WATERFOWL	
Anas platyrhynchos	mallard
FALCONIDAE - FALCONS	
Falco sparverius	American kestrel
APODIDAE - SWIFTS	
Aeronautes saxatalis	white-throated swift
TROCHILIDAE - HUMMINGBIRDS	
Calypte costae	Costa's hummingbird
TYRANNIDAE - TYRANT FLYCATCHERS	
Empidonax difficilis	Pacific-slope flycatcher
Sayornis nigricans	black phoebe
Myiarchus cinerascens	ash-throated flycatcher
VIREONIDAE - VIREOS	
Vireo cassinii	Cassin's vireo
CORVIDAE - CROWS & JAYS	
Aphelocoma californica	western scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
HIRUNDINIDAE - SWALLOWS	
Stelgidopteryx serripennis	northern rough-winged swallow
Petrochelidon pyrrhonota	cliff swallow
PARIDAE - TITMICE	
Baeolophus inornatus	oak titmouse
AEGITHALIDAE - BUSHTITS	
Psaltriparus minimus	bushtit
TROGLODYTIDAE - WRENS	
Thryomanes bewickii	Bewick's wren
PARULIDAE - WARBLERS	
Oreothlypis [*Vermivora*] *celata*	orange-crowned warbler
Dendroica petechia	yellow warbler
Dendroica coronata	yellow-rumped warbler
Dendroica nigrescens	black-throated gray warbler
Wilsonia pusilla	Wilson's warbler
EMBERIZIDAE - SPARROWS & JUNCOS	
Pipilo maculatus	spotted towhee
Melozone [*Pipilo*] *crissalis*	California towhee
Melospiza melodia	song sparrow
Junco hyemalis	dark-eyed junco

WILDLIFE COMPENDIUM (Continued)

Species	
CARDINALIDAE - CARDINALS & ALLIES	
Pheucticus melanocephalus	black-headed grosbeak
Passerina amoena	lazuli bunting
ICTERIDAE - BLACKBIRDS	
Molothrus ater	brown-headed cowbird
Icterus bullockii	Bullock's oriole
FRINGILLIDAE - FINCHES	
Carpodacus mexicanus	house finch
Spinus [Carduelis] psaltria	lesser goldfinch
Mammals	
CANIDAE - WOLVES & FOXES	
Urocyon cinereoargenteus	gray fox
MUSTELIDAE - WEASELS, SKUNKS & OTTERS	
Mephitis mephitis	striped skunk
CERVIDAE - DEER	
Odocoileus hemionus	mule deer

APPENDIX B-2

JURISDICTIONAL DELINEATION REPORT

Jurisdictional Delineation Report

Big Tujunga Reservoir Sediment Removal Project
Los Angeles County, California

Prepared for

Los Angeles County Department of Public Works
Water Resources Division
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Alhambra, California 91802
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Prepared by

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December 2020

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Attachment

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E California Rapid Assessment Method Datasheets
F Literature Review Details
G Map of USACE Jurisdictional Waters
H Map of CDFW Jurisdictional Waters
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EXECUTIVE SUMMARY

The purpose of this report is to provide baseline data concerning the type and extent of jurisdictional resources for the Big Tujunga Reservoir Sediment Removal Project located in Los Angeles County, California. Jurisdictional resources considered for this report include wetlands and non-wetland "waters of the U.S." regulated by the U.S. Army Corps of Engineers (USACE); "waters of the State" regulated by the Regional Water Quality Control Board (RWQCB); and the bed, bank, and channel of all lakes, rivers, and/or streams (and associated riparian vegetation), as regulated by the California Department of Fish and Wildlife (CDFW).

The limits of non-wetland "waters of the U.S." and "waters of the State" were identified by the presence of an ordinary high water mark (OHWM). Features in the survey area that are considered "waters of the U.S." reflect the definition provided in the Navigable Water Protection Rule that was published on April 21, 2020 and became effective on June 22, 2020. Wetland features were identified based on the USACE's three-parameter approach in which wetlands are defined by the presence of hydrophytic vegetation, hydric soils, and presence of wetland hydrology indicators. The limits of CDFW jurisdictional waters were identified as either the top of bank or the outer dripline of riparian vegetation.

The jurisdictional delineation work was performed by Psomas Regulatory Specialist David Hughes and Environmental Planner Daria Sarraf on May 31 and June 20, 2017. Based on the results of the jurisdictional delineation field work, it was determined that the total amount of jurisdictional resources in the survey area and proposed impacts are as follows:

USACE Jurisdictional "waters of the U.S."

- **Total Existing**: 0.00 acre of wetlands and 70.65 acres of non-wetland "waters of the U.S."
- **Total Impacts:** 1.33 acre of permanent impacts; 46.63 acre of temporary impacts

RWQCB Jurisdictional "waters of the State"

- **Total Existing**: 0.00 acre of wetlands and 70.65 acres of non-wetland "waters of the U.S."
- **Total Impacts:** 2.38 acre of permanent impacts; 46.63 acre of temporary impacts

CDFW Jurisdictional Streambeds and Riparian Habitat

- **Total Existing**: 93.11 acres
- **Total Impacts:** 3.23 acre of permanent impacts; 47.47 acre of temporary impacts

1.0 INTRODUCTION

This Jurisdictional Delineation Report (report) was prepared for the Los Angeles County Department of Public Works, Water Resources Division to provide baseline data concerning the type and extent of resources under the jurisdiction of the U.S. Army Corps of Engineers (USACE), the California Department of Fish and Wildlife (CDFW), and the Los Angeles Regional Water Quality Control Board (RWQCB) for the Big Tujunga Reservoir Sediment Removal Project (hereinafter referred to as "the proposed project"). This Jurisdictional Delineation Report is based on the jurisdictional delineation surveys performed on May 31 and June 20, 2017. Jurisdictional delineation surveys were previously conducted for this project site on September 28 and October 27, 2011.

1.1 PROJECT LOCATION

The proposed project is located in Big Tujunga Canyon in unincorporated Los Angeles County, within the boundaries of the Angeles National Forest (Exhibit 1). It is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute quadrangle of the San Bernardino Meridian at Township 3 North, Range 12 West, Section 31; Township 2 North, Range 12 West, Section 6; and Township 2 North, Range 13 West, Section 1 (Exhibit 2).

The study area for this jurisdictional delineation includes Big Tujunga Reservoir (which extends approximately two river miles upstream of Big Tujunga Dam), Big Tujunga Canyon Creek (which flows into the reservoir), the plunge pool immediately downstream of Big Tujunga Dam, Big Tujunga Wash (located downstream of the plunge pool for approximately one mile), and the Maple Canyon Sediment Placement Site (SPS) (Exhibit 3). Josephine Canyon Creek, White Oak Canyon Creek, and Fox Canyon Creek are smaller creeks that feed into Big Tujunga Reservoir, but only small portions of these creeks are within the survey area. The topography steeply slopes down into Big Tujunga Canyon; elevations range from approximately 2,150 to 3,400 feet above mean sea level (msl).

1.2 PROJECT DESCRIPTION

The proposed project involves the dewatering of the Big Tujunga Reservoir and the removal of sediment from the reservoir to the nearby Maple Canyon SPS.

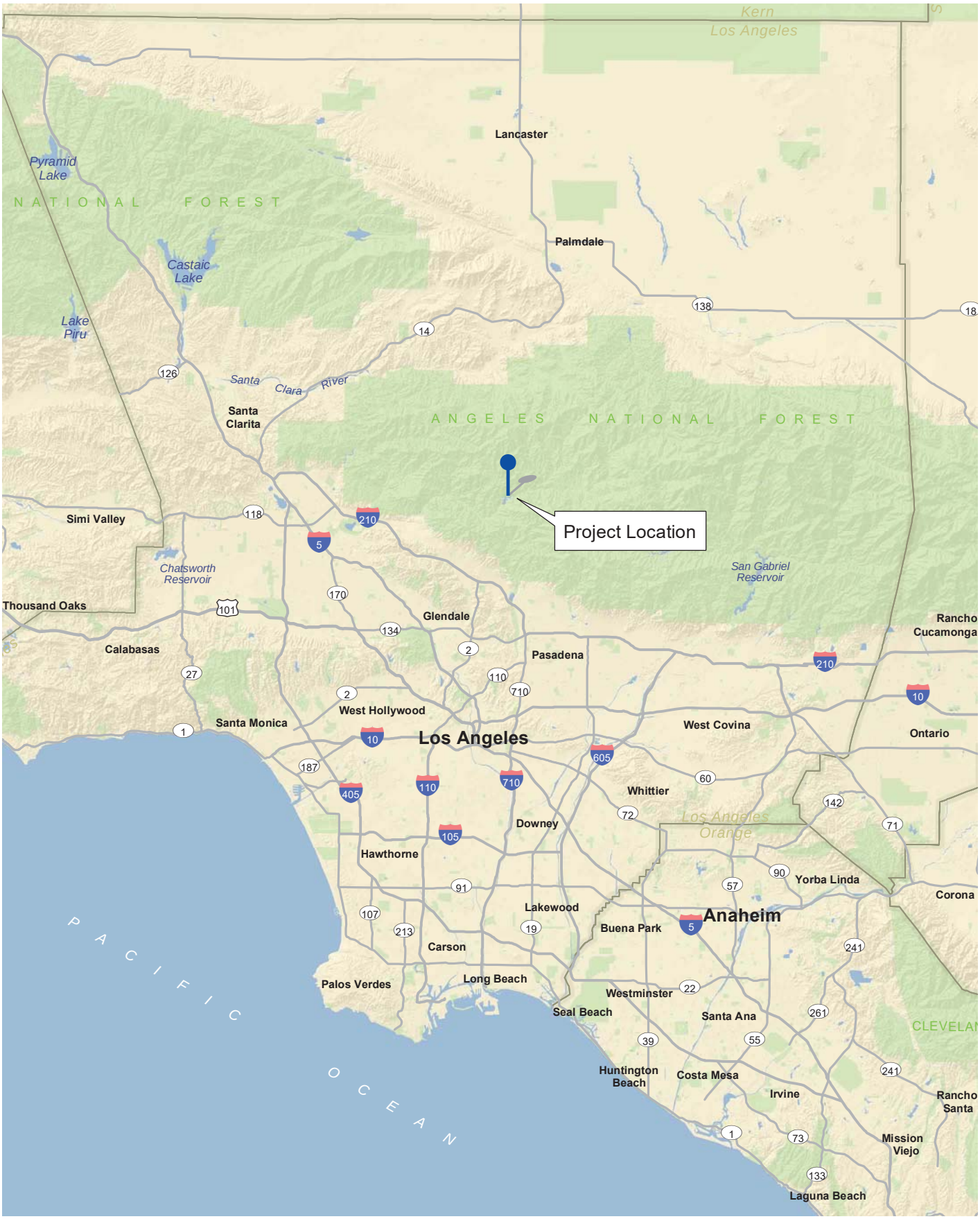
1.3 REGULATORY AUTHORITY

This section summarizes the federal and State agencies' regulatory jurisdiction over activities that have a potential to impact jurisdictional resources. A detailed explanation of each agency's regulatory authority is provided in Attachment A.

1.3.1 U.S. Army Corps of Engineers

The USACE Regulatory Branch regulates activities that discharge dredged or fill materials into "waters of the U.S." (WOTUS) under Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. Its authority applies to all WOTUS where the material (1) replaces any portion of a WOTUS with dry land or (2) changes the bottom elevation of any portion of any WOTUS. Activities that result in fill or dredge of WOTUS require a permit from the USACE.

Under the Navigable Waters Protection Rule published on April 21, 2020, WOTUS include the following categories: (1) territorial seas and Traditional Navigable Waterways (TNWs); (2) perennial and intermittent tributaries of jurisdictional waters; (3) lakes, ponds, and impoundments



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Regional Location

Exhibit 1

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

N W E S

10 5 0 10 Miles

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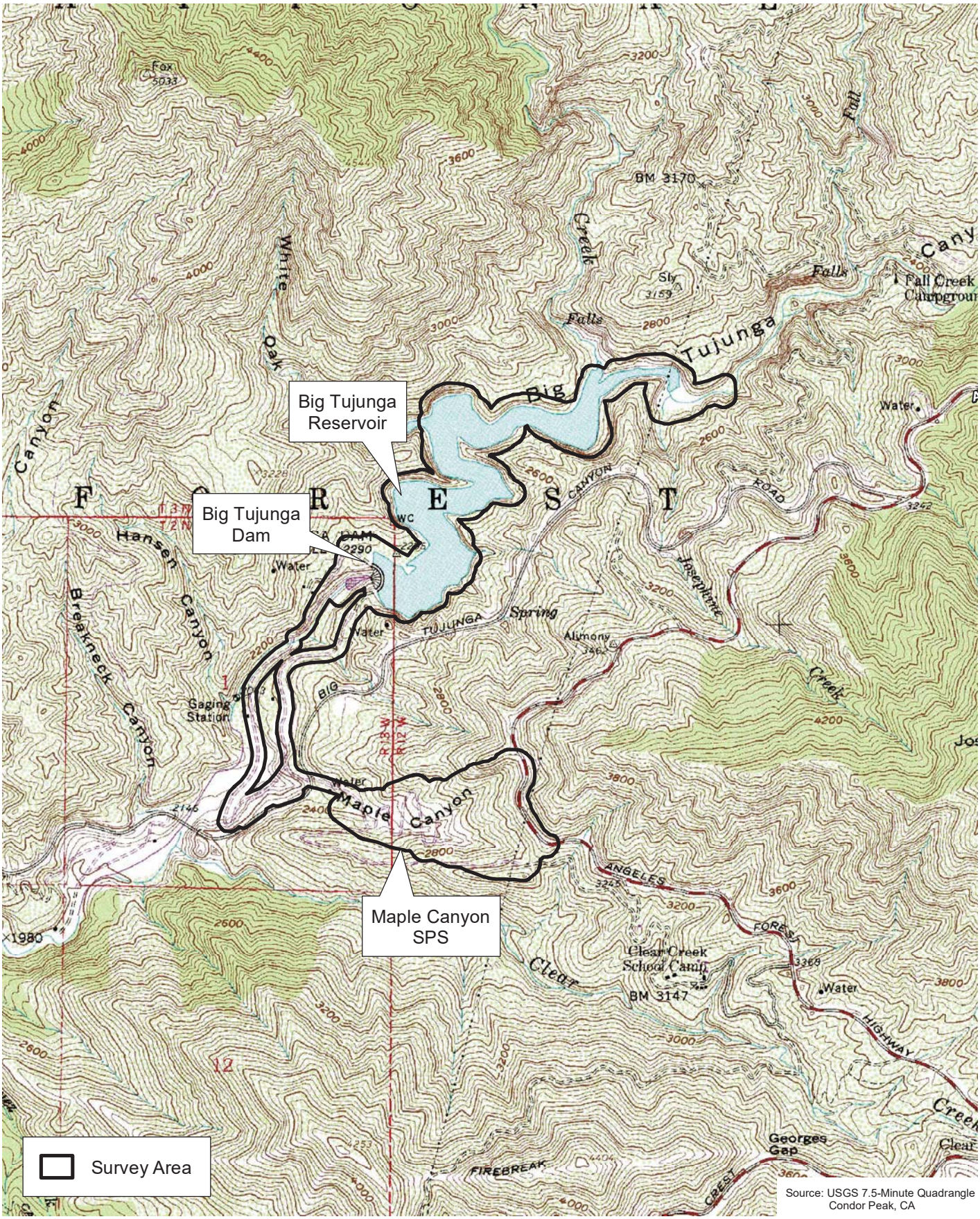

Source: USGS 7.5-Minute Quadrangle
Condor Peak, CA

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U.S. Geological Survey 7.5-Minute Quadrangle

Exhibit 2

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

N W E S

2,000 1,000 0 2,000 Feet

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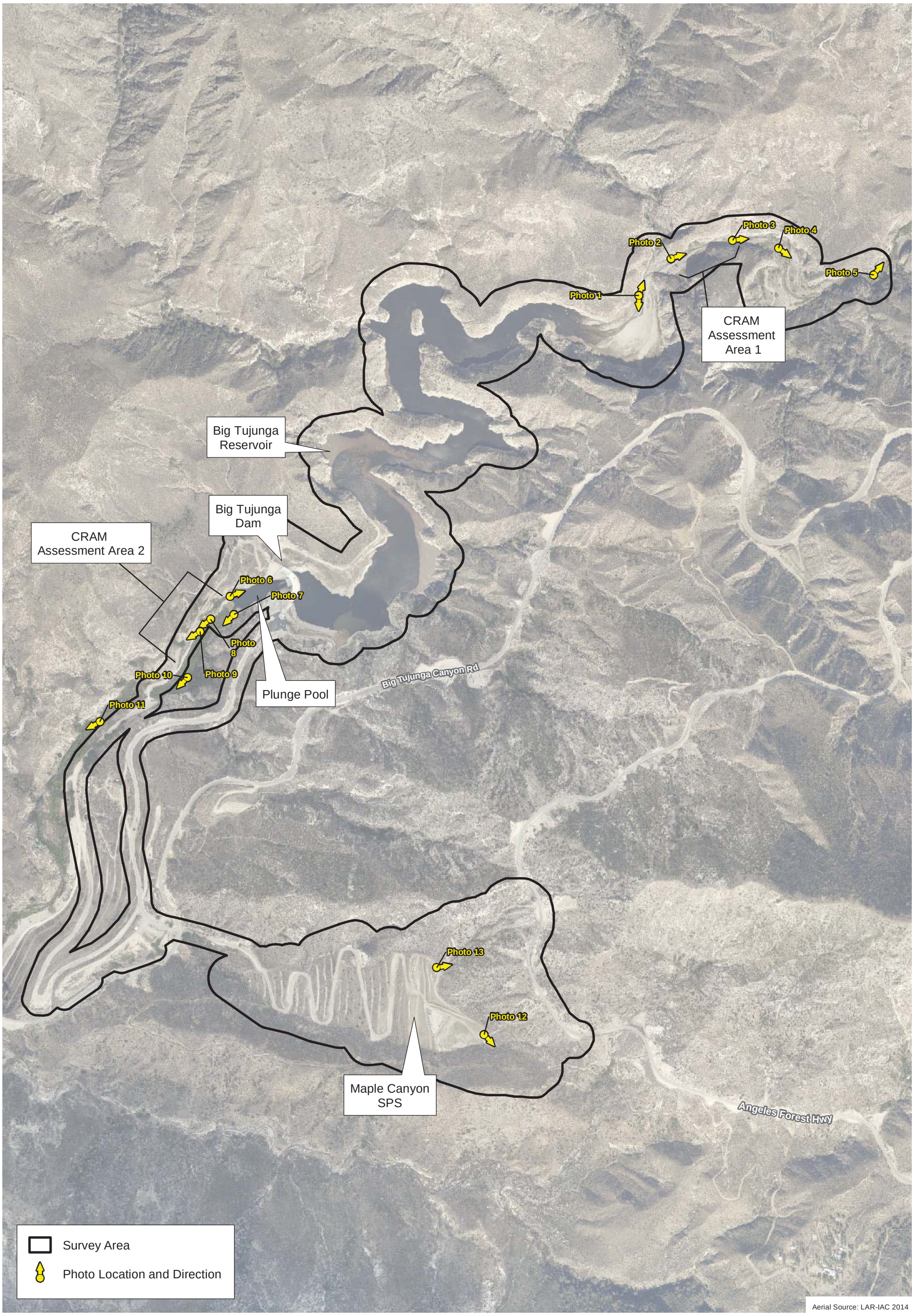

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Project Location

Exhibit 3

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

N W E S

800 400 0 800 Feet

PSOMAS

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that contribute surface water flow to a jurisdictional water in a typical year; and (4) wetlands that are adjacent to non-wetland jurisdictional waters.

1.3.2 Regional Water Quality Control Board

The State Water Resources Control Board (SWRCB), in conjunction with the nine RWQCBs, is the primary agency responsible for protecting water quality in California through the regulation of discharges to surface waters under the CWA and the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The SWRCB's and RWQCBs' jurisdictions extend to all "waters of the State" and to all WOTUS, including wetlands (isolated and non-isolated).

1.3.3 California Department of Fish and Wildlife

The CDFW regulates activities that may affect rivers, streams, and lakes pursuant to the *California Fish and Game Code* (§§1600–1616). According to Section 1602 of the *California Fish and Game Code,* the CDFW has jurisdictional authority over any work that will (1) substantially divert or obstruct the natural flow of any river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

2.0 METHODS

The three-parameter approach used to identify USACE wetlands is summarized in Sections 2.1 through 2.3; literature reviewed for the preparation of the delineation is outlined in Section 2.4; the California Rapid Assessment Method (CRAM) functional assessment is discussed in Section 2.5; and the field delineation is outlined in Section 2.6.

2.1 VEGETATION

Hydrophytic vegetation (or hydrophytes) is defined as any macrophytic plant that "grows in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content; plants typically found in wet habitats" (Environmental Laboratory 1987). Specifically, these plant species have specialized morphological, physiological, or other adaptations for surviving in permanently saturated to periodically saturated soils where oxygen levels are very low or the soils are anaerobic. Lichvar and Gillrich (2011) provide the following technical definitions of wetland plant indicator status categories:

- **Obligate Wetland (OBL):** These wetland-dependent plants (herbaceous or woody) require standing water or seasonally saturated soils (14 or more consecutive days) near the surface to assure adequate growth, development, and reproduction and to maintain healthy populations. These plants consist of four types:
    - *submerged:* plants that conduct virtually all of their growth and reproductive activity under water.
    - *floating:* plants that grow with leaves and most often their vegetative and reproductive organs floating on the water surface.
    - *floating-leaved:* plants that are rooted in sediment but also have leaves that float on the water surface.
    - *emergent:* herbaceous and woody plants that grow with their bases submerged and rooted in inundated sediment or seasonally saturated soil and their upper portions, including most of the vegetative and reproductive organs, growing above the water level.
- **Facultative Wetlands (FACW):** These plants depend on and predominantly occur with hydric soils, standing water, or seasonally high water tables in wet habitats for assuring optimal growth, development, and reproduction and for maintaining healthy populations. These plants often grow in geomorphic locations where water saturates soils or floods the soil surface at least seasonally.
- **Facultative (FAC):** These plants can occur in wetlands or non-wetlands. They can grow in hydric, mesic, or xeric habitats. The occurrence of these plants in different habitats represents responses to a variety of environmental variables other than just hydrology (e.g., shade tolerance, soil hydrogen potential [pH], and elevation) and they have a wide tolerance of soil moisture conditions.
- **Facultative Upland (FACU):** These plants are not wetland dependent. They can grow on hydric and seasonally saturated soils, but they develop optimal growth and healthy populations on predominantly drier or more mesic sites. Unlike FAC plants, these plants are non-wetland plants by habitat preference.

- **Obligate Upland (UPL):** These plants occupy mesic to xeric non-wetland habitats. They almost never occur in standing water or saturated soils. Typical growth forms include herbaceous, shrubs, woody vines, and trees.

The USACE—as part of an interagency effort with the U.S. Environmental Protection Agency (USEPA), the U.S. Fish and Wildlife Service (USFWS), and the U.S. Department of Agriculture's Natural Resources Conservation Service (USDA NRCS)—has approved a National Wetland Plant List (NWPL) that provides the current indicator status for plant species. The NWPL is used to determine whether the hydrophytic vegetation parameter is met when conducting wetland determinations under the CWA. The NWPL is also intended to be used for wetland restoration, establishment, and enhancement projects. This report utilized the indicator statuses for the Arid West Supplement portion of the NWPL.

The following are three procedures for determining hydrophytic vegetation: Indicator 1, "Dominance Test", using the "50/20 Rule"; Indicator 2, "Prevalence Index"; or Indicator 3, "Morphological Adaptation", as identified in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008). Hydrophytic vegetation is present if any indicator is satisfied. If none of the indicators are satisfied, then hydrophytic vegetation is absent unless (1) indicators of hydric soil and wetland hydrology are present and (2) the site meets the requirements for a problematic wetland situation.

Dominance Test: Vegetative cover is estimated and is ranked according to its dominance. Dominant species are the most abundant species for each stratum of the community (i.e., tree, sapling/shrub, herb, or woody vine) that individually or collectively amount to 50 percent of the total coverage of vegetation plus any other species that, by itself, accounts for 20 percent of the total vegetation cover (also known as the "50/20 Rule"). These species are recorded on the "Wetland Determination Data Form – Arid West Region" (see Attachment B). The wetlands indicator status of each species is also recorded on the data forms based on the *National List of Plant Species that Occur in Wetlands* (Reed 1988). If greater than 50 percent of the dominant species across all strata are OBL, FACW, or FAC species, the criterion for wetland vegetation is considered to be met.

Prevalence Index: The prevalence index considers all plant species in a community, not just the dominant ones. The prevalence index is the average of the wetland indicator status of all plant species in a sampling plot. Each indicator status category is given a numeric code (OBL = 1, FACW = 2, FAC = 3, FACU = 4, and UPL = 5) and is weighted by the species' abundance (percent cover). Hydrophytic vegetation is present if the prevalence index is 3.0 or less.

Morphological Adaptation: Morphological adaptations, such as adventitious roots (i.e., roots that take advantage of the wet conditions) and shallow root systems must be observed on more than 50 percent of the individuals of a FACU species for the hydrophytic vegetation wetland criterion to be met.

2.2 SOILS

The National Technical Committee for Hydric Soils (NTCHS) defines a hydric soil as a soil that is formed under conditions of saturation, flooding, or ponding that occurs long enough during the growing season to develop anaerobic conditions (or conditions of limited oxygen) at or near the soil surface and that favor the establishment of hydrophytic vegetation (USDA NRCS 2017a). It should be noted that hydric soils created under artificial conditions of flooding and inundation sufficient for the establishment of hydrophytic vegetation would also meet this hydric soils indicator.

The soil conditions are verified by digging test pits along each transect to a depth of at least 20 inches (except where a restrictive layer occurs in areas containing hard pan, cobble, or solid rock). It should be noted that, at some sites, it may be necessary to make exploratory soil test pits up to 40 inches in depth to more accurately document and understand the variability in soil properties and hydrologic relationships on the site. Soil test pit locations are usually dug within the drainage invert or at the edge of a drainage course in vegetated areas. Soil extracted from each soil test pit is then examined for texture and color using the standard plates within the Munsell Soil Color Chart (1994) and recorded on the Data Form. The Munsell Soil Color Chart aids in designating soils by color labels based on gradations of three simple variables: hue, value, and chroma. Any indicators of hydric soils such as redoximorphic features (i.e., areas where iron is reduced under anaerobic conditions and oxidized following a return to aerobic conditions); buried organic matter; organic streaking; reduced soil conditions; gleyed (i.e., soils having a characteristic bluish-gray or greenish-gray in color) or low-chroma soils; or sulfuric odor are also recorded on the Data Form. If hydric soils are found, progressive pits are dug along the transect moving laterally away from the active channel area until hydric soil features are no longer present within the top 20 inches of the soil.

2.3 HYDROLOGY

Wetlands hydrology is represented by either (1) all of the hydrological elements or characteristics of areas permanently or periodically inundated or (2) areas containing soils that are saturated for a sufficient duration of time to create hydric soils suitable for the establishment of plant species that are typically adapted to anaerobic soil conditions. The presence of wetland hydrology is evaluated at each intersect by recording the extent of observed surface flows, the depth of inundation, the depth to saturated soils, and the depth to free water in soil test pits. In instances where stream flow is divided into multiple channels with intervening sandbars, the entire area between the channels is considered within the OHWM. Therefore, an area containing these features would meet the indicator requirements for wetland hydrology.

2.4 LITERATURE REVIEW

Prior to conducting the delineation and during the course of report preparation, Psomas reviewed the following documents to identify areas that may fall under agency jurisdiction: the USGS' Condor Peak 7.5-minute quadrangle map; color aerial photography provided by Google Earth; soil data provided by the U.S. Department of Agriculture's Natural Resources Conservation Service (USDA NRCS 2017a); the National Hydric Soils List (USDA NRCS 2017b); the National Wetlands Inventory's Wetland Mapper (USFWS 2017); and the Water Quality Control Plan for the Los Angeles Region (Los Angeles RWQCB 1994).

2.5 CALIFORNIA RAPID ASSESSMENT METHOD

CRAM is a wetland monitoring tool that was developed in response to a monitoring framework recommended by the USEPA (2006) to help States meet monitoring requirements stated in the CWA. Personnel from the USACE, the CDFW, and the RWQCB (among other agencies) participated in the development of CRAM, which these agencies accept as an assessment tool.

A CRAM analysis was conducted concurrently with the jurisdictional delineation field studies. Surveys were conducted in accordance with the *California Rapid Assessment Method (CRAM) for Wetlands and Riparian Areas (Version 6.0)* (CWMW 2013). The CRAM analysis for Riverine

Wetlands[1] was used to establish and score two Assessment Areas (AAs) in the survey area: one in the upper reservoir area and another in Big Tujunga Wash below Big Tujunga Dam.

The AA is the fundamental unit of evaluation for CRAM analysis. The length of each AA is between 100 and 200 meters and depends on the bankfull width of each streambed. The AA width is defined as the outer canopy of vegetation that overhangs the channel, where present.

Information recorded for the AA includes (1) percentage of the AA that was surrounded by a buffer and the condition of the buffer; (2) number of plant layers in the AA; (3) number of codominant species and invasive species; and (4) cross-sectional measurements to determine hydrologic connectivity to adjacent areas. Qualitative factors that were assessed include (1) degree of plant zonation; (2) vertical plant structure; (3) buffer condition; and (4) complexity of the channel's bank features. Worksheets that identified different structural patches and the degree of channel stability were also filled out for use in the assessment. Aerial photos of the site were later analyzed to determine the site's overall landscape connectivity, buffer width, and water sources.

Individual scores are obtained by "choosing the best-fit set of narrative descriptions of observable conditions ranging from the worst commonly observed [D] to the best achievable [A] for the type of wetland being assessed" (CWMW 2013). Each description has a fixed numerical value. This information was used to assess four primary attributes that are equally weighted: (1) Buffer and Landscape Context; (2) Hydrology; (3) Physical Structure; and (4) Biotic Structure. Table 1 provides a description of these attributes and their associated metrics. The attribute score is calculated by first adding the values of the chosen narrative descriptions for the attribute's component metrics, and then converting the sum into a percentage of the maximum possible score for the attribute. The overall CRAM score is the average of the final attribute scores.

CRAM scores for each of the 4 attributes range from 25 to 100. CRAM scores provide an assessment of the level of the various functions and services provided by an aquatic system. The score is a relative measurement to indicate how an individual site compares to the best achievable conditions for that wetland type in the State. It is assumed that the same scores for different wetlands of the same type represent the same overall condition and functional capacity. Therefore, these scores may be used to track the progress of restoration efforts over time; to compare impacted sites to their in-kind mitigation sites; or to compare an individual wetland to the status and trends in ambient condition of its wetland type.

[1] CRAM uses the definition of a wetland provided by the National Wetland Inventory (NWI) of the USFWS: "Wetlands are lands transitional between terrestrial and aquatic systems, where the water table is usually at or near the surface or the land is covered by shallow water. For the purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is not a soil and is saturated with water or covered by shallow water at some time during the growing season of each year" (Cowardin et al. 1979).

TABLE 1
DESCRIPTION OF CRAM ATTRIBUTES AND METRICS

Attribute	Metric		Description
Buffer and Landscape Context	Stream Corridor Continuity		Measures continuity along the stream corridor for wildlife movement; non-buffer land types are identified 500 meters upstream and downstream of Assessment Area.
	Buffer Condition		Combination of the three sub-metric scores described below.
	Sub-metrics	Percent of Assessment Area with Buffer	Measures percentage of Assessment Area perimeter that contains land cover types that provide a buffer.
		Average Buffer Width	Measures the average width of identified buffer land types around Assessment Area.
		Buffer Condition	Qualitatively evaluates buffer condition.
Hydrology	Water Source		Qualitatively evaluates impacts to the extent, duration, and frequency of saturated or ponded conditions .
	Channel Stability		Qualitatively evaluates channel equilibrium, degradation, or aggradation.
	Hydrologic Connectivity		Measures the entrenchment of the channel to determine the ability for water to inundate adjacent upland areas.
Physical Structure	Structural Patch Richness		Measures the diversity of physical riparian features that may potentially provide habitat for aquatic species (e.g., vegetated islands, pools, riffles).
	Topographic Complexity		Qualitatively evaluates the micro- and macro-topographic relief and variety of elevations.
Biotic Structure	Plant Community Composition		Average of the three sub-metric scores described below.
	Sub-metrics	Number of Plant Layers	Identifies of number of plant strata.
		Number of Co-dominant Species	Identifies the number of co-dominant plant species based on visual estimation.
		Percent Invasion	Measures the percent of invasive plant species among the co-dominant species identified above.
	Horizontal Interspersion		Qualitatively evaluates the variety and distribution of plant associations.
	Vertical Biotic Structure		Assesses the degree of overlap among plant strata.

Source: CWMW 2013.

2.6 JURISDICTIONAL DELINEATION

In September 2008, the USACE issued the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region.* This regional supplement is designed for use with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). Both the 1987 Wetlands Manual and the Arid West Supplement to the manual provide technical methods and guidelines for determining the presence of "waters of the U.S." and wetland resources. A three-parameter approach is used to identify wetlands and requires evidence of wetland hydrology, hydrophytic vegetation, and hydric soils. Wetlands generally include swamps, marshes, bogs, and similar areas. In order to be considered a wetland, an area must exhibit at least minimal hydric characteristics within the three parameters. However, problem areas may periodically or permanently lack certain indicators due to seasonal or annual variability of the nature of the soils or plant species on site. Atypical wetlands lack certain indicators due to recent human activities or natural events. Guidance for determining the presence of wetlands in these situations is presented in the regional supplement. Non-wetland WOTUS are delineated based on the limits of the ordinary high water mark (OHWM), which can be determined by a number of factors including erosion, the deposition of vegetation or debris, and changes in vegetation.

It should be noted that the RWQCB shares USACE jurisdiction unless isolated conditions are present. If isolated waters conditions are present, the RWQCB takes jurisdiction using the USACE's definition of the OHWM and/or the three-parameter wetlands methodology pursuant to the 1987 Wetlands Manual. The CDFW's jurisdiction is defined as the top of the bank to the top of the bank of the stream, channel, or basin or to the outer limit of riparian vegetation located within or immediately adjacent to the river, stream, creek, pond, or lake or other impoundment.

The analysis contained in this report uses the results of a field survey conducted by Psomas Regulatory Specialist David Hughes and Environmental Planner Daria Sarraf on May 31, 2017, and Mr. Hughes on June 20, 2017. Jurisdictional features were delineated using a 1 inch equals 100 feet (1″ = 100′) scale aerial photograph. Jurisdictional features were delineated as a drainage polygon with corresponding width measurements. A preliminary assessment of the presence of wetland WOTUS was made based on vegetation and hydrology; if potential wetlands were observed, test pits were dug to analyze soil and to confirm the presence or absence of wetlands. Information on the OHWM was recorded on the Arid West Ephemeral and Intermittent Streams OHWM Datasheet (Attachment C). The field survey included the collection of vegetation, soils, and hydrologic data from 15 sampling points in the survey area; this information was recorded on Wetland Determination Data Forms (Attachment B). Representative photographs of the survey area are included in Attachment D.

3.0 EXISTING CONDITIONS

The overall hydrological, soil, and habitat conditions that exist at the project site are described in Sections 3.1 through 3.3 to provide additional context to the determination of jurisdictional resources described in Section 4. The results of the CRAM evaluation of the on-site riparian conditions is provided in Section 3.4.

3.1 HYDROLOGY

Upper Big Tujunga Creek is a perennially flowing stream with a watershed that is entirely in the Angeles National Forest so that its flows are entirely dependent on natural precipitation. This hydrology presumably would have been true historically for the downstream portions of the study area. However, natural stream flows and the process of sediment transport have been disrupted by the construction of Big Tujunga Dam. The presence of the dam largely prevents transport of sandy sediment from the upper portions of the study area to the lower portions, so that sediment steadily accumulates above the dam.

Water is released through the dam during typical years, though the rate of water that is released is highly variable. At the time of the field surveys for this report, the amount of water released from Big Tujunga Dam was 5.7 cubic feet per second (cfs) (Villegas 2017), which was recently reduced from 9.9 cfs. However, the peak release rate in February 2017 was approximately 200 cfs. Therefore, these higher flows likely scour sand and silt from the streambed areas below the dam and the presence of the dam prevents replenishment of this material. Seasonally high flows also likely scour much of the understory habitat. Willow saplings were commonly seen knocked over in the streambed as evidence of the previous high flow rates released through the dam.

There are two areas immediately downstream of the plunge pool in which water is seeping from the canyon wall and encouraging the establishment of various herbaceous and grass species that are often associated with wetland conditions. No obvious flowing water was observed, but the soil was saturated and water is ponding on the compacted adjacent dirt road.

In the Maple Canyon SPS area, the watershed is limited to the canyon area itself. The streambeds in this area are ephemeral and dominated by chaparral habitat. Flowing water is assumed to be infrequent and minimal. Conditions overall are very dry. Two debris/desilting basins occur at the bottom of the canyon.

3.2 VEGETATION

The uppermost portion of the Big Tujunga Reservoir area and the Upper Big Tujunga Creek are dominated by willow riparian forest and willow riparian scrub habitat. The areas that are furthest upstream contain the most mature habitat with larger trees and dense and diverse understory. These areas have moderately large arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), Fremont cottonwood (*Populus fremontii*), and white alder (*Alnus rhombifolia*) trees that are approximately three to eight inches in trunk diameter. Further downstream where habitat is inundated more frequently, the willow vegetation is mostly shrubby with arroyo willow and red willow saplings approximately ½ to 2 inches in trunk diameter. Habitat conditions generally become more sparse until reaching the open water portion of the Big Tujunga Reservoir.

Downstream of the dam, habitat conditions are fairly uniform in Big Tujunga Wash with habitat dominated by young arroyo and red willows. Understory habitat is very sparse, generally consisting of species that quickly establish such as crofton weed (*Ageratina adenophora*) and broad-leaved cattails (*Typha latifolia*). These understory conditions are consistent with the hydrological regime of the area, in which high rates of water discharge through the dam in the

winter likely scour understory vegetation, and weedy species such as crofton weed are the first species to re-colonize the area in the spring and summer.

Vegetation associated with the two seeps described above generally consists of crofton weed, broad-leaved cattails, barnyard grass (*Echinochloa crus-galli*), Mexican sprangletop (*Leptochloa fusca* ssp. *uninervia*), rabbitsfoot grass (*Polypogon monspeliensis*), and smilo grass (*Stipa miliaceum*).

Vegetation in the Maple Canyon SPS area mostly consists of chamise chaparral and scrub oak chaparral. Much of the area consists of sediment that has been transported there and revegetated.

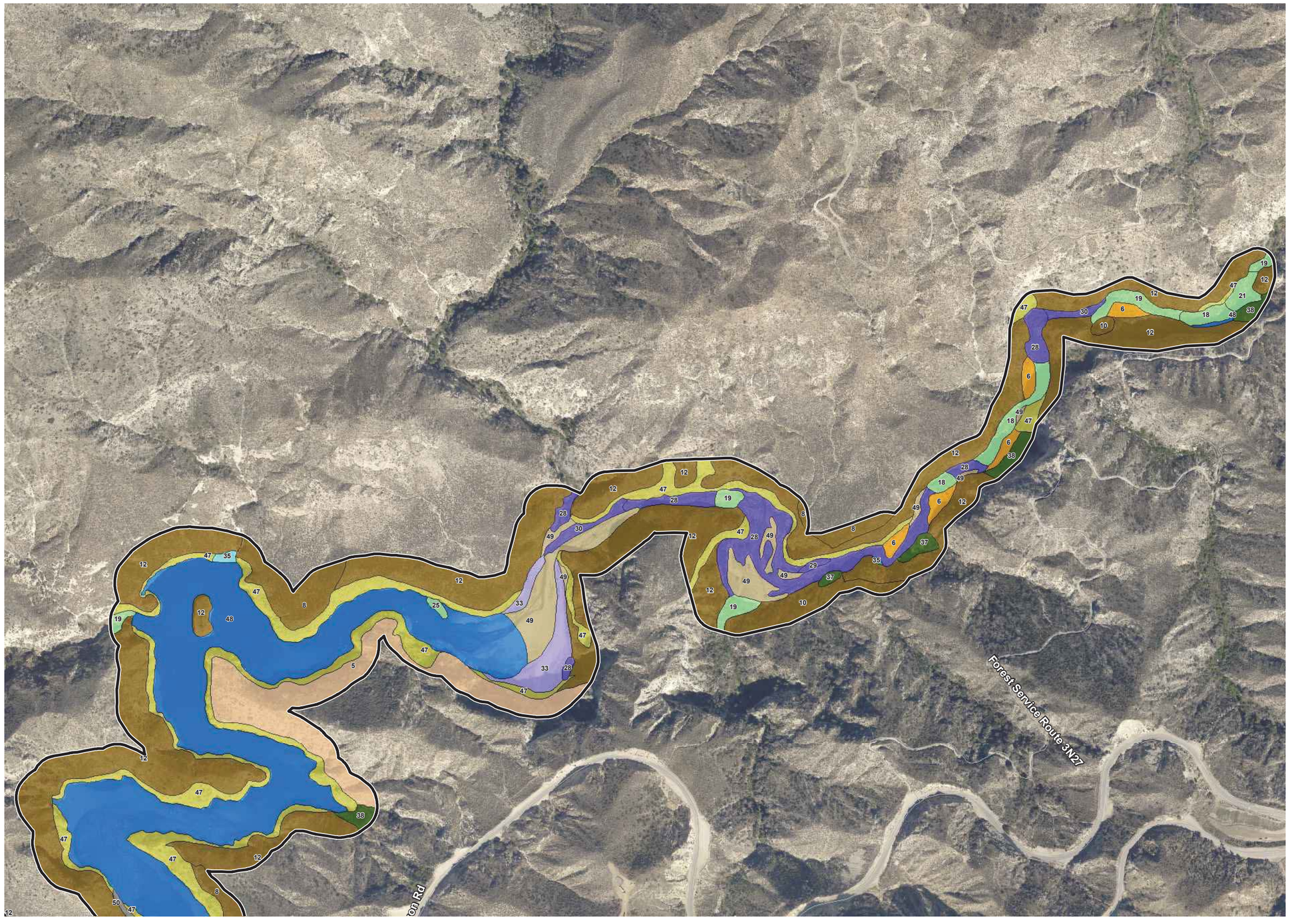
Vegetation throughout the project area was mapped during special status botanical surveys in 2011 and updated in 2017 (Psomas 2017a) (Exhibit 4). The following vegetation types and land covers were observed in the project area: California buckwheat scrub, disturbed California buckwheat scrub, laurel sumac scrub, scale broom scrub, thick leaf yerba santa scrub, chamise chaparral, chamise chaparral–thick leaf yerba santa scrub, scrub oak chaparral, hoary leaf ceanothus chaparral, birch leaf mountain mahogany chaparral, white alder grove–California sycamore woodland, white alder grove–willow thicket, California sycamore woodland–red willow thicket, black willow thicket, arroyo willow thicket, sandbar willow thicket, mulefat thicket, annual brome grassland, Russian thistle field, smartweed-cocklebur patch, freshwater seep, disturbed freshwater seep, coast live oak woodland, bigcone Douglas fir–canyon live oak forest, native planting, non-native planting, cliff, open water, dry wash, disturbed, and developed/ornamental.

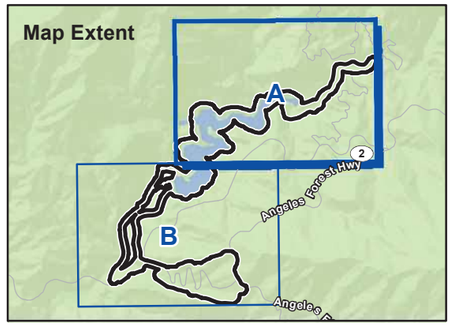
3.3 SOILS

As stated above, upstream of the dam, soils in the riparian areas generally consist of very deep sand, the result of ongoing sediment accumulation. Downstream of the dam, high stream flows scour sand and silt from the stream bottoms, and the dam prevents new sediment from reaching these areas. As a result, the stream bottom downstream of the dam consists of large rock. Broad-leaved cattails are establishing in pockets of the streambed where water velocity has slowed; the dense roots of this species capture the minimal sediment that is suspended in the water that is released through the dam.

3.4 CALIFORNIA RAPID ASSESSMENT METHOD

Two AAs were established in the survey area to evaluate site conditions. CRAM scores associated with jurisdictional resources were generally very high, which reflects the dense riparian habitat and the natural setting in which the streambed resources occur. The streambed area in the upper reservoir area received a score of 78.5 and the streambed below the Big Tujunga Dam received a score of 75.4. CRAM scores provide an assessment of the level of the various functions and services provided by an aquatic system. As described in Section 2.5, scores for each of the 4 attributes can range from a minimum of 25 to a maximum of 100, with the final score represented as an average of the 4 attribute scores. The final scores for the two AAs are fairly high, a reflection of their mostly natural condition. A summary of the results of the CRAM evaluation is provided in Table 2. The CRAM datasheets for each AA are provided in Attachment E. A summary of field conditions that determined the CRAM scores for each attribute is provided below.





Survey Area

Vegetation Types and Other Areas

- Sage Scrub
  - 5 : Laurel Sumac Scrub
- Alluvial Scrub
  - 6 : Scale Broom Scrub
- Chaparral
  - 8 : Chamise Chaparral
  - 10 : Scrub Oak Chaparral
  - 12 : Birch Leaf Mountain Mahogany Chaparral
- Riparian Forest
  - 18 : White Alder Grove–California Sycamore Woodland
  - 19 : White Alder Grove–Willow Thicket
  - 21 : California Sycamore Woodland–Red Willow Thicket
  - 25 : Black Willow Thicket
- Riparian Scrub
  - 28 : Arroyo Willow Thicket
  - 29 : Sandbar Willow Thicket
  - 30 : Mulefat Thicket
- Riparian Herb
  - 33 : Smartweed–Cocklebur Patch
- Seep
  - 35 : Freshwater Seep
- Forest/Woodland
  - 37 : Coast Live Oak Woodland
  - 38 : Bigcone Douglas Fir–Canyon Live Oak Forest
- Cliff/Rock
  - 47 : Cliff
- Open Water
  - 48 : Open Water
- Alluvium
  - 49 : Dry Wash
- Other Landcover
  - 50 : Disturbed

*Open water boundaries observed in October 2017, though variable throughout year.
Aerial Source: LAR-IAC 2014

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Existing Vegetation

Exhibit 4A

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

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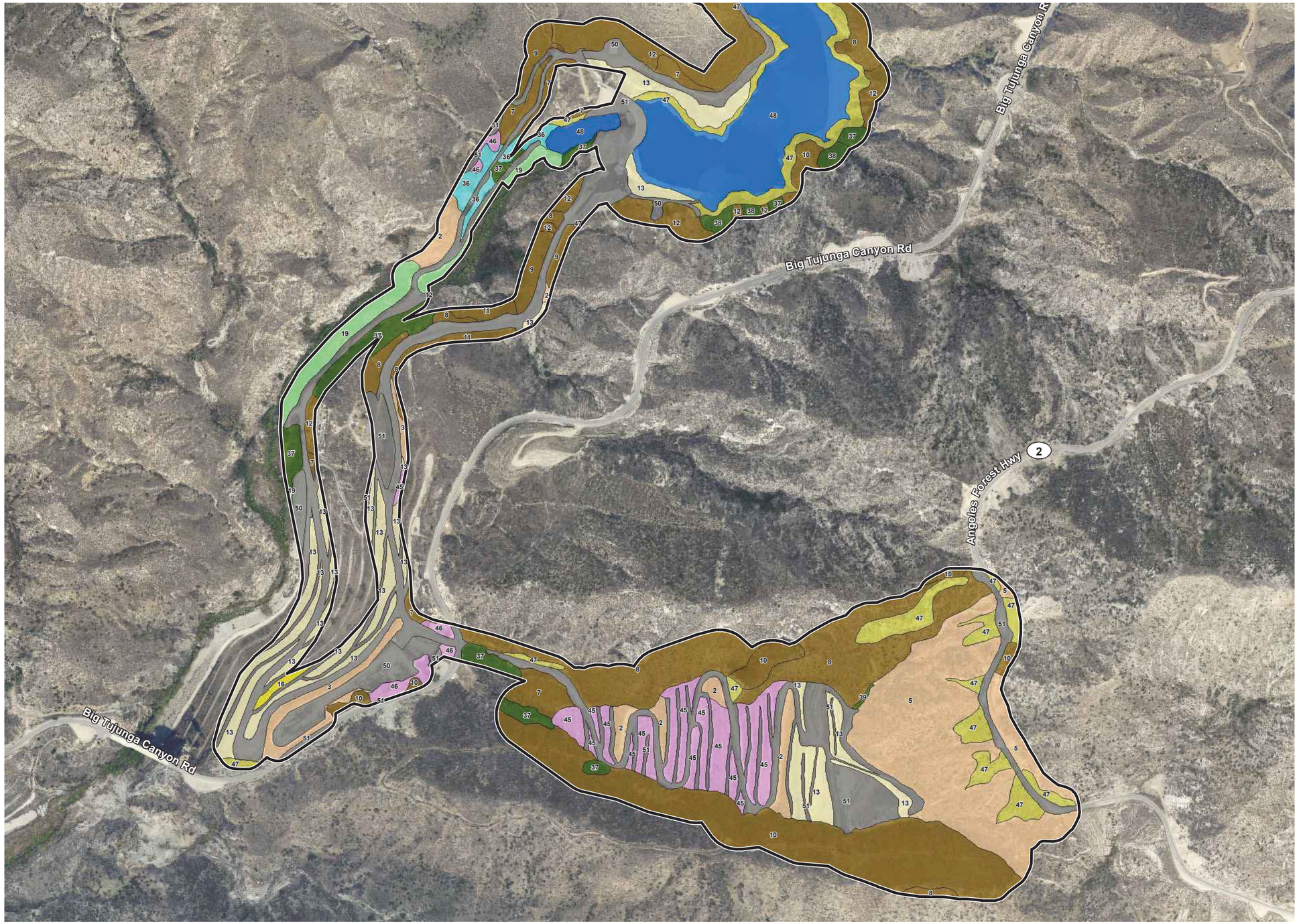

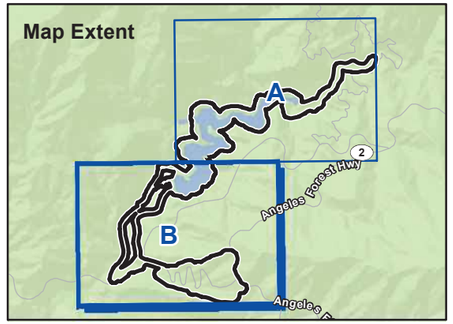

Survey Area

Vegetation Types and Other Areas

- Sage Scrub
  - 2 : California Buckwheat Scrub
  - 3 : Disturbed California Buckwheat Scrub
  - 5 : Laurel Sumac Scrub
- Chaparral
  - 7 : Thick Leaf Yerba Santa Scrub
  - 8 : Chamise Chaparral
  - 9 : Chamise Chaparral–Thick Leaf Yerba Santa Scrub
  - 10 : Scrub Oak Chaparral
  - 11 : Hoary Leaf Ceanothus Chaparral
  - 12 : Birch Leaf Mountain Mahogany Chaparral
- Grassland
  - 13 : Annual Brome Grassland
- Ruderal
  - 16 : Russian Thistle Field
- Riparian Forest
  - 19 : White Alder Grove–Willow Thicket
- Seep
  - 36 : Disturbed Freshwater Seep
- Forest/Woodland
  - 37 : Coast Live Oak Woodland
  - 38 : Bigcone Douglas Fir–Canyon Live Oak Forest
  - 39 : California Sycamore Woodland
- Ornamental Plantings
  - 45 : Native Planting
  - 46 : Non-native Planting
- Cliff/Rock
  - 47 : Cliff
- Open Water
  - 48 : Open Water
- Other Landcover
  - 50 : Disturbed
  - 51 : Developed/Ornamental

*Open water boundaries observed in October 2017, though variable throughout year.
Aerial Source: LAR-IAC 2014

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Existing Vegetation

Exhibit 4B

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

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TABLE 2
SUMMARY OF CRAM SCORES

Attribute	Metric	Score	
		AA1 (Upstream)	**AA2 (Downstream)**
Buffer and Landscape Context	Landscape Connectivity	A (12)	D (3)
	Buffer Condition (sub-metrics below)		
	Percentage of Assessment Area Perimeter with Buffer	A (12)	A (12)
	Average Buffer Width	A (12)	C (6)
	Buffer Condition	A (12)	A (12)
	Attribute Score	**100.0**	**54.5**
Hydrology	Water Source	A (12)	C (6)
	Hydroperiod/Channel Stability	C (6)	B (9)
	Hydrologic Connectivity	A (12)	A (12)
	Attribute Score	**83.3**	**75.0**
Physical Structure	Structural Patch Richness	C (6)	A (12)
	Topographic Complexity	C (6)	A (12)
	Attribute Score	**50.0**	**100.0**
Biotic Structure	Plant Community (sub-metrics below)		
	Number of Plant Layers	A (12)	A (12)
	Number of Co-dominant Species	A (12)	B (9)
	Percent of Co-dominant Species Known to be Invasive	B (9)	A (12)
	Horizontal Interspersion/Plant Zonation	C (6)	C (6)
	Vertical Biotic Structure	A (12)	B (9)
	Attribute Score	**80.6**	**72.2**
	Overall AA Score	***78.5***	***75.4***

AA: Assessment Area

Note: Scores are shown as the letter grade given to each metric with the corresponding numeric score in parentheses.
AA1 is located in the upper portion of Big Tujunga Reservoir; AA2 is located in Big Tujunga Wash below Big Tujunga Dam.

3.4.1 Buffer and Landscape Context Attribute

Scores for the metrics in this attribute are generally high throughout the survey area. Both AAs are surrounded by high quality buffer areas, though the score for buffer width was somewhat lower for the downstream AA due to the presence of various access roads. The principal difference between the two AAs is that the downstream AA was located within 500 meters of Big Tujunga Dam, which presents a significant impediment to connectivity, where the upstream AA was more than 500 meters from the dam.

3.4.2 Hydrology Attribute

The metrics in this attribute generally received high scores. The hydrology of the upstream AA is entirely affected by natural precipitation as the watershed is within the Angeles National Forest. As a result, the water source metric received a score of 'A'. On the other hand, the hydrology of the downstream AA is completely dependent on releases from the dam, so that the water source metric received a score of 'C'. As discussed above, the presence of the dam prevents sediment from being naturally transported from upper portions of the streambed to lower portions, which has affected the scores for Hydroperiod/Channel Stability. Therefore, there is significant aggradation (sediment accumulation) in the upstream AA (resulting in a score of 'C') and there is moderate degradation (scour) in the downstream AA (resulting in a score of 'B'). The Hydrological

Connectivity metric is a measure of the ability for water to escape the low-flow channel and affect adjacent areas. This score is based on the ratio of the width and depth of the channel; both the upstream and downstream AAs received an 'A' score indicating that the low-flow channels are hydrologically connected to the adjacent areas.

3.4.3 Physical Structure Attribute

The upstream AA received scores of 'C' for both the Structural Patch Richness metric and the Topographic Complexity metric, while the downstream metric received 'A' scores for both metrics. Eight structural patches (as listed in the CRAM forms in Attachment E) were observed in the downstream AA while five structural patches were observed in the upstream AA. The difference in the Topographic Complexity scores between the two AAs is largely the result of disruption of sediment transport caused by the dam. The upstream AA has significant amounts of accumulated sediment, which has led to stream banks with a single sandy bench. The stream banks of the downstream AA are much rockier and have more than one bench with significant micro-topography.

3.4.4 Biotic Structure Attribute

Both AAs received high scores for this attribute due to the dense nature of the riparian habitat in the upstream and downstream portions of the project area. The downstream AA is subject to intense scour when water released from the dam reaches rates of up to 200 cfs. As discussed above, this has led to poorly developed midstory and understory strata in areas downstream of Big Tujunga Dam, while habitat in the upper reservoir area has dense midstory and understory vegetation. These differences are not well represented in the habitat scores (e.g., Number of Plant Layers, Number of Co-dominant Species), because the threshold for determining the presence of a habitat layer is low (five percent of the total AA) and a dominant species is one that occupies ten percent relative cover of that habitat layer. So, though the downstream AA has sparse midstory and understory vegetation, there is little difference in the scores between the upstream and downstream AAs. However, the difference in the habitat strata is documented in the Vertical Biotic Structure metric. Because there is significant overlap among three habitat layers in the upstream AA, that area received a score of 'A'. The downstream AA had only moderate overlap among two layers, so that it received a score of 'B'.

4.0 RESULTS

A description of the literature review results is provided in Section 4.1, and a detailed analysis of each regulatory agency's jurisdiction is provided in Section 4.2.

4.1 LITERATURE REVIEW

USGS Topographic Quadrangle. The USGS quadrangle maps show geological formations and their characteristics; they describe the physical settings of an area through topographic contour lines and other major surface features. These features include lakes, streams, rivers, buildings, roadways, landmarks, and other features that may fall under the jurisdiction of one or more regulatory agencies. In addition, the USGS maps provide topographic information that is useful in determining elevations, latitude and longitude, and Universal Transverse Mercator (UTM) Grid coordinates for a survey area.

The project site is shown on the USGS Condor Peak 7.5-minute quadrangle map (Exhibit 2). Big Tujunga Canyon Creek and Big Tujunga Reservoir are identified on this map along with three blueline streams that drain into Big Tujunga Reservoir: Josephine Canyon Creek, White Oak Canyon Creek, and Fox Canyon Creek.

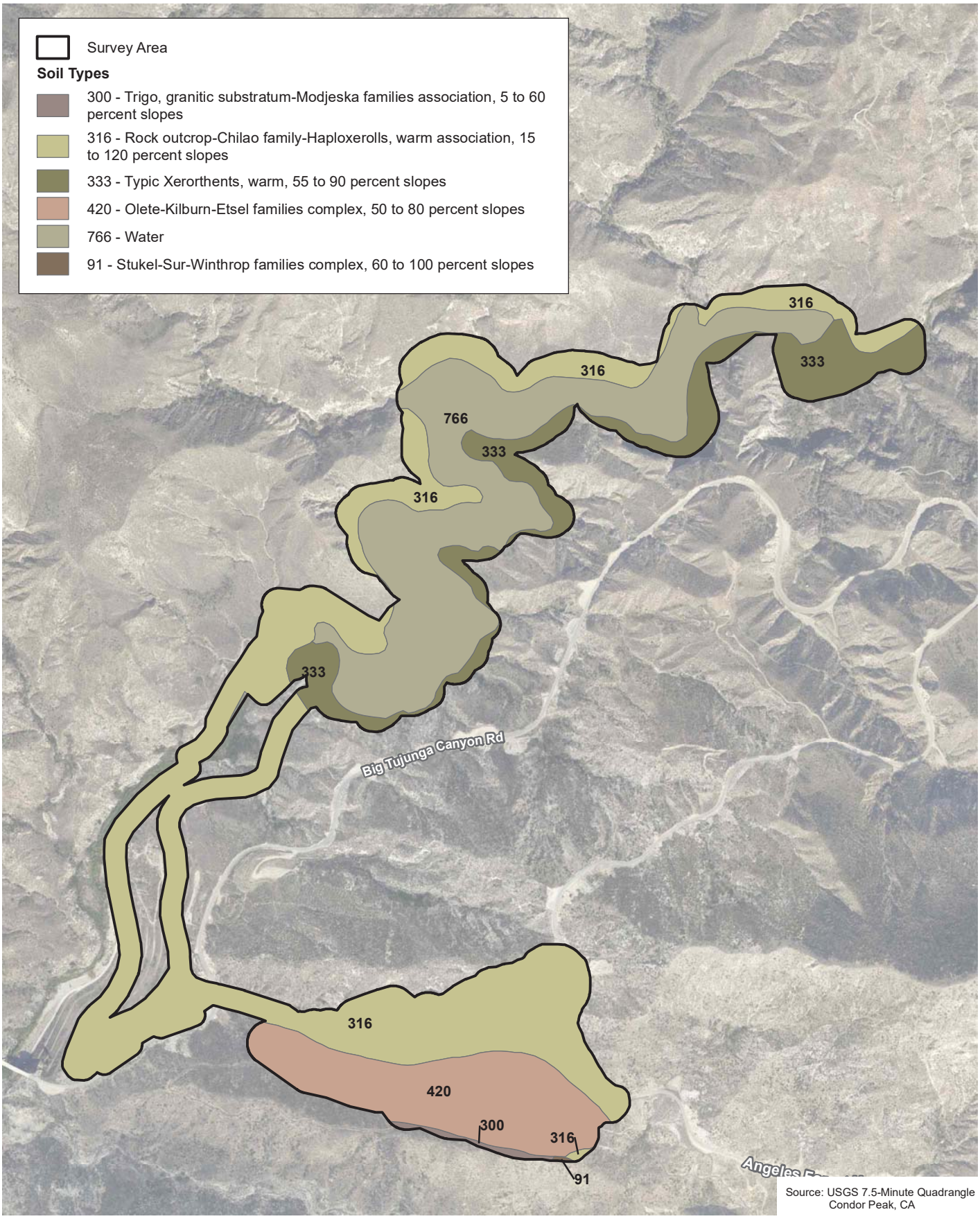
Color Aerial Photography. Psomas reviewed an existing color aerial photograph prior to conducting the field delineation to identify the extent of any drainages/waterbodies and riparian vegetation occurring in the survey area.

Big Tujunga Canyon Creek, Big Tujunga Reservoir, Big Tujunga Wash, Josephine Canyon Creek, White Oak Canyon Creek, Fox Canyon Creek, and associated vegetation are visible on the aerial photograph (Exhibit 3). Surface water is visible in Google Earth aerial images taken at multiples times, including April 2017, April 2015, and May 2013.

U.S. Department of Agriculture, Natural Resources Conservation Service. The presence of hydric soils is one of the chief indicators of jurisdictional wetlands. Psomas reviewed the USDA's soil data for the survey area (USDA NRCS 2006).

Soils on the project site are shown on Exhibit 5 and consist of Trigo, granitic substratum-Modjeska families association (5 to 60 percent slopes); Rock outcrop-Chilao family-Haploxerolls, warm association (15 to 120 percent slopes); Typic Xerorthents, warm (55 to 90 percent slopes); Olete-Kilburn-Etsel families complex (50 to 80 percent slopes); and Stukel-Sur-Winthrop families complex (60 to 100 percent slopes). No soils mapped on the project site are listed as "hydric" on the National Hydric Soils List (USDA NRCS 2017b). Available descriptions of the soil series mapped on the project site are provided in Attachment F of this report.

U.S. Fish and Wildlife Service, National Wetlands Inventory. The NWI Wetland Mapper shows wetland resources available from the Wetlands Spatial Data Layer of the National Spatial Data Infrastructure. This resource provides the classification of known wetlands following the Classification of Wetlands and Deepwater Habitats of the United States (FGDC 2013). This classification system is arranged in a hierarchy of (1) Systems that share the influence of similar hydrologic, geomorphologic, chemical, or biological factors (i.e., Marine Estuarine, Riverine, Lacustrine, and Palustrine); (2) Subsystems (i.e., Subtidal and Intertidal; Tidal, Lower Perennial, Upper Perennial, and Intermittent; or Littoral and Limnetic); (3) Classes, which are based on substrate material and flooding regime or on vegetative life forms; (4) Subclasses; and (5) Dominance Types, which are named for the dominant plant or wildlife forms. In addition, there are modifying terms applied to Classes or Subclasses.



Source: USGS 7.5-Minute Quadrangle
Condor Peak, CA

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Soil Types

Exhibit 5

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

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Resources on the project site upstream of Big Tujunga Dam are mapped as L1UBK, L2USK, R3USC, R5UBF, PFOA, and PFOC. Resources downstream of Big Tujunga Dam are mapped as PEM1C and R4SBC. The lower portion of the Maple Canyon SPS is shown as PFOC (Exhibit 6). The descriptions for mapped wetland resources are provided in Attachment F of this report.

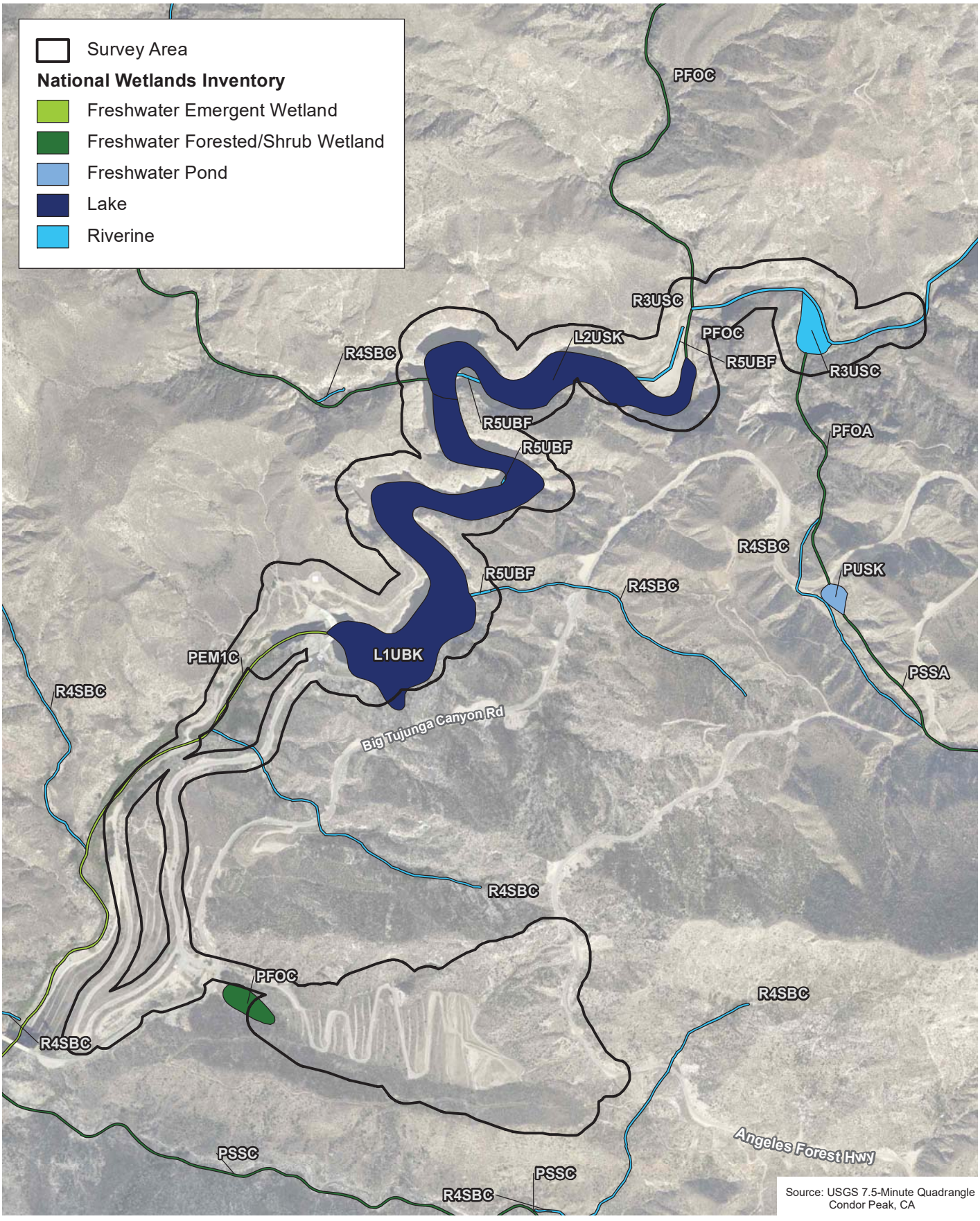
Regional Water Quality Control Plans. There are nine RWQCBs in California. The survey area is located in RWQCB Region 4, the Los Angeles Region. The Los Angeles RWQCB has adopted a Water Quality Control Plan (or "Basin Plan") for the coastal watersheds of Los Angeles and Ventura Counties. The Basin Plan contains goals and policies, descriptions of conditions, and proposed solutions to surface and groundwater issues. The Basin Plan also establishes water quality standards for surface and groundwater resources and includes beneficial uses and levels of water quality that must be met and maintained to protect these uses. These water quality standards are implemented through various regulatory permits pursuant to the CWA, specifically Section 401 for Water Quality Certifications and Section 402 for Report of Waste Discharge (ROWD) permits.

The Basin Plan indicates that the project site is located within the Los Angeles-San Gabriel River Hydrologic Unit, the San Fernando Hydrologic Area Split, and the Tujunga Hydrologic Subarea (HSA). The Basin Plan provides Water Quality Objectives for the Tujunga HSA as summarized in Table 3.

TABLE 3
WATER QUALITY OBJECTIVES FOR THE
TUJUNGA HYDROLOGIC SUBAREA

Water Quality Objectives (mg/L)					
Total Dissolved Solids	**Sulfate**	**Chloride**	**Boron**	**Nitrogen**	**Sodium Adsorption Ratio**
350	50	20	*	*	*
mg/L: milligrams per liter; * site-specific objectives have not been determined.					
Source: RWQCB 1994.					

Beneficial uses are defined in the Porter-Cologne Act as those uses of water that are necessary for tangible and intangible economic, social, and environmental benefits. The Basin Plan identifies a number of existing or potential beneficial uses for waters in the survey area: Municipal and Domestic Water Supply (MUN); Groundwater Recharge (GWR); Warm Fresh Water Habitat (WARM); Cold Fresh Water Habitat (COLD); Wildlife Habitat (WILD); Rare, Threatened or Endangered Species (RARE) waters; Spawning, Reproduction, or Early Development of Aquatic Organisms (SPWN); Potential Presence of Wetlands (WET); Water Contact Reservation (REC-1); and Non-contact Water Recreation (REC-2) (Table 4).Possible effects to these existing and potential beneficial uses would need to be addressed as part of the request for a CWA Section 401 Water Quality Certification for this project. Descriptions of the beneficial uses applicable to waters in the survey area are provided in Attachment F of this report along with the project's anticipated impact to these beneficial uses.



Source: USGS 7.5-Minute Quadrangle
Condor Peak, CA

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National Wetlands Inventory

Exhibit 6

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

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TABLE 4
SUMMARY OF BENEFICIAL USES

Feature	Beneficial Uses									
	MUN	**GWR**	**WARM**	**COLD**	**WILD**	**RARE**	**SPWN**	**WET**	**REC1**	**REC2**
Big Tujunga Wash (Hanson Dam to Big Tujunga Reservoir) WBD 180701050105	P	E	E	E	E	E	E	E	E	E
Big Tujunga Reservoir WBD 180701050103	P	E	E	P	E	E	E	–	P	E
Big Tujunga Canyon Creek (Above Big Tujunga Reservoir) WBD 180701050105	P	E	E	E	E	E	E	E	E	E

WBD: Watershed Boundary Dataset; MUN: Municipal Water Supply; GWR: Ground Water Recharge; WARM: Warm Freshwater Habitat; COLD: Cold Freshwater Habitat; WILD: Wildlife Habitat; RARE: Rare, Threatened, or Endangered Species; SPWN: Spawning, Reproduction, and/or Early Development; WET: Wetland Habitat; REC1: Limited Water Contact Recreation; REC2: Non-Contact Water Recreation;

E: Existing Beneficial Use; P: Potential Beneficial Use

Source: Los Angeles RWQCB 1994.

4.2 JURISDICTIONAL ANALYSIS

As described in Attachment A, the USACE asserts jurisdiction over WOTUS, which include the following waters: (1) territorial seas and TNWs; (2) perennial and intermittent tributaries of jurisdictional waters; (3) lakes, ponds, and impoundments that contribute surface water flow to a jurisdictional water in a typical year; and (4) wetlands that are adjacent to non-wetland jurisdictional waters.

This section provides analysis to determine whether waters in the project area are considered under the jurisdiction of the USACE based on the definitions provided above. As described in Section 2.0, wetlands are determined by documenting the presence of three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology.

The RWQCB shares jurisdiction with the USACE, but the RWQCB also asserts jurisdiction over other features that are considered non-jurisdictional by the USACE. Examples include unless isolated waters (waters without a clear connection to a TNW) are present. The CDFW asserts jurisdiction over the bed and bank of lake and streambed features as well as associated riparian vegetation.

4.2.1 "Waters of the U.S." Determination

Big Tujunga Canyon Creek flows into Big Tujunga Reservoir. Water is released through Big Tujunga Dam in a typical year and flows into Big Tujunga Wash, which reaches Hansen Flood Control Basin. Flows that are discharged through Hansen Dam travel through Tujunga Wash, which conveys flows to the Los Angeles River, which ultimately flows into the Pacific Ocean in the City of Long Beach. The project site is approximately 62 river miles and 37 aerial miles from the Pacific Ocean. Due to the clear connection to the Los Angeles River and the Pacific Ocean, waters in the survey area would be considered to be a tributary to a TNW. However, drainage features that do not have intermittent or perennial flows (i.e., ephemeral) are specifically excluded from the definition of WOTUS. Ephemeral drainage features in the survey area that are excluded from USACE jurisdiction include all drainages mapped in the Maple Canyon SPS and ephemeral tributaries to Big Tujunga Wash.

Limits of "Waters of the U.S."

The limits of non-wetland WOTUS were defined by the presence of the OHWM. Evidence of an OHWM for the drainage consists of sediment deposits along hardened banks and scour marks in other portions of drainage. Arid West Ephemeral and Intermittent Streams OHWM Datasheets were completed for areas showing evidence of an OHWM (see Attachment C). Based on the field observations and data collected, approximately 70.65 acres of non-wetland WOTUS occur within the project site. This consists of 62.79 acres within Big Tujunga Reservoir/Upper Big Tujunga Creek, 1.45 acres within the plunge pool immediately downstream of Big Tujunga Dam, and 6.41 acres within Big Tujunga Wash to the Big Tujunga Canyon Road overpass (See Table 5). The Maple Canyon SPS area contains only ephemeral drainages that are not considered WOTUS. The extent of WOTUS on the project site is shown on Exhibit 7. These resources are also provided in Attachment G at a lower scale on multiple maps.

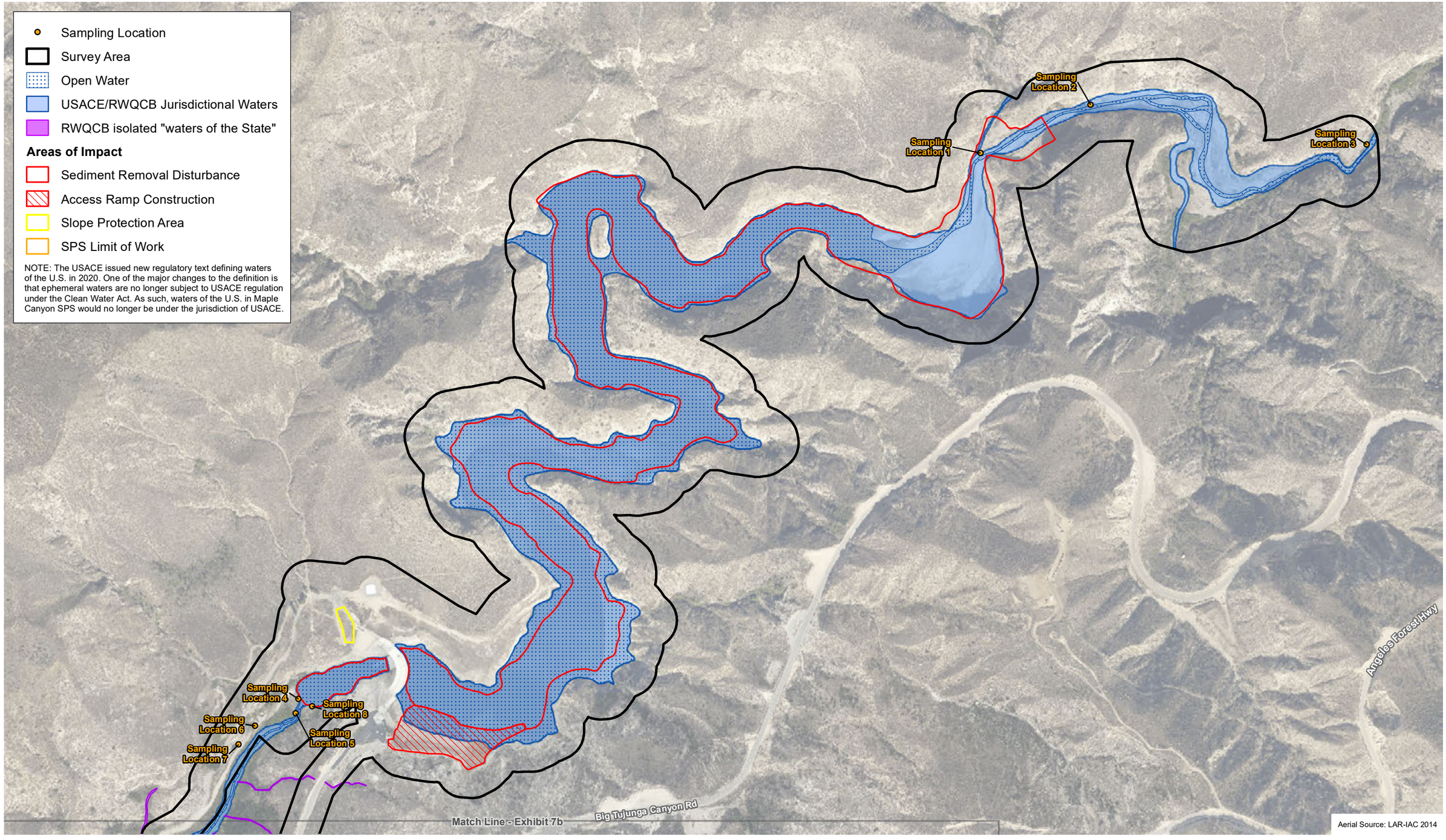
TABLE 5
USACE JURISDICTIONAL "WATERS OF THE U.S."
IN THE SURVEY AREA

Project Areas	USACE/RWQCB "waters of the U.S."		
	Non-Wetland Waters (acres)	Wetlands (acres)	Total (acres)
Big Tujunga Reservoir/Upper Big Tujunga Creek[a]	62.79	0.00	62.79
Plunge Pool	1.45	0.00	1.45
Big Tujunga Wash	6.41	0.00	6.41
Maple Canyon Sediment Placement Site	0.00	0.00	0.00
Total	**70.65**	**0.00**	**70.65**

[a] Big Tujunga Reservoir and Upper Big Tujunga Creek are combined as there is no clear boundary between these features.
[b] The Maple Canyon area contains only ephemeral drainages that are not considered "waters of the U.S.".

Wetlands Determination

A total of 15 sampling locations were assessed for the presence of hydrophytic vegetation, hydric soils, and wetland hydrology to determine the presence of wetlands on the project site (Table 6; Attachment B). These sampling locations are shown in Exhibit 7.



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USACE/RWQCB Jurisdictional Waters

Exhibit 7a

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

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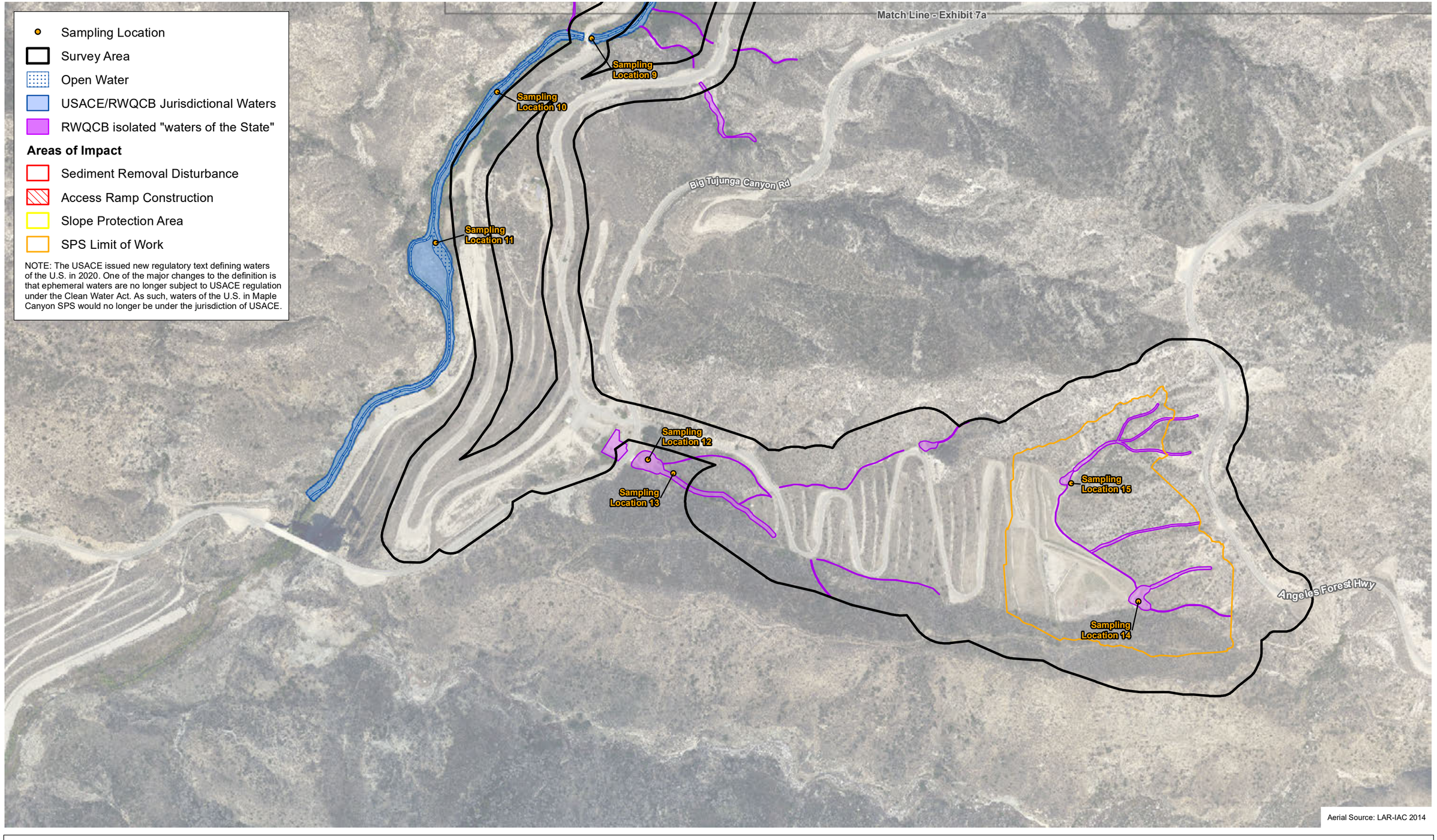

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USACE/RWQCB Jurisdictional Waters

Exhibit 7b

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

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TABLE 6
SUMMARY OF SAMPLING POINT DATA

Sampling Location	Dominance Test Result*	Prevalence Index Result	Hydrophytic Vegetation Present	Hydric Soil Indicators	Wetland Hydrology Indicators	Wetland Conditions Present
1	100%	2.0	Yes	None	A2, A3	No
2	100%	1.7	Yes	None	A2, A3	No
3	100%	1.8	Yes	None	A1, A2, A3	No
4	100%	1.8	Yes	None	A2, A3	No
5	67%	2.4	Yes	None	A1, A2, A3	No
6	100%	1.9	Yes	None	A1, A2, A3	No
7	100%	1.9	Yes	None	A3	No
8	100%	1.4	Yes	None	A1	No
9	100%	1.6	Yes	None	A1	No
10	75%	1.8	Yes	None	A1	No
11	100%	1.9	Yes	None	A1	No
12	33%	4.4	No	None	B2, B10	No
13	33%	2.8	Yes	None	A2, A3	No
14	0%	5.0	No	None	B2, B10	No
15	0%	5.0	No	None	B2, B10	No

* Percent of dominant species that are OBL, FACW, or FAC.

Wetland Hydrology Indicators
A1 Surface Water
A2 High Water Table
A3 Saturation
B2 Sediment Deposits
B10 Drainage Patterns

Vegetation

Vegetation was assessed in areas at or below the OHWM; areas containing OBL and/or FACW species were specifically targeted for analysis. As described in Section 3.2, vegetation in Upper Big Tujunga Creek, the upper portion of Big Tujunga Reservoir, and along Big Tujunga Wash is dominated by willow scrub and willow riparian forest habitat with broad-leaved cattails occurring in pockets of slower-moving water. As a result, the hydrophytic vegetation criterion was met throughout these areas. Maple Canyon SPS is generally dominated by chamise chaparral and scrub oak chaparral. The various basins at the upper and lower limits of the canyon are also dominated by upland vegetation. As a result, the hydrophytic vegetation criterion was met in only one location at the Maple Canyon SPS.

Soils

As discussed in Section 3.1, the presence of Big Tujunga Dam has a significant effect on the streambed soil conditions. Upstream of the dam, deep sand has accumulated while downstream of the dam, sand and silt is scoured from the streambed during high flows, and the dam generally prevents sediment transport to downstream areas. Sampling locations 1 through 3 are located in the upper portion of Big Tujunga Reservoir; soils in these areas consist of deep sand with no hydric soil indicators.

Sampling locations 4, 5, and 8, 9, 10, and 11 are located along the edge of the plunge pool and in Big Tujunga Wash downstream of the dam. Soils at these locations consist of a thin layer (approximately one to five inches thick) of organic matter (plant roots, generally that of broad-

leaved cattail) combined with sandy sediment that has been trapped by these roots. Though these soils have a significant component of organic material, the amount of decomposition is low. The organic component has many roots and fibers and are therefore considered to be fibric (peat) rather than sapric (muck). The hydric soil indicator that most closely aligns with this description is sandy mucky mineral (S1 on the Wetland Data Forms in Attachment B). This hydric soil indicator requires sapric material to an accumulated depth of at least two inches. It is possible that sapric soil conditions may develop over time as more organic matter accumulates in these areas, but it is likely that seasonal high flows downstream of the dam scour the cattails and the associated trapped sediment so that these soils do not have time to develop into sapric conditions. As a result, hydric soils are not considered to be present at these locations.

Sampling locations 6 and 7 are associated with areas that are saturated from water seeping from the canyon walls near the plunge pool. The soil conditions are similar to the description of the above-described sampling locations. A layer of sandy silt with a significant organic component was observed to a depth of four inches. Below this soil was a restrictive layer of rock. These areas are outside the OHWM for Big Tujunga Wash, and it does not appear that high flow releases from the dam would scour these areas as they would in the stream. However, as with the above-described sampling locations, the organic matter appears to be fibric and not sapric so that the soil does not meet the criteria to be considered sandy mucky mineral. Therefore, the soil at these locations are not considered to be hydric.

Conditions in the Maple Canyon SPS are significantly drier than along Big Tujunga Canyon Creek and Big Tujunga Wash. Sandy soils to a depth of several inches were encountered with no hydric soil indicators.

Hydrology

All 15 sampling points exhibit at least 1 indicator of wetland hydrology (e.g., surface water, high water table, saturation, sediment deposits, and/or drainage patterns). Therefore, the wetland hydrology criterion was met throughout the project area.

Results

Most of the sampling locations contained hydrophytic vegetation, and all of the locations had indicators of wetland hydrology. However due to lack of hydric soil indicators at the sampling locations, no wetland conditions are deemed to be present on the project site.

4.2.2 Regional Water Quality Control Board Jurisdiction

The RWQCB asserts jurisdiction over all WOTUS so that their jurisdiction generally matches that of the USACE. The RWQCB also takes jurisdiction over several types of drainage features that fall outside the USACE's jurisdiction. These include ephemeral drainages that occur in the Maple Canyon SPS and ephemeral tributaries to Big Tujunga Wash. Approximately 73.57 acres (including 62.79 acres within Big Tujunga Reservoir/Upper Big Tujunga Creek, 1.45 acres within the plunge pool, 6.85 acres within Big Tujunga Wash, and 2.48 acres within and adjacent to the Maple Canyon SPS) would be considered WOTUS based on the presence of an OHWM and connectivity to a TNW; therefore, it would be considered jurisdictional by the RWQCB. The extent of RWQCB jurisdictional areas is shown in Exhibit 7 and is summarized above in Table 7.

TABLE 7
RWQCB JURISDICTIONAL "WATERS OF THE STATE"
IN THE SURVEY AREA

Project Areas	USACE/RWQCB "waters of the U.S."		
	Non-Wetland Waters (acres)	Wetlands (acres)	Total (acres)
Big Tujunga Reservoir/Upper Big Tujunga Creek*	62.79	0.00	62.79
Plunge Pool	1.45	0.00	1.45
Big Tujunga Wash	6.85	0.00	6.85
Maple Canyon Sediment Placement Site	2.48	0.00	2.48
Total	**73.57**	**0.00**	**73.57**

* Big Tujunga Reservoir and Upper Big Tujunga Creek are combined as there is no clear boundary between these features.

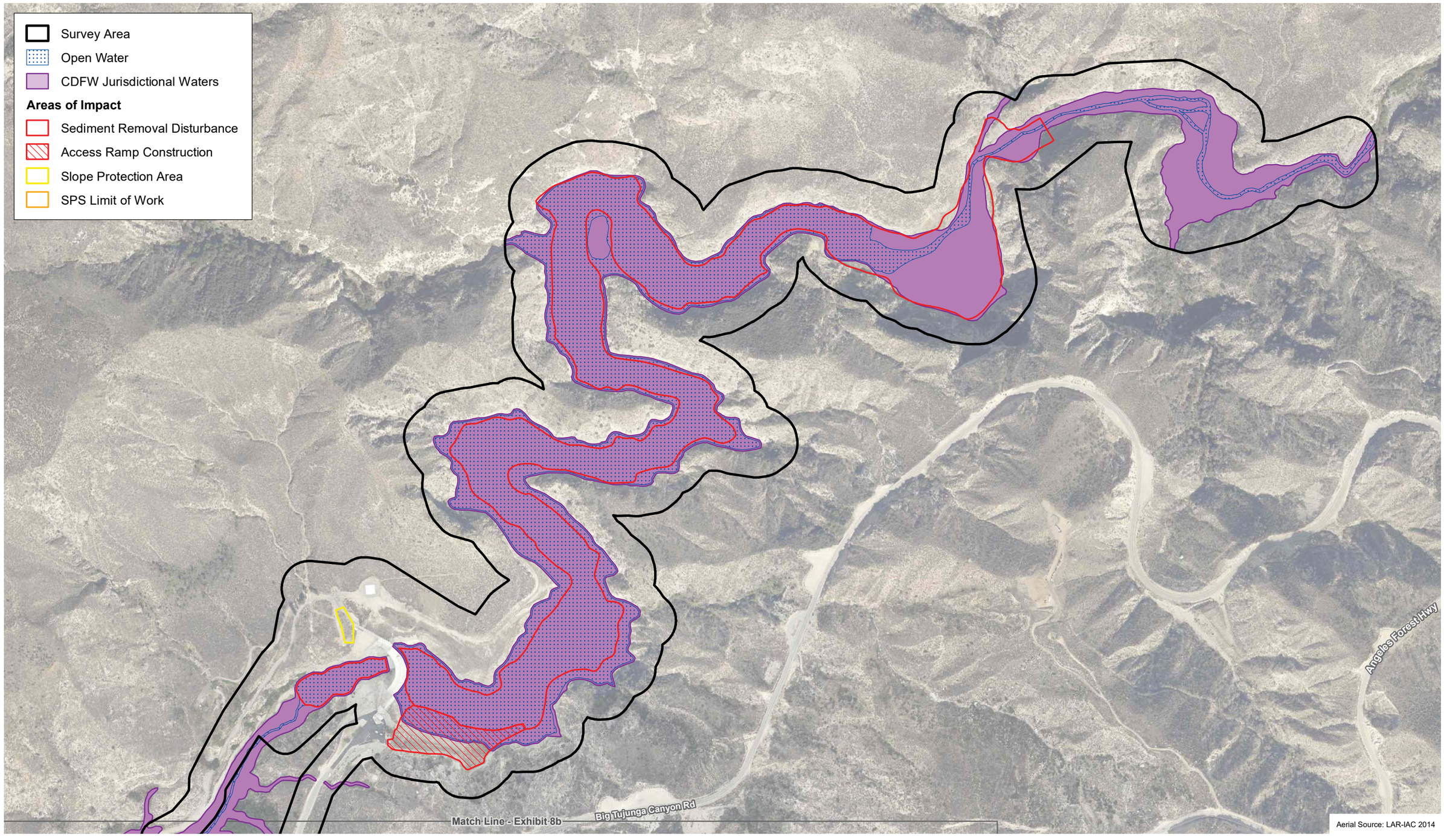
4.2.3 California Department of Fish and Wildlife Jurisdiction

The limits of CDFW jurisdiction within the drainages extend from the top of the bank to the top of the bank and to the outer dripline in areas containing riparian vegetation. Based on field observations and data collection, a total of 93.11 acres of resources under CDFW jurisdiction pursuant to Section 1602 of the *California Fish and Game Code* are located within the project site as summarized in Table 8. This consists of 71.03 acres within Big Tujunga Reservoir/Upper Big Tujunga Creek, 1.75 acres within the plunge pool, 14.35 acres within Big Tujunga Wash to the point where it reaches the Big Tujunga Canyon Road overpass, and 5.98 acres within and adjacent to the Maple Canyon SPS. The extent of CDFW jurisdictional waters is shown on Exhibit 8. These resources are also provided in Attachment H at a lower scale on multiple maps.

TABLE 8
CDFW JURISDICTIONAL WATERS ON THE PROJECT SITE

Project Areas	CDFW Jurisdictional Waters (acres)
Big Tujunga Reservoir/Upper Big Tujunga Creek*	71.03
Plunge Pool	1.75
Big Tujunga Wash	14.35
Maple Canyon Sediment Placement Site	5.98
Total	**93.11**

* Big Tujunga Reservoir and Upper Big Tujunga Creek are combined as there is no clear boundary between these features.



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CDFW Jurisdictional Waters

Exhibit 8a

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

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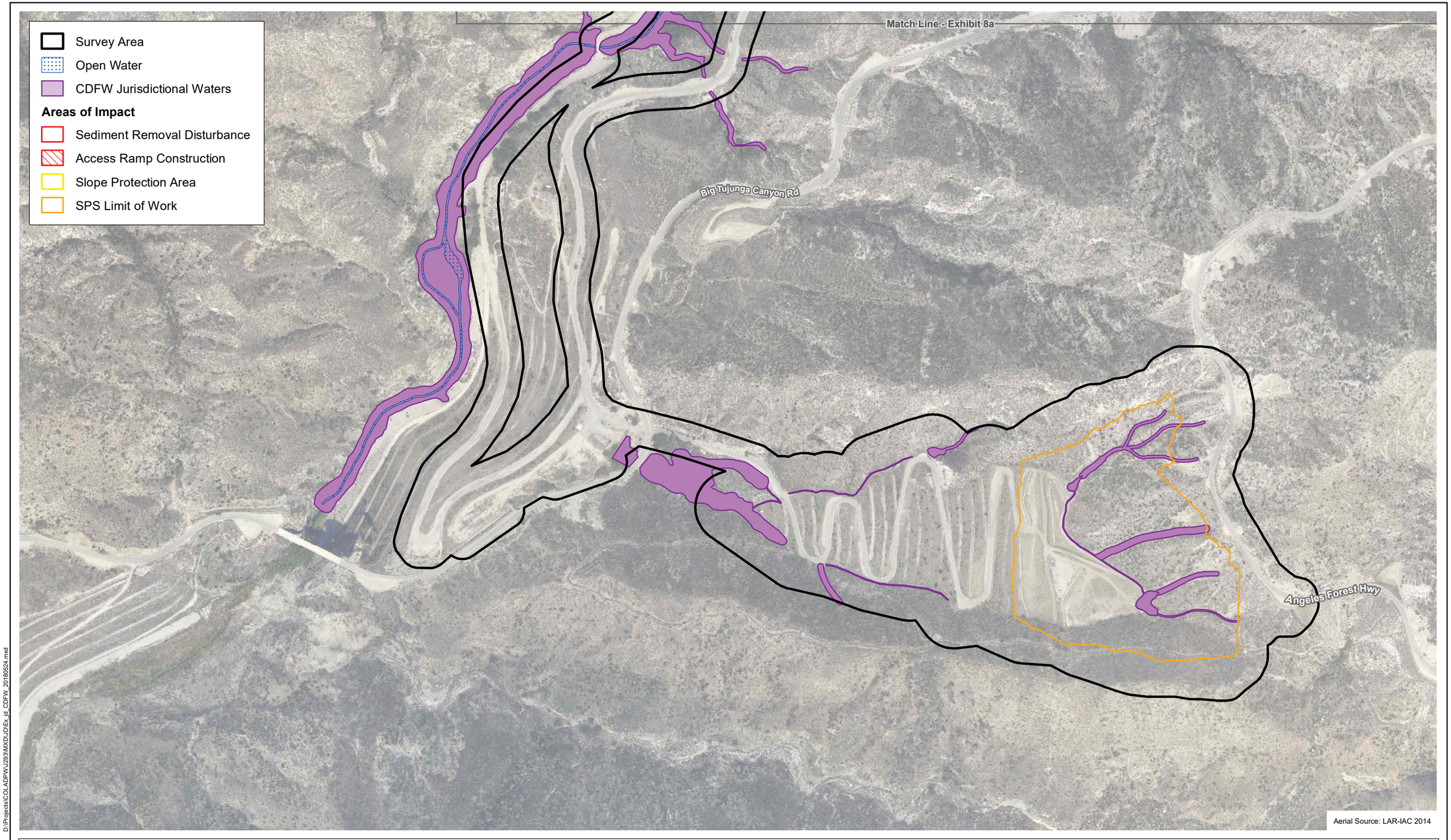

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CDFW Jurisdictional Waters

Exhibit 8b

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

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5.0 IMPACT ANALYSIS

Impacts to jurisdictional resources are largely expected to result from the removal of sediment from Big Tujunga Reservoir and placement of sediment in the Maple Canyon SPS. Removal of sediment is assumed to be considered a temporary impact on jurisdictional waters by the resource agencies, while discharging sediment in jurisdictional waters in the Maple Canyon SPS would be considered a permanent impact. Transport of construction equipment is expected to occur on existing roads downstream of Big Tujunga Dam. While jurisdictional waters are located adjacent to these roads, no impacts are expected from project activities.

Table 9 provides a summary of impacts to USACE, RWQCB, and CDFW jurisdictional waters that would result from proposed project activities.

TABLE 9
IMPACTS TO JURISDICTIONAL WATERS

Jurisdictional Types	Impact Type	Project Areas (acres)				Total
		Big Tujunga Reservoir/Upper Big Tujunga Creek	Plunge Pool	Big Tujunga Wash[a] (downstream of Dam)	Maple Canyon SPS[b]	
USACE non-wetland "waters of the U.S."	Total Existing in Survey Area	62.79	1.45	6.41	0.00	70.65
	Proposed Permanent Impact	1.33	0.00	0.00	0.00	1.33
	Proposed Temporary Impact	45.18	1.45	0.00	0.00	46.63
RWQCB non-wetland "waters of the State"	Total Existing in Survey Area	62.79	1.45	6.85	2.48	73.57
	Proposed Permanent Impact	1.33	0.00	0.00	1.05	2.38
	Proposed Temporary Impact	45.18	1.45	0.00	0.00	46.63
CDFW Jurisdictional Waters	Total Existing in Survey Area	71.03	1.75	14.35	0.00	93.11
	Proposed Permanent Impact	1.43	0.00	0.00	1.80	3.23
	Proposed Temporary Impact	46.02	1.45	0.00	0.00	47.47

USACE: U.S. Army Corps of Engineers; RWQCB: Regional Water Quality Control Board; CDFW: California Department of Fish and Wildlife; SPS: Sediment Placement Site

[a] Approximately 0.28 acre of USACE/RWQCB and 0.70 acre of CDFW jurisdictional waters in Big Tujunga Wash occur along the haul routes downstream of Big Tujunga Dam. No impacts are expected to occur to these resources from project activities

[b] Drainage features in the Maple Canyon SPS are ephemeral and do not meet the definition of "waters of the U.S."

6.0 REGULATORY APPROVAL PROCESS

6.1 REGULATORY PERMIT REQUIREMENTS

This section summarizes the various permits, agreements, and certifications that are expected to be required prior to initiation of proposed project activities that involve impacts to jurisdictional waters.

- USACE Section 404 Permit
- RWQCB Section 401 Water Quality Certification
- CDFW Section 1602 Notification of Lake or Streambed Alteration

It should be noted that all regulatory permit applications can be processed concurrently. The USACE permit would be issued subject to the receipt of the RWQCB's Section 401 Water Quality Certification.

6.1.1 U.S. Army Corps of Engineers

Prior to construction in WOTUS, a Section 404 permit from the USACE is required. Regulatory authorization in the form of a Nationwide Permit (NWP) or regional permit is provided for certain categories of activities. If the NWP conditions cannot be met, an Individual Permit (IP) will be required.

The proposed project would likely fall under NWP 3 (Maintenance), which authorizes (1) the repair, rehabilitation, and replacement of previously authorized, currently serviceable structures; (2) discharges associated with removal of accumulated sediments and debris in the vicinity of existing structures; and (3) temporary structures, fills, and work necessary to conduct maintenance activities. A preconstruction notification is required for sediment removal. Since sediment removal would occur more than 200 feet from Big Tujunga Dam, the project exceeds the limits for the Nationwide Permit Program. Therefore, the USACE would need to consult with the USFWS to acquire a waiver from that agency that would allow issuance of the NWP. If the USFWS does not issue a waiver, the project would require issuance of an Individual Permit. A description of NWP 3 is provided in Attachment I.

Issuance of the USACE Section 404 permit would be contingent upon the approval of a Section 401 Water Quality Certification from the Los Angeles RWQCB. The RWQCB requires certification of the proposed project's California Environmental Quality Act (CEQA) documentation before it will approve the Section 401 Water Quality Certification or ROWD. The RWQCB, as a responsible agency, will use the proposed project's CEQA document to satisfy its own CEQA-compliance requirements.

6.1.2 Regional Water Quality Control Board

As noted above, issuance of the USACE Section 404 permit would be contingent upon the approval of a Section 401 Water Quality Certification from the Los Angeles RWQCB. The RWQCB requires the Applicant to address urban storm water runoff during and after construction in the form of Best Management Practices (BMPs). These BMPs are intended to address the treatment of pollutants carried by storm water runoff and are required in all complete applications. The notification/application for a CWA Section 401 Water Quality Certification must also address compliance with the Basin Plan. Please note that the application would also require the payment of an application fee, which would be based on project impacts.

6.1.3 California Department of Fish and Wildlife

Prior to construction, Notification of a Lake or Streambed Alteration (LSA) must be submitted to the CDFW that describes any proposed streambed alteration contemplated by the proposed project. If an LSA Agreement is required, the CDFW may want to conduct an on-site inspection.

In addition to the formal application materials and the fee, a copy of the appropriate environmental document (e.g., Mitigated Negative Declaration) should be included in the submittal, consistent with CEQA requirements. The CDFW will not deem the application to be complete until the application fees have been paid and the agency is provided with a certified CEQA document and a signed copy of the receipt of County Clerk filing fees for the Notice of Determination (NOD).

6.2 RECOMMENDATIONS

Based on the conclusions of this Jurisdictional Delineation Report, the following recommendations are identified:

1. A pre-application meeting should be scheduled with USACE, CDFW, and RWQCB staff to discuss site conditions; the proposed project; biological and jurisdictional resources and impacts to these resources resulting from the proposed project; proposed minimization measures and the mitigation program to offset these impacts; and the regulatory permit process, including the decision to prepare and submit an Approved Jurisdictional Determination or a Preliminary Jurisdictional Determination. The USACE is expected to approve a Preliminary Jurisdictional Determination as the appropriate jurisdictional determination given the extent of proposed project impacts and the length of project construction.
2. The following should be prepared and processed: a USACE Section 404 Permit; an RWQCB Section 401 Water Quality Certification; a CDFW Section 1602 Notification of LSA; and the appropriate jurisdictional determination form approved by the USACE.

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ATTACHMENT A

SUMMARY OF REGULATORY AUTHORITY

REGULATORY AUTHORITY

This attachment summarizes the regulatory authority of the U.S. Army Corps of Engineers (USACE), the Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW) over activities that have potential to impact jurisdictional resources.

U.S. Army Corps of Engineers

The USACE Regulatory Branch regulates activities that discharge dredged or fill materials into "waters of the U.S." (WOTUS) under Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. This permitting authority applies to all WOTUS where the material (1) replaces any portion of WOTUS with dry land or (2) changes the bottom elevation of any portion of any WOTUS. These fill materials would include sand, rock, clay, construction debris, wood chips, and materials used to create any structure or infrastructure in these waters.

Waters of the United States

On April 21, 2020, the United States Environmental Protection Agency (USEPA) and the USACE published in the *Federal Register* the Navigable Waters Protection Rule (NWPR) which revised the definition of WOTUS. The NWPR subsequently became effective on June 22, 2020.

The NWPR narrows the definition of WOTUS that are subject to USACE jurisdiction through two rules: the Step One rule, issued on October 22, 2019, which reestablished USACE regulations that were in place prior to the 2015 Waters of the United States Rule, and the Step Two rule, published on April 21, 2020, which narrows federal jurisdiction so that WOTUS must demonstrate a direct connection to a Traditional Navigable Waterway (TNW).

Under the NWPR, four categories of waters are considered WOTUS:

1. Territorial seas and TNWs;
2. Tributaries of jurisdictional waters;
3. Lakes, ponds, and impoundments that contribute surface water flow to a jurisdictional water in a typical year; and
4. Wetlands adjacent to non-wetland jurisdictional waters.

Under the rule, a wetland is considered "adjacent" if it:

1. Abuts (i.e., touches a side or corner of) another non-wetland jurisdictional water;
2. Is inundated by flooding from another non-wetland jurisdictional water at least once in a typical year;
3. Is physically separated from a non-wetland jurisdictional water by a natural berm, bank, dune, or similar natural feature without regard to whether there is a specific hydrological surface connection in a typical year; or
4. Is physically separated from a non-wetland jurisdictional water by an artificial structure like a road, dike, or barrier as long as the structure allows for a direct hydrologic surface connection between the wetland and the other jurisdictional water at least once in a typical year. This connection can be through a gate or culvert or even by water overtopping a road.

The NWPR also identifies waters specifically excluded from consideration as WOTUS. The twelve categories of non-jurisdictional waters include:

1. All waters not covered by the four categories of WOTUS discussed above;

2. Groundwater;
3. Ephemeral features;
4. Storm water runoff and overland sheet flow;
5. All ditches not considered tributaries;
6. Prior converted cropland;
7. Artificially irrigated areas;
8. Certain artificial lakes and ponds;
9. Water-filled depressions or pits excavated in connection with mining or construction or to obtain fill, sand, or gravel;
10. Certain storm water control features;
11. Groundwater recharge, water reuse, and wastewater recycling structures; and
12. Wastewater treatment systems.

The NWPR was drafted to incorporate direction that the U.S. Supreme Court provided via three decisions that provided context and guidance in determining the appropriate scope of WOTUS. In *United States v. Riverside Bayview Homes* (1985), the Court upheld the inclusion of adjacent wetlands in the regulatory definition of WOTUS. In *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* ("SWANCC", issued in 2001), the Court held that the use of "isolated" non-navigable intrastate ponds by migratory birds was not, by itself, sufficient basis for the exercise of federal regulatory authority under the CWA. In *Rapanos v. United States* ("Rapanos", 2006)[1], a majority of the U.S. Supreme Court overturned two Sixth Circuit Court of Appeals decisions, finding that certain wetlands constituted WOTUS under the CWA. In his plurality opinion, Justice Scalia argued that WOTUS should not include channels through which water flows intermittently or ephemerally or channels that periodically provide drainage for rainfall. He also stated that a wetland may not be considered "adjacent to" remote WOTUS based on a mere hydrologic connection. Justice Kennedy authored a separate concurring opinion concluding that wetlands are WOTUS if they, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as "navigable". Lacking a majority opinion, regulatory jurisdiction under the CWA existed over a water body if either the plurality's or Justice Kennedy's "significant nexus" standard was satisfied.

Ordinary High Water Mark

The landward limit of tidal WOTUS is the high-tide line. In non-tidal waters where adjacent wetlands are absent, the lateral limits of USACE jurisdiction extend to the ordinary high water mark (OHWM).[2] The OHWM is defined as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas".[3] When wetlands are present, the lateral limits of USACE jurisdiction extend beyond the OHWM to the limits of the adjacent wetlands.[4]

Wetlands

A wetland is a subset of jurisdictional waters and is defined by the USACE and the USEPA as "those areas that are inundated or saturated by surface or groundwater at a frequency and

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1 Consolidated cases: *Rapanos v. United States* and *Carabell v. United States* refer to the U.S. Supreme Court's decision concerning USACE jurisdiction over "waters of the U.S." under the CWA.

2 U.S. Army Corps of Engineers (USACE). 2005 (December 7). Regulatory Guidance Letter. Ordinary High Water Mark Identification. Washington, D.C.: USACE.

3 *Code of Federal Regulations* (CFR), Title 33, §328.3(e)

4 USACE 2005

duration sufficient to support, and under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions".[5] Wetlands generally include swamps, marshes, bogs, and areas containing similar features.

The definition and methods for identifying wetland resources can be found in the USACE's *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region*,[6] a supplement to the 1987 *Corps of Engineers Wetlands Delineation Manual*.[7] Both the 1987 Wetlands Manual and the 2008 Arid West Supplement to the manual provide technical methods and guidelines for determining the presence of wetland WOTUS. Pursuant to these manuals, a three-parameter approach is used to identify wetlands and requires evidence of wetland hydrology, hydrophytic vegetation, and hydric soils. In order to be considered a wetland, an area must exhibit one or more indicators of all three of these parameters. However, problem areas may periodically or permanently lack certain indicators for reasons such as seasonal or annual variability of rainfall, vegetation, and other factors. Atypical wetlands lack certain indicators due to recent human activities or natural events. Guidance for determining the presence of wetlands in these situations is presented in the regional supplement.

Section 404 Permit

Except as specified in Section 323.4 of the CFR, impacts to WOTUS require a Section 404 Permit. Permit authorization may be in the form of (1) a "general permit" authorizing a category of activities in a specific geographical region or nationwide or (2) an "individual permit" (IP) following a review of an individual application form (to be obtained from the district office having jurisdiction over the waters in which the activity is proposed to be located).

Regulatory authorization in the form of a Nationwide Permit (NWP) is provided for certain categories of activities such as repair, rehabilitation, or replacement of a structure or fill which was previously authorized; utility line placement; or bank stabilization. The current set of NWPs became effective on March 19, 2017 and will expire on March 18, 2022. NWPs authorize only those activities with minimal adverse effects on the aquatic environment and are valid only if the conditions applicable to the permits are met or waivers to these conditions are provided in writing from the USACE. Please note that waivers may require consultation with affected federal and State agencies, which can be a lengthy process with no mandated processing time frames. Certain activities do not require submission of an application form, but may require a separate notification. If the NWP conditions cannot be met, an IP will be required. WOTUS temporarily filled, flooded, excavated, or drained but restored to pre-construction contours and elevations after construction are not included in the measurement of loss of WOTUS. The appropriate permit authorization will be based on the amount of impacts to WOTUS, as determined by the USACE. There is no filing fee for the Section 404 Permit.

Approximately three or four months are typically required to process a routine permit application; large or complex activities may take longer to process. When a permit application is received, it will be assigned an identification number and reviewed for completeness by the District Engineer. If an application is incomplete, additional information will be requested within 15 days of receipt of the application. If an application is complete, the District Engineer will issue a public notice within 15 days unless specifically exempted by provisions of the CFR. Public comments will be accepted no more than 30 days but not less than 15 days from the date of public notice; these will become part of the administrative record of the application. Generally, the District Engineer

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5 33 CFR §328.3(b)

6 USACE. 2008a. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*. (J.S. Wakeley, R.W. Lichvar, and C.V. Noble, Eds.). Vicksburg, MS: U.S. Army Engineer Research and Development Center.

7 Environmental Laboratory. 1987. Cor*ps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1)*. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

will decide on the application no later than 60 days after receipt of the completed application. Additional permit situations may increase the permit processing time (e.g., projects involving a Section 401 Water Quality Certification, a coastal zone management consistency analysis, historic properties, a federal agency, and/or Endangered species). The Project Applicant will be given time, not to exceed 30 days, to respond to requests of the District Engineer.

On January 31, 2007, the USACE published a memorandum clarifying the Interim Guidance for Amendments to the National Historic Preservation Act and the Advisory Council on Historic Preservation (ACHP) implementing regulations.[8] The Interim Guidance applies to all Department of the Army requests for authorization/verification, including Individual Permits (IPs, i.e., standard permits and letters of permission) and all Regional General Permits (RGPs) and Nationwide Permits (NWPs). The State or Tribal Historic Preservation Officer (SHPO/THPO) has 30 days to respond to a determination that a proposed activity, which otherwise qualifies for an NWP or an RGP, has no effect or no adverse effect on a historic property. If the SHPO/THPO does not respond within 30 days of notification, the Los Angeles District may proceed with verification. If the SHPO/THPO disagrees with the District's determination, the District may work with the SHPO/THPO to resolve the disagreement or request an opinion from the ACHP. The USACE will submit the Draft Jurisdictional Delineation Report to the SHPO/THPO for review prior to initiating the actual regulatory process.

Please note that, if the USACE determines that the drainages/waterbodies are jurisdictional and would be impacted by project implementation, the Applicant will be required to obtain a CWA Section 401 Water Quality Certification from the RWQCB before the USACE will issue the Section 404 Permit. If the USACE determines that the impacted drainage/waterbody is not jurisdictional, the Applicant will be required to obtain RWQCB authorization under the provisions of a Report of Waste Discharge (ROWD).

Jurisdictional Determinations

Pursuant to USACE Regulatory Guidance Letter (RGL) 08-02 (dated June 26, 2008), the USACE can issue two types of jurisdictional determinations to implement Section 404 of the CWA: Approved Jurisdictional Determinations and Preliminary Jurisdictional Determinations.[9] An Approved Jurisdictional Determination is an official USACE determination that jurisdictional WOTUS, "Navigable Waters of the U.S.", or both are either present or absent on a site. An Approved Jurisdictional Determination also identifies the precise limits of jurisdictional waters on a project site.

The USACE will provide an Approved Jurisdictional Determination when (1) an Applicant requests an official jurisdictional determination; (2) an Applicant contests jurisdiction over a particular water body or wetland; or (3) when the USACE determines that jurisdiction does not exist over a particular water body or wetland. The Approved Jurisdictional Determination then becomes the USACE's official determination that can then be relied upon over a five-year period to request regulatory authorization as part of the permit application.

In addition, an Applicant may decline to request an Approved Jurisdictional Determination and instead obtain a USACE IP or General Permit Authorization based on a Preliminary Jurisdictional Determination or, in certain circumstances (e.g., authorizations by non-reporting nationwide general permits), with no Jurisdictional Determination.

[8] USACE. 2007 (January 31). Memorandum: Interim Guidance for Amendments to the National Historic Preservation Act and the Advisory Council on Historic Preservation (ACHP) Implementing Regulations. Washington, D.C.: USACE.

[9] USACE. 2008b (June 26). Regulatory Guidance Letter. Jurisdictional Determinations. Washington, D.C.: USACE.

Preliminary Jurisdictional Determinations are non-binding, advisory in nature, and may not be appealed. They indicate that there may be WOTUS on a project site. An Applicant may elect to use a Preliminary Jurisdictional Determination to voluntarily waive or set aside questions regarding CWA jurisdiction over a site, usually in the interest of expediting the permitting process. The USACE will determine what form of Jurisdictional Determination is appropriate for a particular project site.

The USACE Regulatory Branch Offices will coordinate with the USEPA Regional Office and USACE Headquarters (HQ), as outlined in its January 28, 2008, memorandum entitled "Process for Coordinating Jurisdictional Determinations Conducted Pursuant to Section 404 of the Clean Water Act in Light of the *Rapanos* and *SWANCC* Supreme Court Decisions".[10] The guidance provided in this memorandum is quoted as follows:

1. Effective immediately, unless and until paragraph 5(b) of the June 5, 2007, Rapanos guidance coordination memorandum is modified by a joint memorandum from Army and EPA, we will follow these procedures:
    a. For jurisdictional determinations involving significant nexus determinations, USACE districts will send copies of draft jurisdictional delineations via e-mail to appropriate EPA regional offices. The EPA regional office will have 15 calendar days to decide whether to take the draft jurisdictional delineation as a special case under the January 19, 1989, "Memorandum of Agreement Between the Department of the Army and the USEPA Concerning the Determination of the Section 404 Program and the Application of the Exceptions under Section 404(f) of the Clean Water Act." If the EPA regional office does not respond to the district within 15 days, the district will finalize the jurisdictional determination.
    b. For jurisdictional determinations involving isolated waters determinations, the agencies will continue to follow the procedure in paragraph 5(b) of June 5, 2007, coordination memorandum, until a new coordination memorandum is signed by USACE and EPA. (In accordance with paragraph 6 of the June 5, 2007, coordination memorandum, this is a 21-day timeline that can only be changed through a joint memorandum between agencies).
2. Approved JDs are not required for non-reporting NWPs, unless the project proponent specifically requests an approved JD. For proposed activities that may qualify for authorization under a State Programmatic General Permit (SPGP) or RGP, an approved JD is not required unless requested by the project proponent.
3. The USACE will continue to work with EPA to resolve the JDs involving significant nexus and isolated waters determinations that are currently in the elevation process.
4. USACE districts will continue posting completed Approved JD Forms on their web pages.

[10] USACE. 2008c (January 28). *Memorandum for Commander, Major Subordinate Commands and District Commands. Process for Coordinating Jurisdictional Determinations Conducted Pursuant to Section 404 of the Clean Water Act in Light of the Rapanos and SWANCC Supreme Court Decisions.* Washington, D.C.: USACE.

Regional Water Quality Control Board

The RWQCB is the primary agency responsible for protecting water quality in California through the regulation of discharges to surface waters under the CWA and the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The RWQCB's jurisdiction extends to all "waters of the State" and to all WOTUS, including wetlands (isolated and non-isolated).

Section 401 of the CWA provides the RWQCB with the authority to regulate, through a Water Quality Certification, any proposed, federally permitted activity that may affect water quality. Among such activities are discharges of dredged or fill material permitted by the USACE pursuant to Section 404 of the CWA. Section 401 requires the RWQCB to provide certification that there is reasonable assurance that an activity which may result in discharge to navigable waters will not violate water quality standards. Water Quality Certification must be based on a finding that the proposed discharge will comply with water quality standards, which contain numeric and narrative objectives that can be found in each of the nine RWQCBs' Basin Plans.

The Porter-Cologne Act provides the State with very broad authority to regulate "waters of the State" (which are defined as any surface water or groundwater, including saline waters). The Porter-Cologne Act has become an important tool in the post-SWANCC (Solid Waste Agency of Northern Cook Counties vs. Unites States Army Corps of Engineers) and Rapanos era with respect to the State's authority over isolated waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file an ROWD when there is no federal nexus, such as under Section 404(b)(1) of the CWA. Although "waste" is partially defined as any waste substance associated with human habitation, the RWQCB interprets this to include fill discharge into water bodies.

Section 401 Water Quality Certification

Issuance of the USACE Section 404 Permit would be contingent upon the approval of a Section 401 Water Quality Certification from the RWQCB. Also, the RWQCB requires certification of the project's California Environmental Quality Act (CEQA) documentation before it will approve the Section 401 Water Quality Certification or ROWD. The RWQCB, as a responsible agency, will use the project's CEQA document to satisfy its own CEQA-compliance requirements.

Upon acceptance of a complete permit application, the RWQCB has between 60 days and 1 year to make a decision regarding the permit request. This is compliant with USACE regulations, which indicate that the RWQCB has 60 days from the date of receipt of a completed application that requests water quality certification to make a decision.[11] The RWQCB has the option of issuing a "Denial Without Prejudice", which does not mean that the request is denied, but that it requires more information in order to make a decision. This effectively stops the processing clock until this information is provided.

The RWQCB is required under the *California Code of Regulations* (CCR) to have a "minimum 21 day public comment period" before any action can be taken on the Section 401 application.[12] This period closes when the RWQCB acts on the application. Since projects often change or are revised during the Section 401 permit process, the comment period can remain open. The public comment period starts as soon as an application has been received. Generally, the RWQCB Section 401, USACE Section 404, and CDFW Section 1602 permit applications are submitted at the same time. However, the RWQCB Section 401 Water Quality Certification may take longer to process than the other two applications.

[11] 33 CFR §325.2(b)(1)(ii)
[12] 23 CCR §3858(a)

The RWQCB requires the Applicant to address urban storm water runoff during and after construction in the form of Best Management Practices (BMPs). These BMPs are intended to address the treatment of pollutants carried by storm water runoff and are required in all complete applications. The notification/application for a CWA Section 401 Water Quality Certification must also address compliance with the Basin Plan. Please note that filing an application would also require the payment of an application fee which would be based on project impacts. The fee schedule calculator is available at http://www.waterboards.ca.gov/santaana/water_issues/programs/401_certification/index.shtml.

California Department of Fish and Wildlife

The CDFW has jurisdictional authority over wetland resources associated with rivers, streams, and lakes pursuant to the *California Fish and Game Code*.[13] Activities of State and local agencies as well as public utilities that are project proponents are regulated by the CDFW under Section 1602 of the *California Fish and Game Code.* This section regulates any work that will (1) substantially divert or obstruct the natural flow of any river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. Section 1602 of the *California Fish and Game Code* applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State.

The CDFW jurisdictional limits are not as clearly defined by regulation as those of the USACE. While they closely resemble the limits described by USACE regulations, they include riparian habitat supported by a river, stream, or lake regardless of the presence or absence of hydric and saturated soils conditions. In general, the CDFW takes jurisdiction from the top of a stream bank or to the outer limits of the adjacent riparian vegetation (outer drip line), whichever is greater. Notification is generally required for any project that will take place within or in the vicinity of a river, stream, lake or within or in the vicinity of tributaries to a river, stream, or lake. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish and other aquatic plant and/or wildlife species. It also includes watercourses that have a surface or subsurface flow that support or have supported riparian vegetation.

Section 1602 Lake or Streambed Alteration Agreement

The CDFW enters into a Lake or Streambed Alteration (LSA) Agreement with a project proponent in order to ensure protection of wildlife and habitat values and acreages.

Prior to construction, a Notification of an LSA must be submitted to the CDFW that describes any proposed lake or streambed alteration that would occur with implementation of a project. The Notification of an LSA must address the initial construction and long-term operation and maintenance of any structures (such as a culvert or a desilting basin) included in the project design that are located within any river, stream, or lake and that may require periodic maintenance. In addition to the formal application materials and the fee, a copy of the appropriate environmental document (e.g., a Mitigated Negative Declaration) should be included in the submittal, consistent with CEQA requirements. The complete notification package must be submitted to the CDFW regional office that services the county where the activity will take place. This notification will serve as the basis for the CDFW's issuance of a Section 1602 LSA Agreement. Note that notification is not required before beginning emergency work, but the CDFW must be notified in writing within 14 days after beginning the work.

[13] See §§1600–1616.

After receiving Notification of an LSA Agreement, the CDFW will determine whether an LSA Agreement will be required for the proposed activity. An LSA Agreement will be required if the activity could substantially adversely affect an existing fish and wildlife resource. If an LSA Agreement is required, the CDFW may want to conduct an on-site inspection.

If the CDFW does not respond in writing concerning the completeness of the Notification within 30 days of its submittal, the Notification automatically becomes complete. If the CDFW does not submit a draft LSA Agreement to the Applicant within 60 days of the determination of a completed Notification package, the CDFW will issue a letter that either (1) identifies the final date to transmit a draft LSA Agreement or (2) indicates that an LSA Agreement was not required. The CDFW will also indicate that it was unable to meet this mandated compliance date and that, by law, the Applicant is authorized to complete the project without an LSA Agreement as long as the Applicant constructs the project as proposed and complies with all avoidance, minimization, and mitigation measures described in the submitted Notification package. Please note that, if the project requires revisions to the design or project construction, the CDFW may require submittal of a new Notification/application with an additional 90-day permit process.

If determined to be necessary, the CDFW will prepare a draft LSA Agreement, which will include standard measures to protect fish and wildlife resources during project construction and during ongoing operation and maintenance of any project element that occurs within a CDFW jurisdictional area. The draft Agreement must be transmitted to the Applicant within 60 calendar days of the CDFW's determination that the notification is complete. It should be noted that the 60-day timeframe might not apply to long-range agreements.

Following receipt of a draft LSA Agreement from the CDFW, the Applicant has 30 calendar days to notify the CDFW concerning the acceptability of the proposed terms, conditions, and measures. If the Applicant agrees with these terms, conditions and measures, the Agreement must be signed and returned to the CDFW. The Agreement becomes final once the CDFW executes it and an LSA Agreement is issued. Please note that all application fees must be paid and the final certified CEQA documentation must be provided prior to the CDFW's execution of the Agreement.

ATTACHMENT B

WETLAND DATA FORMS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site City/County: Unincorporated Los Angeles Sampling Date: May 31, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 1

Investigator(s): David Hughes Section, Township, Range: Section 31, Township 3N, Range 12W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.301505° Long: -118.176941° Datum: NAD 83

Soil Map Unit Name: open water NWI classification: L1UBK

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. Salix lasiolepis	80	Y	FACW
2. Populus fremontii	5	N	FACW
3. Salix exigua	5	N	FACW
4.			
5.			
	90 = Total Cover		
Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species 90	x 2 =	180
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: 90 (A)		180 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

This portion of reservoir was recently flooded. Vegetation is still developing.

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 5/2	100					sand	accumulated sediment

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): _____

Water Table Present? Yes ✓ No _____ Depth (inches): 15"

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 10"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site City/County: Unincorporated Los Angeles Sampling Date: May 31, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 2

Investigator(s): David Hughes Section, Township, Range: Section 31, Township 3N, Range 12W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.302197° Long: -118.174357° Datum: NAD 83

Soil Map Unit Name: open water NWI classification: L1UBK

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. Salix lasiolepis	10	Y	FACW
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: _____)			
1. Mimulus guttatus	10	Y	OBL
2. Cyperus eragrostis	5	N	FACW
3. Typha latifolia	15	Y	OBL
4. Melilotus indica	5	N	FACU
5.			
6.			
7.			
8.			
	35 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 65 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	25	x 1 =	25
FACW species	15	x 2 =	30
FAC species		x 3 =	
FACU species	5	x 4 =	20
UPL species		x 5 =	
Column Totals:	45 (A)		75 (B)

Prevalence Index = B/A = 1.7

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 5/1	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 12"

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): adjacent

Water Table Present? Yes ✓ No ____ Depth (inches): 4"

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site City/County: Unincorporated Los Angeles Sampling Date: May 31, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 3

Investigator(s): David Hughes Section, Township, Range: Section 31, Township 3N, Range 12W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.301143° Long: -118.171316° Datum: NAD 83

Soil Map Unit Name: open water NWI classification: L1UBK

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix laevigata	40	Y	FACW
2.			
3.			
4.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. Baccharis salicifolia	40	Y	FAC
2. Salix laevigata	20	Y	FACW
3.			
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: _____)			
1. Typha latifolia	80	Y	OBL
2. Xanthium strumarum	10	N	FAC
3. Veronica anagalis-aquatica	2	N	OBL
4.			
5.			
6.			
7.			
8.			
	92	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 8 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	82	x 1 =	82
FACW species	60	x 2 =	120
FAC species	40	x 3 =	120
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	182 (A)		322 (B)

Prevalence Index = B/A = 1.8

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No _____

Remarks:

Sampling location is in the densest portion of a patch of cattails.

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 5/2	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 9"

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 0

Water Table Present? Yes ✓ No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site City/County: Unincorporated Los Angeles Sampling Date: May 31, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 4

Investigator(s): David Hughes Section, Township, Range: Section 1, Township 2N, Range 13W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.293416° Long: -118.189267° Datum: NAD 83

Soil Map Unit Name: Chilao family-Haploxerolls NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix laevigata	20	Y	FACW
2.			
3.			
4.			
	20	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. Salix laevigata	60	Y	FACW
2. Salix lasiolepis	30	Y	FACW
3.			
4.			
5.			
	90	= Total Cover	
Herb Stratum (Plot size: _____)			
1. Typha latifolia	60	Y	OBL
2. Ageratina adenophora	10	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	70	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	110	x 2 =	220
FAC species		x 3 =	
FACU species	10	x 4 =	40
UPL species		x 5 =	
Column Totals:	180 (A)		320 (B)

Prevalence Index = B/A = 1.8

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

cattails occur in a band approximately 10-12 feet wide around plunge pool edge

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100					fibric	fibric organic material

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 5"

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): ____

Water Table Present? Yes ✓ No ____ Depth (inches): 2"

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site City/County: Unincorporated Los Angeles Sampling Date: May 31, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 5

Investigator(s): David Hughes Section, Township, Range: Section 1, Township 2N, Range 13W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.292949° Long: -118.189237° Datum: NAD 83

Soil Map Unit Name: Chilao family-Haploxerolls NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

site is in the channel as it leaves the plunge pool and transitions to willow riparian habitat

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix laevigata	80	Y	FACW
2.			
3.			
4.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: _____)			
1. Typha latifolia	30	Y	OBL
2. Ageratina adenophora	50	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	80	x 2 =	160
FAC species		x 3 =	
FACU species	50	x 4 =	200
UPL species		x 5 =	
Column Totals:	160 (A)		390 (B)

Prevalence Index = B/A = 2.4

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 2/1	100					fibric	
1-5	10YR 3/1	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 5"

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 0

Water Table Present? Yes ✓ No _____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes _____ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site City/County: Unincorporated Los Angeles Sampling Date: May 31, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 6

Investigator(s): David Hughes Section, Township, Range: Section 1, Township 2N, Range 13W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.292861° Long: -118.190092° Datum: NAD 83

Soil Map Unit Name: Chilao family-Haploxerolls NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

site is associated with a seep from canyon wall

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix gooddingii	25	Y	FACW
2.			
3.			
4.			
	25	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. Baccharis salicifolia	25	Y	FAC
2.			
3.			
4.			
5.			
	25	= Total Cover	
Herb Stratum (Plot size: _____)			
1. Echinochloa crus-galli	60	Y	FACW
2. Typha latifolia	35	Y	OBL
3. Veronica anagalis-aquatica	5	N	OBL
4.			
5.			
6.			
7.			
8.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	85	x 2 =	170
FAC species	25	x 3 =	75
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	150 (A)		285 (B)

Prevalence Index = B/A = 1.9

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					fibric	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 4"

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 0

Water Table Present? Yes ✓ No _____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site City/County: Unincorporated Los Angeles Sampling Date: May 31, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 7

Investigator(s): David Hughes Section, Township, Range: Section 1, Township 2N, Range 13W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.292557° Long: -118.190364° Datum: NAD 83

Soil Map Unit Name: Chilao family-Haploxerolls NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

site is a seep; water is draining slowing from the canyon wall

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: _____)			
1. Typha latifolia	40	Y	OBL
2. Echinochloa crus-galli	30	Y	FAC
3. Polypogon monspeliensis	30	Y	FACW
4.			
5.			
6.			
7.			
8.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	30	x 2 =	60
FAC species	30	x 3 =	90
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	100 (A)		190 (B)

Prevalence Index = B/A = 1.9

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					fibric	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 4"

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): ____

Water Table Present? Yes ____ No ____ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site City/County: Unincorporated Los Angeles Sampling Date: June 20, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 8

Investigator(s): David Hughes Section, Township, Range: Section 1, Township 2N, Range 13W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.293154° Long: -118.189051° Datum: NAD 83

Soil Map Unit Name: Chilao family-Haploxerolls NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	10	Y	FACW
2.			
3.			
4.			
	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: _____)			
1. Typha latifolia	90	Y	OBL
2. Ageratina adenophora	10	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	90	x 1 =	90
FACW species	10	x 2 =	20
FAC species		x 3 =	
FACU species	10	x 4 =	40
UPL species		x 5 =	
Column Totals:	110 (A)		150 (B)

Prevalence Index = B/A = 1.4

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					fibric	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 4"

Hydric Soil Present? Yes _____ No ✓

Remarks:

fibric organic soil consisting of cattail roots and sediment on top of rocky streambottom

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 0

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site City/County: Unincorporated Los Angeles Sampling Date: June 20, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 9

Investigator(s): David Hughes Section, Township, Range: Section 1, Township 2N, Range 13W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.290968° Long: -118.191685° Datum: NAD 83

Soil Map Unit Name: Chilao family-Haploxerolls NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	30	Y	FACW
2.			
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. Typha latifolia	40	Y	OBL
2.			
3.			
4.			
5.			
	40	= Total Cover	
Herb Stratum (Plot size: _____)			
1. Urtica dioica	20	Y	FAC
2. Nasturtium officinale	10	Y	OBL
3. Veronica anagalis-aquatica	10	Y	OBL
4.			
5.			
6.			
7.			
8.			
	40	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	30	x 2 =	60
FAC species	20	x 3 =	60
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	110 (A)		180 (B)

Prevalence Index = B/A = 1.6

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/3	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 2"

Hydric Soil Present? Yes _____ No ✓

Remarks:

stream bottom composed of rock, very little sand present

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 0

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site City/County: Unincorporated Los Angeles Sampling Date: June 20, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 10

Investigator(s): David Hughes Section, Township, Range: Section 1, Township 2N, Range 13W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.290072° Long: -118.193554° Datum: NAD 83

Soil Map Unit Name: Chilao family-Haploxerolls NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	50	Y	FACW
2. Alnus rhombifolia	25	Y	FACW
3.			
4.			
	75	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. Typha latifolia	50	Y	OBL
2.			
3.			
4.			
5.			
	50	= Total Cover	
Herb Stratum (Plot size: _____)			
1. Ageratina adenophora	10	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	10	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	75	x 2 =	150
FAC species		x 3 =	
FACU species	10	x 4 =	40
UPL species		x 5 =	
Column Totals:	135 (A)		240 (B)

Prevalence Index = B/A = 1.8

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/2	100					fibric	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 3"

Hydric Soil Present? Yes ____ No ✓

Remarks:

partially decomposed cattail root material on top of rock

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 0

Water Table Present? Yes ____ No ____ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site City/County: Unincorporated Los Angeles Sampling Date: June 20, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 11

Investigator(s): David Hughes Section, Township, Range: Section 1, Township 2N, Range 13W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.287855° Long: -118.194474° Datum: NAD 83

Soil Map Unit Name: Chilao family-Haploxerolls NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	30	Y	FACW
2. Salix laevigata	30	Y	FACW
3.			
4.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. Salix laevigata	40	Y	FACW
2.			
3.			
4.			
5.			
	40	= Total Cover	
Herb Stratum (Plot size: _____)			
1. Polypogon monspeliensis	50	Y	FACW
2. Nasturtium officinale	30	Y	OBL
3. Urtica dioica	20	Y	FAC
4.			
5.			
6.			
7.			
8.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	150	x 2 =	300
FAC species	20	x 3 =	60
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	200 (A)		390 (B)

Prevalence Index = B/A = 1.9

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/2	100					fibric	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 5"

Hydric Soil Present? Yes ____ No ✓

Remarks:

partially decomposed fibric organic layer on top of rock

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 0

Water Table Present? Yes ____ No ____ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

lower-gradient portion of creek, where water slows down and spreads out

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site - Maple Cyn SPS City/County: Unincorporated Los Angeles Sampling Date: June 20, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 12

Investigator(s): David Hughes Section, Township, Range: Section 1, Township 2N, Range 13W

Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.284593° Long: -118.190673° Datum: NAD 83

Soil Map Unit Name: Chilao family-Haploxerolls NWI classification: PFOC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

sampling location is in a debris basin at bottom of canyon

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. Baccharis salicifolia	10	Y	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: _____)			
1. Ambrosia acanthicarpa	15	Y	UPL
2. Avena sp.	10	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	25 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 75 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species 10	x 3 =	30
FACU species	x 4 =	
UPL species 25	x 5 =	125
Column Totals: 35 (A)		155 (B)

Prevalence Index = B/A = 4.4

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

SOIL

Sampling Point: 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 4/3	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✓ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site-Maple Cyn SPS City/County: Unincorporated Los Angeles Sampling Date: June 20, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 13

Investigator(s): David Hughes Section, Township, Range: Section 1, Township 2N, Range 13W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.284312° Long: -118.190124° Datum: NAD 83

Soil Map Unit Name: Chilao family-Haploxerolls NWI classification: PFOC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	70	Y	FACW
2.			
3.			
4.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. Salix lasiolepis	60	Y	FACW
2.			
3.			
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: _____)			
1. Epilobium canum	30	Y	UPL
2. Stipa miliaceum	20	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	50	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species 130	x 2 = 260
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species 50	x 5 = 250
Column Totals: 180 (A)	510 (B)

Prevalence Index = B/A = 2.8

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/3	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 8"

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ✓ No ____ Depth (inches): 2

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site-Maple Cyn SPS City/County: Unincorporated Los Angeles Sampling Date: June 20, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 14

Investigator(s): David Hughes Section, Township, Range: Section 6, Township 2N, Range 12W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.282543° Long: -118.181721° Datum: NAD 83

Soil Map Unit Name: Olete-Kilburn-Etsel families complex NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. Eriogonum fasciculatum	30	Y	UPL
2.			
3.			
4.			
5.			
	30 = Total Cover		
Herb Stratum (Plot size: _____)			
1. Bromus diandrus	40	Y	UPL
2. Stipa miliaceum	30	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	70 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species 100	x 5 = 500
Column Totals: 100 (A)	500 (B)

Prevalence Index = B/A = 5.0

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

SOIL

Sampling Point: 14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/2	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: hard pan

Depth (inches): 6"

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✓ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Big Tujunga Dam Project Site-Maple Cyn SPS City/County: Unincorporated Los Angeles Sampling Date: June 20, 2017

Applicant/Owner: Los Angeles County Department of Public Works State: CA Sampling Point: 15

Investigator(s): David Hughes Section, Township, Range: Section 6, Township 2N, Range 12W

Landform (hillslope, terrace, etc.): Canyon Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): Mediterranean California Lat: 34.284341° Long: -118.183089° Datum: NAD 83

Soil Map Unit Name: Chilao family-Haploxerolls NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No _____
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes _____	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. Eriogonum fasciculatum	25	Y	UPL
2.			
3.			
4.			
5.			
	25 = Total Cover		
Herb Stratum (Plot size: _____)			
1. Bromus diandrus	60	Y	UPL
2. Avena sp.	10	N	UPL
3. Salsola tragus	10	N	UPL
4.			
5.			
6.			
7.			
8.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species 105	x 5 = 525
Column Totals: 105 (A)	525 (B)

Prevalence Index = B/A = 5.0

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

SOIL

Sampling Point: 15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/2						sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: hard pan

Depth (inches): 5"

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✓ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

ATTACHMENT C

ORDINARY HIGH WATER MARK DATASHEET

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Big Tujunga Dam
Project Number: 3SPW029305
Stream:
Investigator(s): David Hughes

Date: 5/31/2017 **Time:**
Town: **State:**
Photo begin file#: **Photo end file#:**

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: upstream of dam

Projection: **Datum:**
Coordinates:

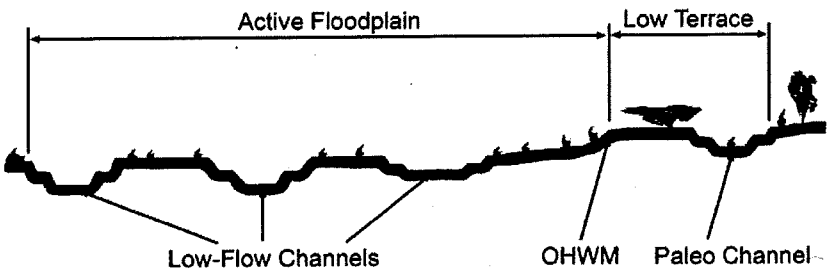
Potential anthropogenic influences on the channel system:
the dam downstream has resulted in significant aggradation in upstream conditions

Brief site description:
willow riparian system in upper reservoir area upstream of open water conditions

Checklist of resources (if available):

- ☒ Aerial photography
  Dates:
- ☒ Topographic maps
- ☐ Geologic maps
- ☒ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

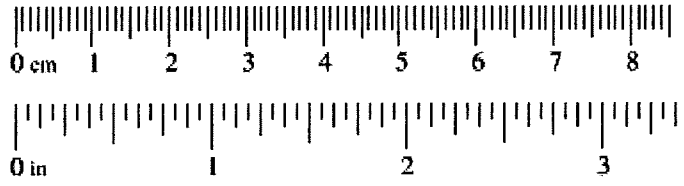


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☒ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☐ GPS
   - ☐ Other:

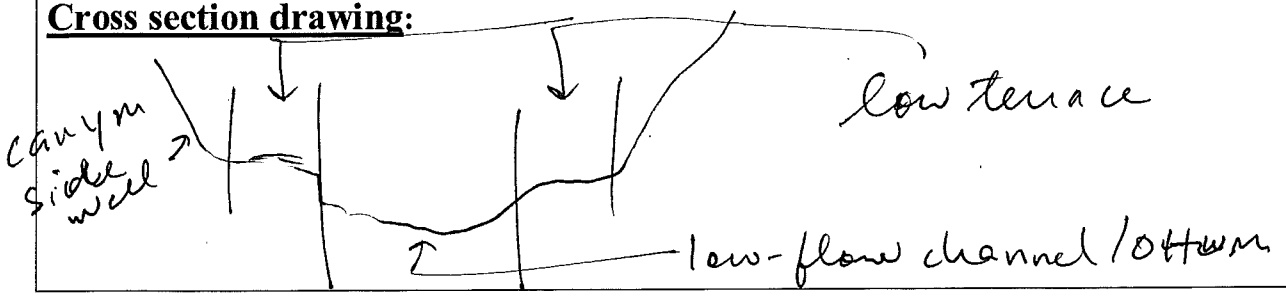
Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64	Pebble	
0.157	4	Granule	
0.079	2.00	Very coarse sand	
0.039	1.00	Coarse sand	
0.020	0.50	Medium sand	Sand
1/2 0.0098	0.25	Fine sand	
1/4 0.005	0.125	Very fine sand	
1/8 0.0025	0.0625	Coarse silt	
1/16 0.0012	0.031	Medium silt	
1/32 0.00061	0.0156	Fine silt	Silt
1/64 0.00031	0.0078	Very fine silt	
1/128 0.00015	0.0039	Clay	Mud



Project ID: **Cross section ID:** **Date:** **Time:**

Cross section drawing:



OHWM

GPS point: _____

Indicators:

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: 90 % Tree: 0 % Shrub: 60 % Herb: 30 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: 90 % Tree: 0 % Shrub: 60 % Herb: 30 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: 60 % Tree: 0 % Shrub: 40 % Herb: 20 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: BIG TUJUNGA DAM
Project Number: 3DPW02905
Stream: BIG TUJUNGA WASH
Investigator(s): DAVID HUGHES

Date: June 20, 2017 **Time:**
Town: **State:**
Photo begin file#: **Photo end file#:**

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details: BIG TUJUNGA WASH DOWNSTREAM OF DAM
Projection: **Datum:**
Coordinates:

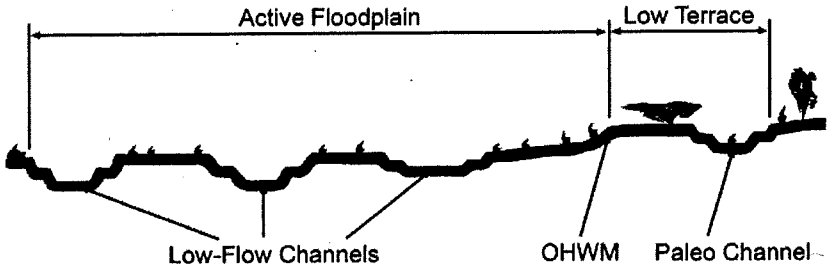
Potential anthropogenic influences on the channel system:
UPSTREAM DAM HAS REDUCED SEDIMENT TRANSPORT — DAM ALSO CONTROLS DOWNSTREAM FLOWS

Brief site description:
willow forest, perennial stream, rocky substrate

Checklist of resources (if available):

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [ ] Geologic maps
- [X] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies
- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

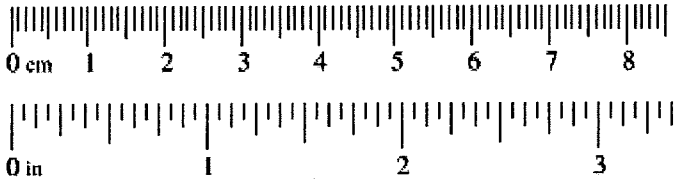


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [X] Mapping on aerial photograph
   - [ ] Digitized on computer
   - [ ] GPS
   - [ ] Other:

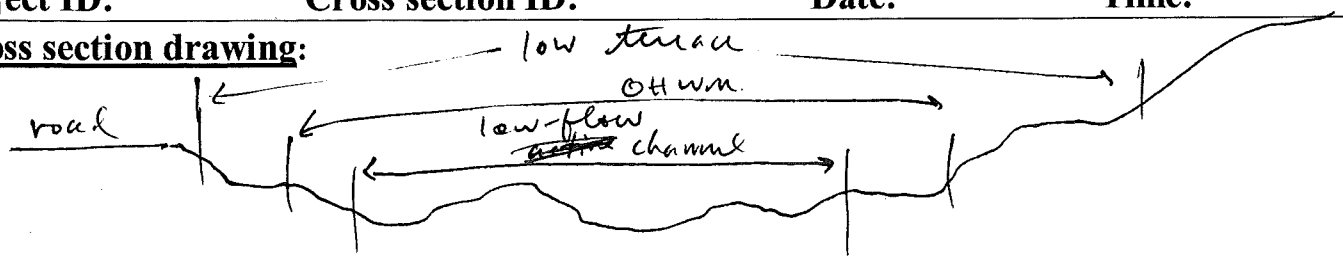
Wentworth Size Classes

Inches (in)		Millimeters (mm)	Wentworth size class	
	10.08	256	Boulder	
	2.56	64	Cobble	Gravel
	0.157	4	Pebble	
	0.079	2.00	Granule	
	0.039	1.00	Very coarse sand	
	0.020	0.50	Coarse sand	
1/2	0.0098	0.25	Medium sand	Sand
1/4	0.005	0.125	Fine sand	
1/8	0.0025	0.0625	Very fine sand	
1/16	0.0012	0.031	Coarse silt	
1/32	0.00061	0.0156	Medium silt	Silt
1/64	0.00031	0.0078	Fine silt	
1/128	0.00015	0.0039	Very fine silt	
			Clay	Mud



Project ID: **Cross section ID:** **Date:** **Time:**

Cross section drawing:



OHWM

GPS point: _____

Indicators:

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: sand / rock

Total veg cover: 100 % Tree: 80 % Shrub: 10 % Herb: 20 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand / rock

Total veg cover: 100 % Tree: 76 % Shrub: 20 % Herb: 20 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand / rock

Total veg cover: 100 % Tree: ~~760~~ 60 % Shrub: 30 % Herb: 20 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

ATTACHMENT D

SITE PHOTOGRAPHS



Photo Location 1, facing upstream. May 31, 2017. Overview of habitat conditions upstream of open water area in reservoir.



Photo Location 1, facing downstream. May 31, 2017. Overview of conditions of recently inundated areas in reservoir.

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Site Photographs

Exhibit D-1

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS



Photo Location 2, facing upstream. May 31, 2017. Willow saplings establishing along low flow channel in upper reservoir area.



Photo Location 3, facing upstream. May 31, 2017. Willow riparian habitat in upper reservoir area.

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Site Photographs

Exhibit D-2

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS



Photo Location 4, facing upstream. May 31, 2017. Willow and cottonwood habitat in upper reservoir habitat. Typically high amount of accumulated sand can be seen in foreground.



Photo Location 5, facing upstream. May 31, 2017. Habitat conditions in uppermost portion of Big Tujunga Reservoir. Note larger trees and more developed midstory and understory habitat compared to areas further downstream.

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Photo Location 6, facing upstream. May 31, 2017. View of plunge pool immediately below Big Tujunga Dam. Cattails in foreground are found all along edge of the open water in this location.



Photo Location 7, facing downstream. May 31, 2017. Typical willow habitat conditions in Big Tujunga Wash below dam.

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Photo Location 8. May 31, 2017. Habitat conditions where water is seeping from canyon wall at soil test pit 6.



Photo Location 9. May 31, 2017. Habitat conditions where water is seeping from canyon wall at soil test pit 7.

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Site Photographs

Exhibit D-5

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

(Rev: 06/28/2017 CJS) R:\Projects\DPW\3DPW029305\Graphics\JD\ExD_jd_photos_20170627.pdf



Photo Location 10, facing downstream. June 20, 2017. Typical willow habitat conditions in Big Tujunga Wash.



Photo Location 11, facing downstream. June 20, 2017. Typical willow habitat conditions in Big Tujunga Wash near soil test pit 10.

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Site Photographs

Exhibit D-6

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS



Photo Location 12. June 20, 2017. Overview of habitat conditions in basin at southeastern portion of Maple Canyon Sediment Placement Site.



Photo Location 13. June 20, 2017. Overview of habitat conditions in basin at northeastern portion of Maple Canyon Sediment Placement Site.

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Site Photographs

Exhibit D-7

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

ATTACHMENT E

CALIFORNIA RAPID ASSESSMENT METHOD DATASHEETS

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: Big Tujunga Reservoir	
Project Name:	
Assessment Area ID #: AA-1	
Project ID #:	**Date:** May 31, 2017
Assessment Team Members for This AA:	
David Hughes, Daria Sarvat	
Average Bankfull Width: 9 m	
Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m): 100 m	
Upstream Point Latitude:	**Longitude:**
Downstream Point Latitude:	**Longitude:**
Wetland Sub-type:	
☒ Confined ☐ Non-confined	
AA Category:	
☐ Restoration ☐ Mitigation ☐ Impacted ☐ Ambient ☐ Reference ☐ Training	
☐ Other:	
Did the river/stream have flowing water at the time of the assessment? ☒ yes ☐ no	
What is the apparent hydrologic flow regime of the reach you are assessing?	
The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.	
☒ perennial ☐ intermittent ☐ ephemeral	

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1		Upstream			
2		Middle Left			
3		Middle Right			
4		Downstream			
5					
6					
7					
8					
9					
10					

Site Location Description:

Comments:

Scoring Sheet: Riverine Wetlands

AA Name:			Date:
Attribute 1: Buffer and Landscape Context (pp. 11-19)			**Comments**
Stream Corridor Continuity (D)	Alpha. A	Numeric 12	
Buffer:			
Buffer submetric A: Percent of AA with Buffer	Alpha. A	Numeric 12	
Buffer submetric B: Average Buffer Width	A	12	
Buffer submetric C: Buffer Condition	A	12	
Raw Attribute Score = D+[C x (A x B)½]½			**Final Attribute Score = (Raw Score/24) x 100**
Attribute 2: Hydrology (pp. 20-26)			
	Alpha.	Numeric	
Water Source	A	12	
Channel Stability	C	6	
Hydrologic Connectivity	A	12	
Raw Attribute Score = sum of numeric scores			**Final Attribute Score = (Raw Score/36) x 100**
Attribute 3: Physical Structure (pp. 27-33)			
	Alpha.	Numeric	
Structural Patch Richness	C	6	
Topographic Complexity	C	6	
Raw Attribute Score = sum of numeric scores			**Final Attribute Score = (Raw Score/24) x 100**
Attribute 4: Biotic Structure (pp. 34-41)			
Plant Community Composition (based on sub-metrics A-C)			
	Alpha.	Numeric	
Plant Community submetric A: Number of plant layers	A	12	
Plant Community submetric B: Number of Co-dominant species	A	12	
Plant Community submetric C: Percent Invasion	B	9	
Plant Community Composition Metric *(numeric average of submetrics A-C)*			
Horizontal Interspersion	C	6	
Vertical Biotic Structure	A	12	
Raw Attribute Score = sum of numeric scores			**Final Attribute Score = (Raw Score/36) x 100**
Overall AA Score (average of four final Attribute Scores)			

Table 5a: Rating for Stream Corridor Continuity for Wadeable Riverine Wetlands.

Rating	For Distance of 500 m Upstream of AA:	For Distance of 500 m Downstream of AA:
A	The combined total length of all non-buffer segments is less than 100 m.	The combined total length of all non-buffer segments is less than 100 m.
B	The combined total length of all non-buffer segments is less than 100 m.	The combined total length of all non-buffer segments is between 100 m and 200 m.
	OR	
	The combined total length of all non-buffer segments is between 100 m and 200 m.	The combined total length of all non-buffer segments is less than 100 m.
C	The combined total length of all non-buffer segments is between 100 m and 200 m.	The combined total length of all non-buffer segments is between 100 m and 200 m.
D	The combined total length of non-buffer segments is greater than 200 m.	any condition
	OR	
	any condition	The combined total length of non-buffer segments is greater than 200 m.

Table 5b: Rating of Stream Corridor Continuity for Non-wadeable Riverine (1-sided AAs).

Rating	For Distance of 500 m Upstream of AA:	For Distance of 500 m Downstream of AA:
A	The combined total length of all non-buffer segments is less 50 m.	The combined total length of all non-buffer segments is less than 50 m.
B	The combined total length of all non-buffer segments is less than 50 m.	The combined total length of all non-buffer segments is between 50 m and 100 m.
	OR	
	The combined total length of all non-buffer segments is between 50 m and 100 m.	The combined total length of all non-buffer segments is less than is less than 50 m.
C	The combined total length of all non-buffer segments is between 50 m and 100 m.	The combined total length of all non-buffer segments is between; 50 m and 100 m.
D	The combined total length of non-buffer segments is greater than 100 m.	any condition
	OR	
	any condition	The combined total length of non-buffer segments is greater than 100 m.

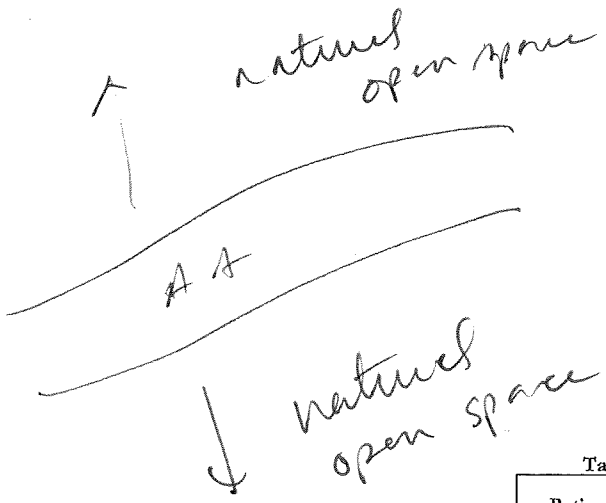
AA is located in a natural setting, the nearest obstruction is Big T dam downstream

Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1		1	
2		2	
3		3	
4		4	
5		5	
Upstream Total Length		Downstream Total Length	

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.



Percent of AA with Buffer: %

Table 7: Rating for Percent of AA with Buffer.

Rating	Alternative States (not including open-water areas)
A	Buffer is 75 - 100% of AA perimeter.
B	Buffer is 50 – 74% of AA perimeter.
C	Buffer is 25 – 49% of AA perimeter.
D	Buffer is 0 – 24% of AA perimeter.

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	250 m
B	
C	
D	
E	
F	
G	
H	
Average Buffer Width *Round to the nearest integer*	250 m

Table 9: Rating for average buffer width.

Rating	Alternative States
A	Average buffer width is 190 – 250 m.
B	Average buffer width 130 – 189 m.
C	Average buffer width is 65 – 129 m.
D	Average buffer width is 0 – 64 m.

Table 10: Rating for Buffer Condition.

**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following ratings.*

Rating	Alternative States
A	Buffer for AA is dominated by native vegetation, has undisturbed soils, and is apparently subject to little or no human visitation.
B	Buffer for AA is characterized by an intermediate mix of native and non-native vegetation (25% to 75% non-native), but mostly undisturbed soils and is apparently subject to little or low impact human visitation.
	OR
	Buffer for AA is dominated by native vegetation, but shows some soil disturbance and is apparently subject to little or low impact human visitation.
C	Buffer for AA is characterized by substantial (>75%) amounts of non-native vegetation AND there is at least a moderate degree of soil disturbance/compaction, and/or there is evidence of at least moderate intensity of human visitation.
D	Buffer for AA is characterized by barren ground and/or highly compacted or otherwise disturbed soils, and/or there is evidence of very intense human visitation, or there is no buffer present.

Buffer consists of natural open space in Angeles National Forest

Table 11: Rating for Water Source.

Rating	Alternative States
A	Freshwater sources that affect the dry season condition of the AA, such as its flow characteristics, hydroperiod, or salinity regime, are precipitation, snow melt, groundwater, and/or natural runoff, or natural flow from an adjacent freshwater body, or the AA naturally lacks water in the dry season. There is **no indication** that dry season conditions are substantially controlled by artificial water sources.
B	Freshwater sources that affect the dry season condition of the AA are mostly natural, but also obviously include occasional or small effects of modified hydrology. Indications of such anthropogenic inputs include developed land or irrigated agricultural land that comprises **less than 20%** of the immediate drainage basin within about 2 km upstream of the AA, or that is characterized by the presence of a few small stormdrains or scattered homes with septic systems. No large point sources or dams control the overall hydrology of the AA.
C	Freshwater sources that affect the dry season conditions of the AA are primarily urban runoff, direct irrigation, pumped water, artificially impounded water, water remaining after diversions, regulated releases of water through a dam, or other artificial hydrology. Indications of substantial artificial hydrology include developed or irrigated agricultural land that comprises **more than 20%** of the immediate drainage basin within about 2 km upstream of the AA, or the presence of major point source discharges that obviously control the hydrology of the AA. OR Freshwater sources that affect the dry season conditions of the AA are **substantially controlled** by known diversions of water or other withdrawals directly from the AA, its encompassing wetland, or from its drainage basin.
D	Natural, freshwater sources that affect the dry season conditions of the AA have **been eliminated** based on the following indicators: impoundment of all possible wet season inflows, diversion of all dry-season inflow, predominance of xeric vegetation, etc.

AA is not in natural streambed with only natural open space in watershed

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☒ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☒ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☐ There is leaf litter, thatch, or wrack in most pools (if pools are present). ☐ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☐ There is little or no active undercutting or burial of riparian vegetation. ☐ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation. ☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar). ☐ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA ☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☐ There are abundant bank slides or slumps. ☐ The lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☐ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☒ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year. ☒ There are partially buried living tree trunks or shrubs along the banks. ☒ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☐ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	☐ **Equilibrium** ☐ **Degradation** ☒ **Aggradation**

Table 12: Rating for Riverine Channel Stability.

Rating	Alternative State (based on the field indicators listed in the worksheet above)
A	Most of the channel through the AA is characterized by equilibrium conditions, with little evidence of aggradation or degradation. Based on the indicators of condition, typical sediment transport processes are occurring.
B	Most of the channel through the AA is characterized by some aggradation or degradation, none of which is severe. The channel may be approaching or moving away from equilibrium. Based on the indicators of condition, typical sediment transport processes are occurring, however the reach is trending toward excess transport or deposition due to moderate disequilibrium conditions.
(C)	There is evidence of severe aggradation or degradation of most of the channel through the AA or the channel bed is artificially hardened through less than half of the AA. Based on the indicators of condition, typical sediment transport processes are severely altered.
D	The channel bed is concrete or otherwise artificially hardened through most of AA.

sediment is trapped upstream of dam.

Riverine Wetland Entrenchment Ratio Calculation Worksheet

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections - ▶	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	7'	11'	16'
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	2'	2.2'	3.1'
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	4'	4.4'	6.2'
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	55'	71'	84'
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	7.9	6.5	5.3
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			6.6

Table 13a: Rating of Hydrologic Connectivity for Non-confined Riverine wetlands.

Rating	Alternative States (based on the entrenchment ratio calculation worksheet above)
A	Entrenchment ratio is > 2.2.
B	Entrenchment ratio is 1.9 to 2.2.
C	Entrenchment ratio is 1.5 to 1.8.
D	Entrenchment ratio is <1.5.

Table 13b: Rating of Hydrologic Connectivity for Confined Riverine wetlands.

Rating	Alternative States (based on the entrenchment ratio calculation worksheet above)
A	Entrenchment ratio is > 1.8.
B	Entrenchment ratio is 1.6 to 1.8.
C	Entrenchment ratio is 1.2 to 1.5.
D	Entrenchment ratio is < 1.2.

Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

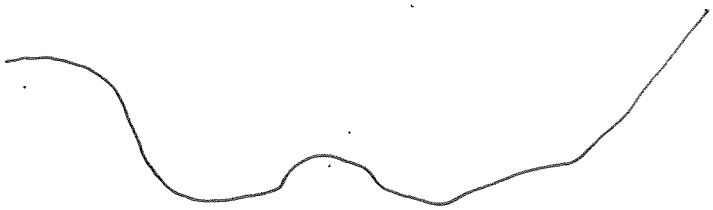
STRUCTURAL PATCH TYPE (circle for presence)	Riverine (Non-confined)	Riverine (Confined)
Minimum Patch Size	**3 m^2**	**3 m^2**
Abundant wrackline or organic debris in channel, on floodplain	1	(1)
Bank slumps or undercut banks in channels or along shoreline	1	1
Cobbles and/or Boulders	1	(1)
Debris jams	1	1
Filamentous macroalgae or algal mats	1	(1)
Large woody debris	1	(1)
Pannes or pools on floodplain	1	N/A
Plant hummocks and/or sediment mounds	1	1
Point bars and in-channel bars	1	(1)
Pools or depressions in channels (wet or dry channels)	1	1
Riffles or rapids (wet or dry channels)	1	1
Secondary channels on floodplains or along shorelines	1	N/A
Standing snags (at least 3 m tall)	1	1
Submerged vegetation	1	N/A
Swales on floodplain or along shoreline	1	N/A
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	1	1
Vegetated islands (mostly above high-water)	1	N/A
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)		5

Rating	Confined Riverine	Non-confined Riverine
A	≥ 8	≥ 12
B	6 – 7	9 – 11
(C)	4 – 5	6 – 8
D	≤ 3	≤ 5

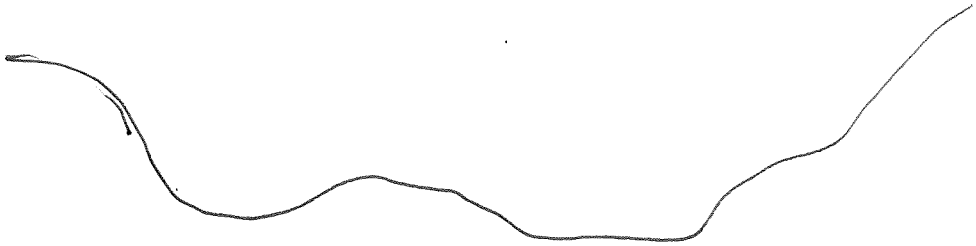
Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

Profile 1



Profile 2



Profile 3



due to excessive sedimentation there is no micro-topography in banks

Table 16: Rating of Topographic Complexity for Riverine Wetlands.

Rating	Alternative States (based on worksheet and diagrams in Figure 10 above)
A	AA as viewed along a typical cross-section has at least two benches at different elevations (not including the channel bottom or high riparian terraces not influenced by fluvial processes). Features below the bankfull elevation are part of the active channel and cannot be considered benches. Additionally, each of these benches, plus the slopes between the benches, contain physical patch types or micro-topographic features such as boulders or cobbles, partially buried woody debris, undercut banks, secondary channels and debris jams that contribute to abundant micro-topographic relief as illustrated in profile A.
B	AA has at least two benches above bankfull elevation, but these benches mostly lack abundant micro-topographic complexity. The AA resembles profile B1.
	OR
	AA has one bench above bankfull elevation, and this bench has abundant micro-topographic complexity as described in the A condition above. The AA resembles profile B2.
C	AA has a single bench that lacks abundant micro-topographic complexity, as illustrated in profile C.
D	AA as viewed along a typical cross-section lacks any obvious bench. The cross-section is best characterized as a single, uniform slope with or without micro-topographic complexity, as illustrated in profile D (includes concrete channels).

Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands
(A dominant species represents ≥10% *relative* cover)

Special Note:

* *Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

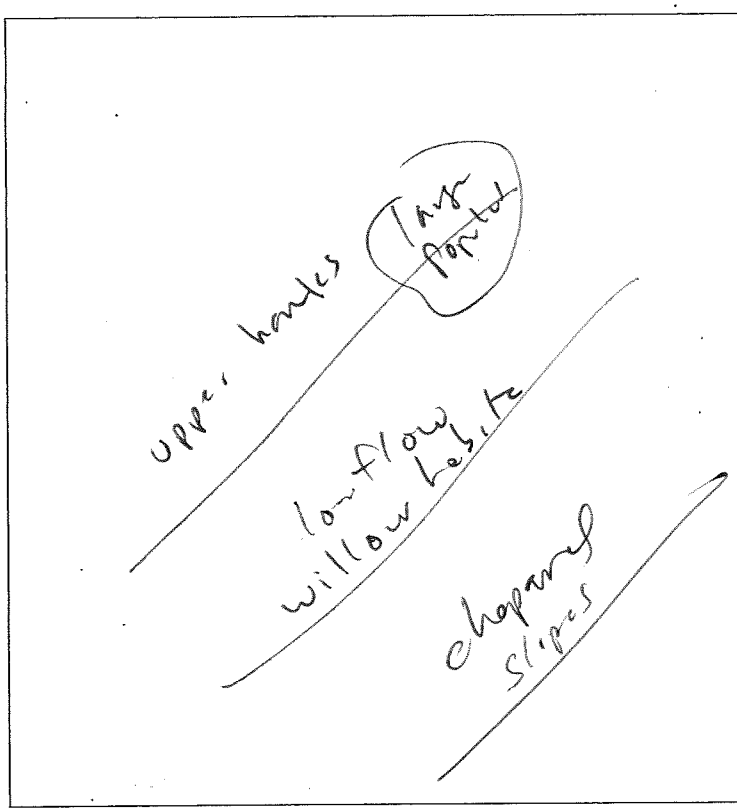
Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		Xanthium strumarum	
		Stipa miliacea	
		Ageratina adenophora	✓
		Melilotus indica	
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
Baccharis salicifolia		Salix laevigata	
Salix lasiolepis		Salix lasiolepis	
Typha latifolia		Baccharis salicifolia	
Spartina juncea	✓		
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	11
Salix lasiolepis			
Populus fremontii			
Salix laevigata		**Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)**	2/11 = 18%
Alnus rhombifolia			

Table 18: Ratings for submetrics of Plant Community Metric.

Rating	Number of Plant Layers Present	Number of Co-dominant Species	Percent Invasion
Non-confined Riverine Wetlands			
A	4 – 5	≥ 12	0 – 15%
B	3	9 – 11	16 – 30%
C	2	6 – 8	31 – 45%
D	0-1	0 – 5	46 – 100%
Confined Riverine Wetlands			
A	4	≥ 11	0 – 15%
B	3	8 – 10	16 – 30%
C	2	5 – 7	31 – 45%
D	0-1	0 – 4	46 – 100%

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.



Assigned zones:

1)

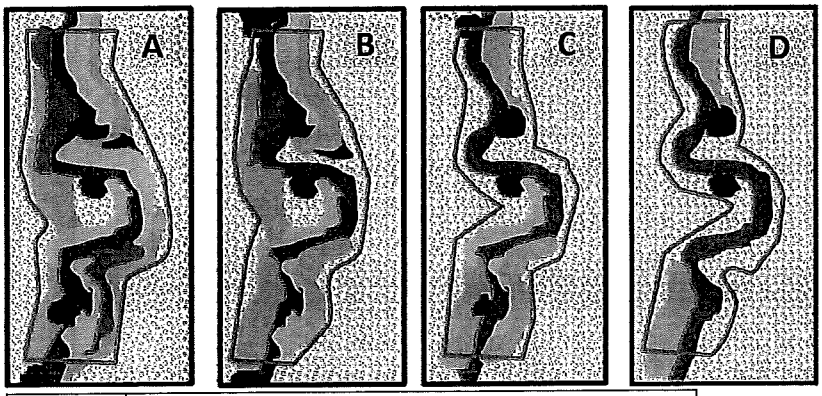
2)

3)

4)

5)

6)



Rating	Alternative States (based on Worksheet drawings and Figure 10)
A	AA has a high degree of plan-view interspersion.
B	AA has a moderate degree of plan-view interspersion.
C	AA has a low degree of plan-view interspersion.
D	AA has minimal plan-view interspersion.

Metric 3: Vertical Biotic Structure

Definition The vertical component of biotic structure assesses the degree of overlap among plant layers. The same plant layers used to assess the Plant Community Composition Metrics are used to assess Vertical Biotic Structure. To be counted in CRAM, a layer must cover at least 5% of the portion of the AA that is suitable for the layer.

Special Notes:

**The "A" condition can be obtained only when >50% of the vegetated area of the AA has three layers that overlap abundantly.*

**It is important to accurately estimate the extent of overlap, particularly when the AA contains only two layers. The aerial imagery can help in determining the extent of overlap between layers.*

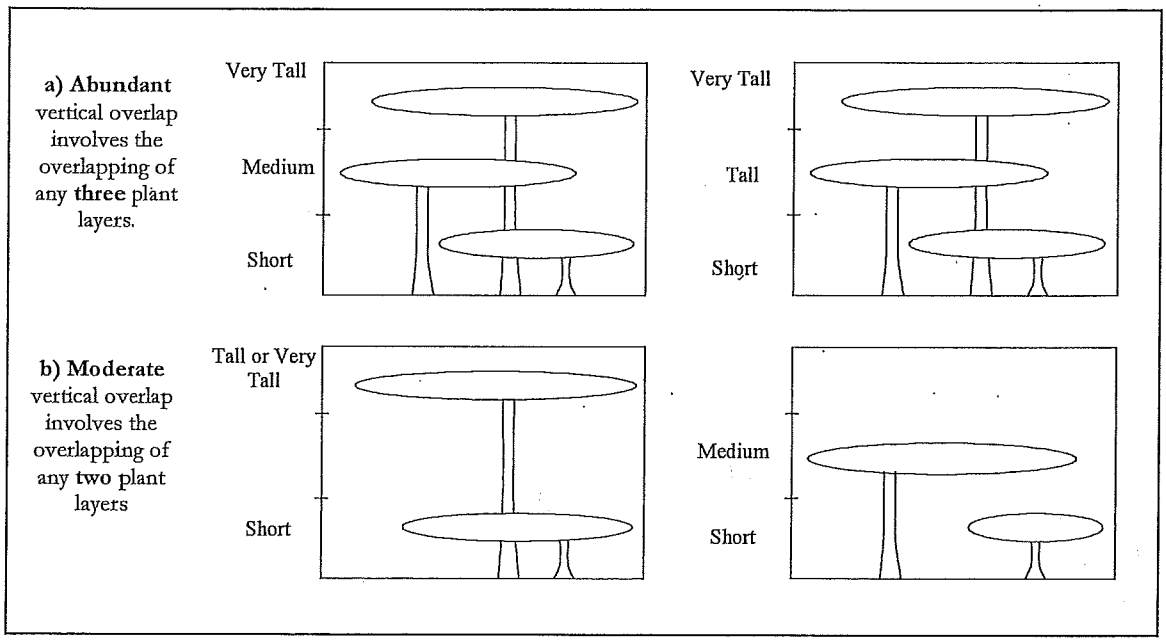


Figure 13: Schematic diagrams potential examples of (a) **abundant** and (b) **moderate** vertical overlap of plant layers for Riverine AAs. *Additional combinations of layer overlap exist for both.*

Table 20: Rating of Vertical Biotic Structure for Riverine AAs

Rating	Alternative States
A	More than 50% of the vegetated area of the AA supports **abundant** overlap of 3 plant layers (see Figure 13a).
B	More than 50% of the area supports at least **moderate** overlap of 2 plant layers (see Figure 13b).
C	25–50% of the vegetated AA supports at least **moderate** overlap of 2 plant layers.
D	Less than 25% of the vegetated AA supports **moderate** overlap of 2 plant layers, **or** AA is sparsely vegetated overall.

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	Yes	No		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
Comments		
AA in natural setting		

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed	✓	✓
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		
Comments		
Excessive sediment accumulation due to dam downstream		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources		
Lack of treatment of invasive plants adjacent to AA or buffer		
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		
Watershed consists of natural open space		

Basic Information Sheet: Riverine Wetlands

Assessment Area Name:	BIG TUJUNGA DAM - DOWNSTREAM AREA
Project Name:	
Assessment Area ID #:	AA-2
Project ID #:	**Date:** 6-20-17
Assessment Team Members for This AA:	
David Hughes	
Average Bankfull Width:	15 ft.
Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m):	
Upstream Point Latitude:	**Longitude:**
Downstream Point Latitude:	**Longitude:**
Wetland Sub-type:	
☒ Confined ☐ Non-confined	
AA Category:	
☐ Restoration ☐ Mitigation ☐ Impacted ☐ Ambient ☐ Reference ☐ Training	
☐ Other:	
Did the river/stream have flowing water at the time of the assessment? ☒ yes ☐ no	

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☒ perennial ☐ intermittent ☐ ephemeral

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1		Upstream			
2		Middle Left			
3		Middle Right			
4		Downstream			
5					
6					
7					
8					
9					
10					

Site Location Description:

Comments:

Scoring Sheet: Riverine Wetlands

AA Name: Downstream 3 Big Tujunga Dam				Date: 6-20-17
Attribute 1: Buffer and Landscape Context (pp. 11-19)				**Comments**
Stream Corridor Continuity (D)		Alpha. D	Numeric 3	
Buffer:				
Buffer submetric A: Percent of AA with Buffer	Alpha. A	Numeric 12		
Buffer submetric B: Average Buffer Width	C	6		
Buffer submetric C: Buffer Condition	A	12		
Raw Attribute Score = D+[C x (A x B)½]½				**Final Attribute Score = (Raw Score/24) x 100**
Attribute 2: Hydrology (pp. 20-26)				
Water Source		Alpha. C	Numeric 6	
Channel Stability		B	9	
Hydrologic Connectivity		A	12	
Raw Attribute Score = sum of numeric scores				**Final Attribute Score = (Raw Score/36) x 100**
Attribute 3: Physical Structure (pp. 27-33)				
Structural Patch Richness		Alpha. A	Numeric 12	
Topographic Complexity		A	12	
Raw Attribute Score = sum of numeric scores				**Final Attribute Score = (Raw Score/24) x 100**
Attribute 4: Biotic Structure (pp. 34-41)				
Plant Community Composition (based on sub-metrics A-C)				
Plant Community submetric A: Number of plant layers	Alpha. A	Numeric 12		
Plant Community submetric B: Number of Co-dominant species	B	9		
Plant Community submetric C: Percent Invasion	A	12		
Plant Community Composition Metric *(numeric average of submetrics A-C)*				
Horizontal Interspersion		C	6	
Vertical Biotic Structure		B	9	
Raw Attribute Score = sum of numeric scores				**Final Attribute Score = (Raw Score/36) x 100**
Overall AA Score (average of four final Attribute Scores)				

Table 5a: Rating for Stream Corridor Continuity for Wadeable Riverine Wetlands.

Rating	For Distance of 500 m Upstream of AA:	For Distance of 500 m Downstream of AA:
A	The combined total length of all non-buffer segments is less than 100 m.	The combined total length of all non-buffer segments is less than 100 m.
B	The combined total length of all non-buffer segments is less than 100 m.	The combined total length of all non-buffer segments is between 100 m and 200 m.
	OR	
	The combined total length of all non-buffer segments is between 100 m and 200 m.	The combined total length of all non-buffer segments is less than 100 m.
C	The combined total length of all non-buffer segments is between 100 m and 200 m.	The combined total length of all non-buffer segments is between 100 m and 200 m.
D	The combined total length of non-buffer segments is greater than 200 m.	any condition
	OR	
	any condition	The combined total length of non-buffer segments is greater than 200 m.

BIG Tujunga dam is approximately 100 meters upstream from AA

Table 5b: Rating of Stream Corridor Continuity for Non-wadeable Riverine (1-sided AAs).

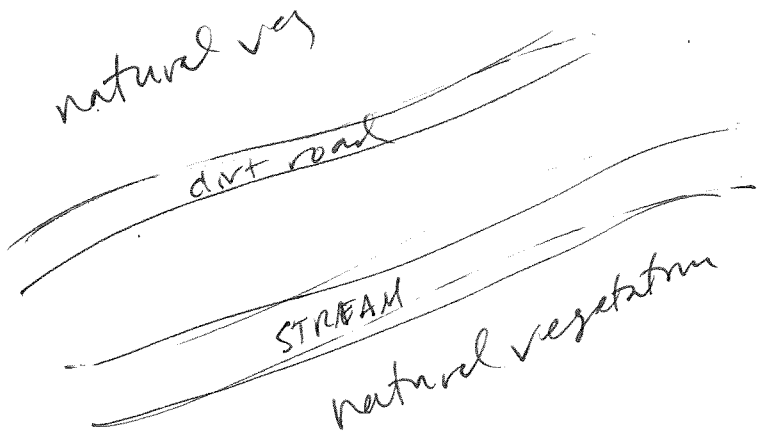
Rating	For Distance of 500 m Upstream of AA:	For Distance of 500 m Downstream of AA:
A	The combined total length of all non-buffer segments is less 50 m.	The combined total length of all non-buffer segments is less than 50 m.
B	The combined total length of all non-buffer segments is less than 50 m.	The combined total length of all non-buffer segments is between 50 m and 100 m.
	OR	
	The combined total length of all non-buffer segments is between 50 m and 100 m.	The combined total length of all non-buffer segments is less than is less than 50 m.
C	The combined total length of all non-buffer segments is between 50 m and 100 m.	The combined total length of all non-buffer segments is between; 50 m and 100 m.
D	The combined total length of non-buffer segments is greater than 100 m.	any condition
	OR	
	any condition	The combined total length of non-buffer segments is greater than 100 m.

Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1		1	
2		2	
3		3	
4		4	
5		5	
Upstream Total Length		Downstream Total Length	

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.



Percent of AA with Buffer: %

Table 7: Rating for Percent of AA with Buffer.

Rating	Alternative States (not including open-water areas)
A	Buffer is 75 - 100% of AA perimeter.
B	Buffer is 50 – 74% of AA perimeter.
C	Buffer is 25 – 49% of AA perimeter.
D	Buffer is 0 – 24% of AA perimeter.

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	26 m
B	25 m
C	22 m
D	20 m
E	105 m
F	110 m
G	128 m
H	55 m
Average Buffer Width *Round to the nearest integer*	65.1

Table 9: Rating for average buffer width.

Rating	Alternative States
A	Average buffer width is 190 – 250 m.
B	Average buffer width 130 – 189 m.
C	Average buffer width is 65 – 129 m.
D	Average buffer width is 0 – 64 m.

Table 10: Rating for Buffer Condition.

**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following ratings.*

Rating	Alternative States
A	Buffer for AA is dominated by native vegetation, has undisturbed soils, and is apparently subject to little or no human visitation.
B	Buffer for AA is characterized by an intermediate mix of native and non-native vegetation (25% to 75% non-native), but mostly undisturbed soils and is apparently subject to little or low impact human visitation.
	OR
	Buffer for AA is dominated by native vegetation, but shows some soil disturbance and is apparently subject to little or low impact human visitation.
C	Buffer for AA is characterized by substantial (>75%) amounts of non-native vegetation AND there is at least a moderate degree of soil disturbance/compaction, and/or there is evidence of at least moderate intensity of human visitation.
D	Buffer for AA is characterized by barren ground and/or highly compacted or otherwise disturbed soils, and/or there is evidence of very intense human visitation, or there is no buffer present.

Table 11: Rating for Water Source.

Rating	Alternative States
A	Freshwater sources that affect the dry season condition of the AA, such as its flow characteristics, hydroperiod, or salinity regime, are precipitation, snow melt, groundwater, and/or natural runoff, or natural flow from an adjacent freshwater body, or the AA naturally lacks water in the dry season. There is **no indication** that dry season conditions are substantially controlled by artificial water sources.
B	Freshwater sources that affect the dry season condition of the AA are mostly natural, but also obviously include occasional or small effects of modified hydrology. Indications of such anthropogenic inputs include developed land or irrigated agricultural land that comprises **less than 20%** of the immediate drainage basin within about 2 km upstream of the AA, or that is characterized by the presence of a few small stormdrains or scattered homes with septic systems. No large point sources or dams control the overall hydrology of the AA.
C	Freshwater sources that affect the dry season conditions of the AA are primarily urban runoff, direct irrigation, pumped water, artificially impounded water, water remaining after diversions, regulated releases of water through a dam, or other artificial hydrology. Indications of substantial artificial hydrology include developed or irrigated agricultural land that comprises **more than 20%** of the immediate drainage basin within about 2 km upstream of the AA, or the presence of major point source discharges that obviously control the hydrology of the AA. OR Freshwater sources that affect the dry season conditions of the AA are **substantially controlled** by known diversions of water or other withdrawals directly from the AA, its encompassing wetland, or from its drainage basin.
D	Natural, freshwater sources that affect the dry season conditions of the AA have **been eliminated** based on the following indicators: impoundment of all possible wet season inflows, diversion of all dry-season inflow, predominance of xeric vegetation, etc.

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☒ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☒ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☐ There is leaf litter, thatch, or wrack in most pools (if pools are present). ☐ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☒ There is little or no active undercutting or burial of riparian vegetation. ☐ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation. ☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar). ☐ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA ☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☐ There are abundant bank slides or slumps. ☐ The lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☒ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year. ☐ There are partially buried living tree trunks or shrubs along the banks. ☐ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☐ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	☐ **Equilibrium** ☒ **Degradation** ☐ **Aggradation**

Table 12: Rating for Riverine Channel Stability.

Rating	Alternative State (based on the field indicators listed in the worksheet above)
A	Most of the channel through the AA is characterized by equilibrium conditions, with little evidence of aggradation or degradation. Based on the indicators of condition, typical sediment transport processes are occurring.
B	Most of the channel through the AA is characterized by some aggradation or degradation, none of which is severe. The channel may be approaching or moving away from equilibrium. Based on the indicators of condition, typical sediment transport processes are occurring, however the reach is trending toward excess transport or deposition due to moderate disequilibrium conditions.
C	There is evidence of severe aggradation or degradation of most of the channel through the AA or the channel bed is artificially hardened through less than half of the AA. Based on the indicators of condition, typical sediment transport processes are severely altered.
D	The channel bed is concrete or otherwise artificially hardened through most of AA.

Riverine Wetland Entrenchment Ratio Calculation Worksheet

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends: An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections - ▶	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	17'	26'	22'
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	3'	2.5'	3'
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	6'	5.0'	6'
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	82'	87	98
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	4.8	3.3	4.5
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections: Enter the average result here and use it in Table 13a or 13b.			4.2

Table 13a: Rating of Hydrologic Connectivity for Non-confined Riverine wetlands.

Rating	Alternative States (based on the entrenchment ratio calculation worksheet above)
A	Entrenchment ratio is > 2.2.
B	Entrenchment ratio is 1.9 to 2.2.
C	Entrenchment ratio is 1.5 to 1.8.
D	Entrenchment ratio is <1.5.

Table 13b: Rating of Hydrologic Connectivity for Confined Riverine wetlands.

Rating	Alternative States (based on the entrenchment ratio calculation worksheet above)
A	Entrenchment ratio is > 1.8.
B	Entrenchment ratio is 1.6 to 1.8.
C	Entrenchment ratio is 1.2 to 1.5.
D	Entrenchment ratio is < 1.2.

Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

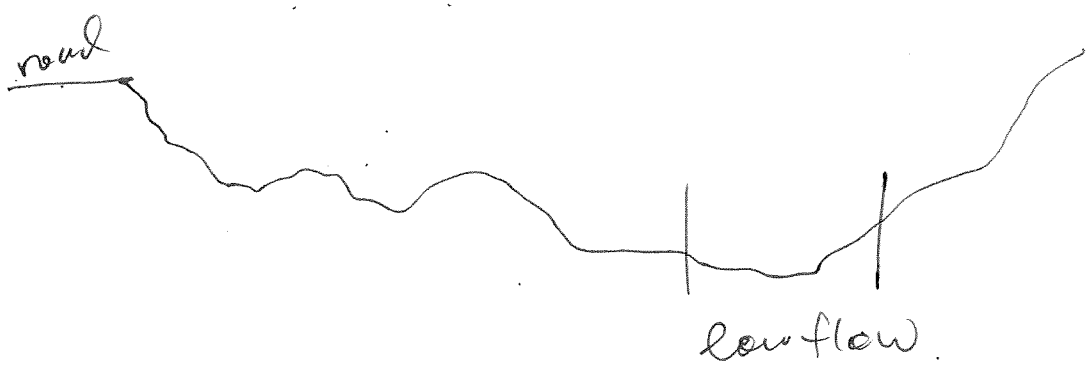
STRUCTURAL PATCH TYPE (circle for presence)	Riverine (Non-confined)	Riverine (Confined)
Minimum Patch Size	**3 m^2**	**3 m^2**
Abundant wrackline or organic debris in channel, on floodplain	1	(1)
Bank slumps or undercut banks in channels or along shoreline	1	1
Cobbles and/or Boulders	1	(1)
Debris jams	1	1
Filamentous macroalgae or algal mats	1	(1)
Large woody debris	1	(1)
Pannes or pools on floodplain	1	N/A
Plant hummocks and/or sediment mounds	1	1
Point bars and in-channel bars	1	(1)
Pools or depressions in channels (wet or dry channels)	1	(1)
Riffles or rapids (wet or dry channels)	1	(1)
Secondary channels on floodplains or along shorelines	1	N/A
Standing snags (at least 3 m tall)	1	1
Submerged vegetation	1	N/A
Swales on floodplain or along shoreline	1	N/A
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	1	(1)
Vegetated islands (mostly above high-water)	1	N/A
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)		8

Rating	Confined Riverine	Non-confined Riverine
(A)	(≥ 8)	≥ 12
B	6 – 7	9 – 11
C	4 – 5	6 – 8
D	≤ 3	≤ 5

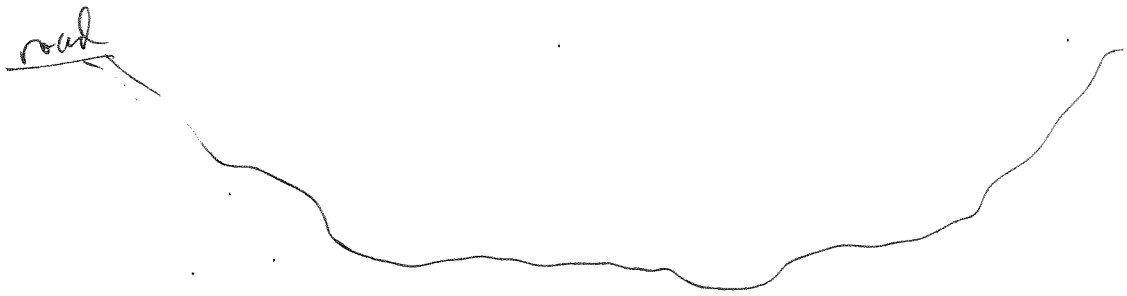
Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

Profile 1



Profile 2



Profile 3

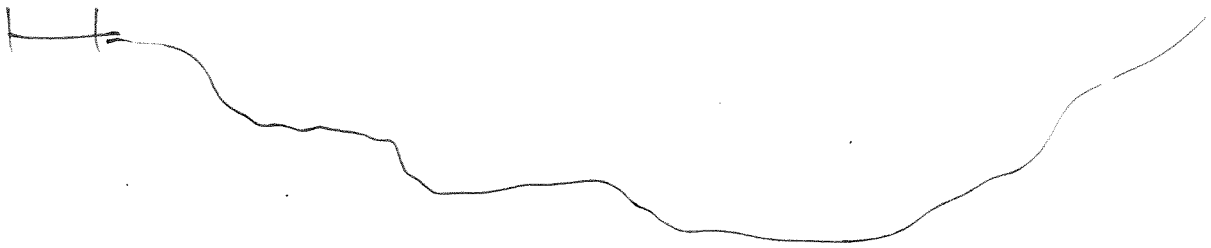


Table 16: Rating of Topographic Complexity for Riverine Wetlands.

Rating	Alternative States (based on worksheet and diagrams in Figure 10 above)
A	AA as viewed along a typical cross-section has at least two benches at different elevations (not including the channel bottom or high riparian terraces not influenced by fluvial processes). Features below the bankfull elevation are part of the active channel and cannot be considered benches. Additionally, each of these benches, plus the slopes between the benches, contain physical patch types or micro-topographic features such as boulders or cobbles, partially buried woody debris, undercut banks, secondary channels and debris jams that contribute to abundant micro-topographic relief as illustrated in profile A.
B	AA has at least two benches above bankfull elevation, but these benches mostly lack abundant micro-topographic complexity. The AA resembles profile B1.
	OR
	AA has one bench above bankfull elevation, and this bench has abundant micro-topographic complexity as described in the A condition above. The AA resembles profile B2.
C	AA has a single bench that lacks abundant micro-topographic complexity, as illustrated in profile C.
D	AA as viewed along a typical cross-section lacks any obvious bench. The cross-section is best characterized as a single, uniform slope with or without micro-topographic complexity, as illustrated in profile D (includes concrete channels).

Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands
(A dominant species represents ≥10% *relative* cover)

Special Note:

* *Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

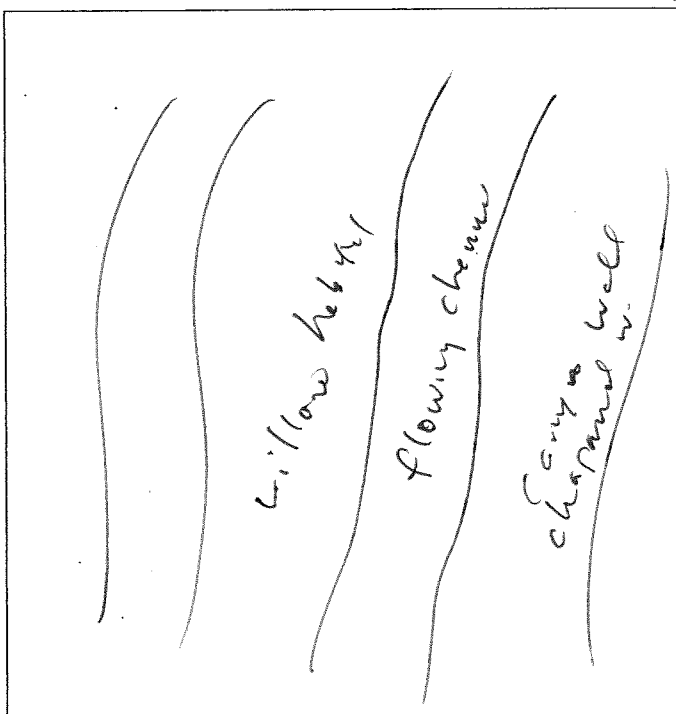
Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		Stipa miliacea	
		Nasturtium officinale	
		Veronica anagallis-aqua.	
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
Agrostis adenophora	X	Typha latifolia	
Typha latifolia			
Stipa miliacea			
Urtica dioica			
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	9
Salix lasiolepis			
Salix laevigata			
Alnus rhombifolia		**Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)**	1/9 = 11%

Table 18: Ratings for submetrics of Plant Community Metric.

Rating	Number of Plant Layers Present	Number of Co-dominant Species	Percent Invasion
Non-confined Riverine Wetlands			
A	4 – 5	≥ 12	0 – 15%
B	3	9 – 11	16 – 30%
C	2	6 – 8	31 – 45%
D	0-1	0 – 5	46 – 100%
Confined Riverine Wetlands			
A	4	≥ 11	0 – 15%
B	3	8 – 10	16 – 30%
C	2	5 – 7	31 – 45%
D	0-1	0 – 4	46 – 100%

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.



Assigned zones:

1)

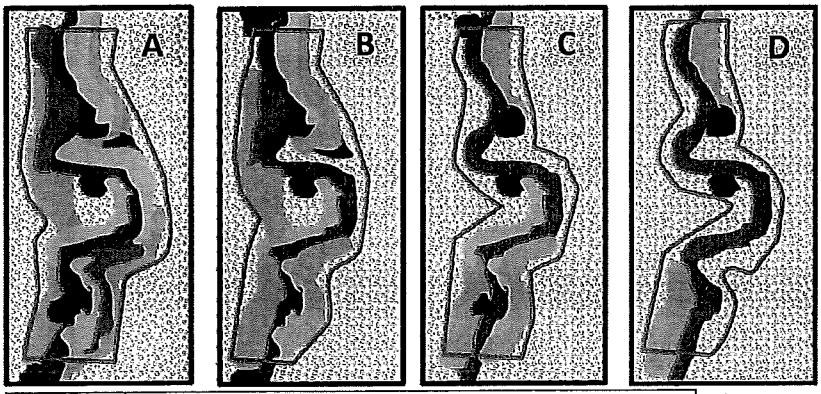
2)

3)

4)

5)

6)



Rating	Alternative States (based on Worksheet drawings and Figure 10)
A	AA has a high degree of plan-view interspersion.
B	AA has a moderate degree of plan-view interspersion.
C	AA has a low degree of plan-view interspersion.
D	AA has minimal plan-view interspersion.

Metric 3: Vertical Biotic Structure

Definition The vertical component of biotic structure assesses the degree of overlap among plant layers. The same plant layers used to assess the Plant Community Composition Metrics are used to assess Vertical Biotic Structure. To be counted in CRAM, a layer must cover at least 5% of the portion of the AA that is suitable for the layer.

Special Notes:

**The "A" condition can be obtained only when >50% of the vegetated area of the AA has three layers that overlap abundantly.*

**It is important to accurately estimate the extent of overlap, particularly when the AA contains only two layers. The aerial imagery can help in determining the extent of overlap between layers.*

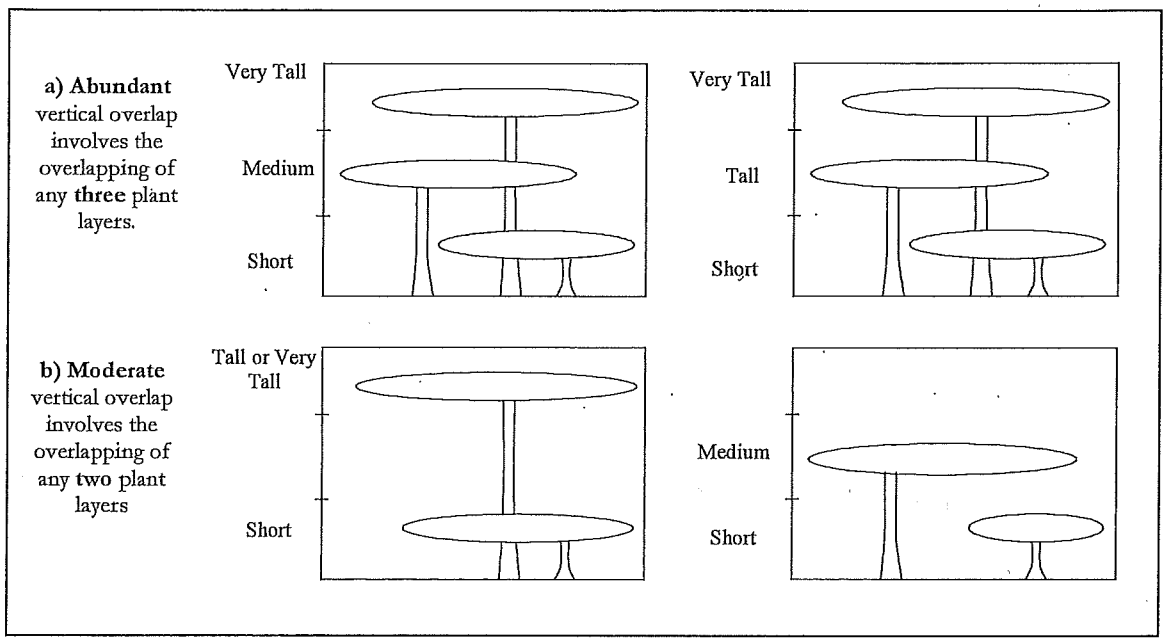


Figure 13: Schematic diagrams potential examples of (a) **abundant** and (b) **moderate** vertical overlap of plant layers for Riverine AAs. *Additional combinations of layer overlap exist for both.*

Table 20: Rating of Vertical Biotic Structure for Riverine AAs

Rating	Alternative States
A	More than 50% of the vegetated area of the AA supports **abundant** overlap of 3 plant layers (see Figure 13a).
B	More than 50% of the area supports at least **moderate** overlap of 2 plant layers (see Figure 13b).
C	25–50% of the vegetated AA supports at least **moderate** overlap of 2 plant layers.
D	Less than 25% of the vegetated AA supports **moderate** overlap of 2 plant layers, **or** AA is sparsely vegetated overall.

AA 4a is dominated by 2-layer overlap, but very little 3-layer overlap observed

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	Yes	No		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		
Flow diversions or unnatural inflows	✓	
Dams (reservoirs, detention basins, recharge basins)	✓	
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
Comments		
hydrology managed by water discharged through dam		

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management	✓	
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		
Comments		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources		
Lack of treatment of invasive plants adjacent to AA or buffer		
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)	✓	
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		
Site is surrounded by natural open space		

ATTACHMENT F

LITERATURE REVIEW DETAILS

This attachment provides detailed results of the literature review.

SOIL SERIES

The soil classifications identified below was obtained from the U.S. Department of Agriculture, Natural Resources Conservation Service[15]. The Official Soil Series Descriptions were obtained from the Soil Survey Staff, Natural Resources Conservation Service, and United States Department of Agriculture.

Stukel Series

The Stukel series consists of shallow, well drained soils that formed in slope alluvium derived from pumiceous tuff. These soils are on shoulders of hills and adjacent to rock outcrops. Slopes are 60 to 100 percent. The mean annual precipitation is approximately 27 to 39 inches and the mean annual temperature is approximately 55 to 64 degrees Fahrenheit (°F).

Range in Characteristics:

The soil is shallow to consolidated sediments. Depth is 8 to 18 inches to lithic bedrock.

The A horizon has dry color of 10YR 4/3, 5/2, or 5/3. Moist color is 10YR 3/2 or 3/3. Reaction is slightly acid or neutral. The particle size control section is 10 to 18 percent clay.

Drainage and Permeability:

Stukel soils are classified as somewhat excessively drained.

Trigo Series

The Trigo series is a loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthent. It consists of shallow, well drained soils formed in consolidated alluvium from mixed sources on dissected terraces. Slopes are 2 to 60 percent. The mean annual precipitation is approximately 10 inches and the mean annual temperature is approximately 61 degrees °F.

Range in Characteristics:

The soil is shallow to consolidated sediments. Depth is 6 to 20 inches. The mean annual soil temperature is 59 to 65 °F. The soil is moist for about 100 days when the soil temperature is above 41 °F.

The A horizon is 2.5Y or 10YR 5/2, 5/3, 6/2, 6/3 or 7/2 dry, and 2.5Y or 10YR 3/3, 4/2, 4/3, 4/4 or 5/2 dry. Reaction is slightly acid or neutral. The particle size control section is 8 to 18 percent clay.

The C horizon is 2.5Y or 10YR 5/3, 6/2, 6/3, 6/4 or 7/2. Moist color is 2.5Y or 10YR 4/2, 4/3. 5/2, 5/4 or 6/4. Reaction is slightly acid to slightly alkaline. Some areas have a few lime seams and are slightly effervescent in the lower part.

Drainage and Permeability:

Trigo soils are well drained, have medium to rapid runoff, and have moderately rapid permeability.

[15] U.S. Department of Agriculture, Natural Resources Conservation Service (USDA NRCS). 2011 (February). Official Soil Series Descriptions (Tujunga). Fort Worth, TX: USDA, NRCS. http://soils.usda.gov/technical/classification/osd/index.html.

Typic Xerorthents

The Typic subgroup of Xerorthents consists of soils that are moderately deep or deep to hard rock, do not have ground water within a depth of 150 cm, and are not partially cemented by silica. These soils have a base saturation of 60 percent or more in some part at a depth of between 25 and 75 cm below the soil surface. Soils that have a shallow lithic contact are excluded from the Typic subgroup, a convention used throughout this taxonomy. Soils that are partially cemented by silica are excluded because such soils are thought to represent intergrades to Durixerepts. Commonly, Typic Xerorthents are in a sandy-skeletal family or have a thin ochric epipedon that rests on a densic or paralithic contact with weakly cemented rock or dense sediments. Some of these soils have been cultivated for a long time or have been reshaped for irrigation and consist of what was the C horizon of other soils, chiefly Xeralfs and Xerolls. Typic Xerorthents are used mostly as forest or grazing land. A few of these soils are used as cropland, and a few are idle.

NATIONAL WETLANDS INVENTORY

The following resources are mapped in the survey area and are shown on Exhibit 6.

The description for codes L1UBK and L2USK is as follows:

- ***L: System LACUSTRINE*****.** The Lacustrine System includes wetlands and deepwater habitats with all of the following characteristics : (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergent vegetation, emergent mosses, or lichens with greater than 30 percent areal coverage ; and (3) total area exceeds 20 acres.
    - ***1: Subsystem LIMNETIC.*** This subsystem includes all deepwater habitats (i.e., deeper than two meters) within the Lacustrine system.
        - ***UB: Class UNCONSOLIDATED BOTTOM.*** This class is characterized by wetland and deepwater habitats with at least 25 percent cover of particles smaller than stones, and a vegetative cover less than 30 percent. Water regimes are restricted to subtidal, permanently flooded, intermittently exposed, and semi-permanently flooded.
            - ***K: Water Regime Modifier ARTIFICIALLY FLOODED*****.** This modifier refers to inundated areas in which the amount and duration of flooding is controlled by means of pumps or siphons in combination with dikes or dams. Neither wetlands resulting from leakage from man-made impoundments, nor irrigated pasture lands supplied by diversion ditches or artesian wells, are included under this modifier.
    - ***2: Subsystem LITTORAL.*** This subsystem includes all wetland habitats in the Lacustrine System. The boundary of this subsystem extends from the shoreward boundary of the system to a depth of two meters below low water or to the maximum extent of non-persistent emergent vegetation, if growing at depths greater than two meters.
        - ***US: Class UNCONSOLIDATED SHORE*****.** Includes all wetland habitats having two characteristics: (1) unconsolidated substrates with less than 75 percent areal cover of stones, boulders or bedrock and; (2) less than 30 percent areal cover of vegetation. Landforms such as beaches, bars, and flats are included in the Unconsolidated Shore class.
            - ***K: Water Regime Modifier ARTIFICIALLY FLOODED*****.** This modifier refers to inundated areas in which the amount and duration of flooding is controlled by means of pumps or siphons in combination with dikes or dams. Neither wetlands resulting from leakage from man-made impoundments, nor irrigated pasture lands supplied by diversion ditches or artesian wells, are included under this modifier.

The description for codes R3USC, R4SBC, and R5UBF is as follows:

- ***R: System RIVERINE*****.** The Riverine System includes all wetlands and deep water habitats contained in natural or artificial channels periodically or continuously containing flowing water or which forms a connecting link between the two bodies of standing water. Upland islands or Palustrine wetlands may occur in the channel, but they are not part of the Riverine System.
    - ***3: Subsystem UPPER PERENNIAL.*** This subsystem is characterized by channels in which the gradient is high (compared to the Lower Perennial Subsystem), velocity of the water is fast, and very little floodplain development exists. There is no tidal influence and some water flows throughout the year. The substrate consists of rock, cobbles, or gravel with occasional patches of sand. The natural dissolved oxygen concentration is normally near saturation.

- ***US: Class UNCONSOLIDATED SHORE.*** Includes all wetland habitats having two characteristics: (1) unconsolidated substrates with less than 75 percent areal cover of stones, boulders or bedrock and; (2) less than 30 percent areal cover of vegetation. Landforms such as beaches, bars, and flats are included in the Unconsolidated Shore class.
  - ***C: Water Regime Modifier SEASONALLY FLOODED.*** Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface.

- ***4: Subsystem INTERMITTENT.*** This Subsystem includes channels that contain flowing water only part of the year, but may contain isolated pools when the flow stops.
  - ***SB: Class STREAMBED.*** Includes all wetlands contained within the Intermittent Subsystem of the Riverine System and all channels of the Estuarine System or of the Tidal Subsystem of the Riverine System that are completely dewatered at low tide.
    - ***C: Water Regime Modifier SEASONALLY FLOODED.*** Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface.

- ***5: Subsystem UNKNOWN PERENNIAL.*** This Subsystem designation was created specifically for use when the distinction between lower perennial, upper perennial, and tidal cannot be made from aerial photography and no data is available.
  - ***UB: Class UNCONSOLIDATED BOTTOM.*** Includes all wetlands and deepwater habitats with at least 25 percent cover of particles smaller than stones (less than 6-7 cm), and a vegetative cover less than 30 percent.
    - ***F: Water Regime Modifier SEMIPERMANENTLY FLOODED.*** Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land's surface.

The description for codes PEM1C, PFOA, and PFOC is as follows:

- ***P: System PALUSTRINE.*** The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 part per trillion (ppt). Wetlands lacking (such vegetation) are also included if they exhibit all of the following characteristics: (1) are less than 8 hectares (20 acres); (2) do not have an active wave-formed or bedrock shoreline feature; (3) have at low water a depth of less than 6.6 feet in the deepest part of the basin; and (4) have salinity due to ocean-derived salts of less than 0.5 ppt.
  - ***EM: Class EMERGENT.*** This Class is characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. The vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.
    - ***1: Subclass PERSISTENT.*** Dominated by species that normally remain standing at least until the beginning of the next growing season. This subclass is found only in the Estuarine and Palustrine systems.
      - ***C: Water Regime Modifier SEASONALLY FLOODED.*** Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is

variable, extending from saturated to the surface to a water table well below the ground surface.

- ***FO: Class FORESTED.*** Characterized by woody vegetation that is 6 m tall or taller.
  - ***A: Water Regime Modifier TEMPORARY FLOODED.*** Surface water is present for brief periods during growing season, but the water table usually lies well below the soil surface for most of the growing season. Plants that grow both in uplands and wetlands may be characteristic of this water regime.
  - ***C: Water Regime Modifier SEASONALLY FLOODED.*** Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface.

BASIN PLAN BENEFICIAL USES

The *Water Quality Control Plan: Los Angeles Region* (Basin Plan) identifies a number of beneficial uses, some or all of which may apply to a specific HSA, including Municipal and Domestic Water Supply (MUN) waters; Agricultural Supply (AGR) waters; Industrial Service Supply waters (IND); Industrial Process Supply (PROC) waters; Groundwater Recharge (GWR) waters; Navigation (NAV) waters; Hydropower Generation (POW) waters; Commercial and Sport Fishing (COMM) waters; Aquaculture (AQUA); Warm Fresh Water Habitat (WARM) waters; Cold Fresh Water Habitat (COLD) waters; Inland Saline Water Habitat (SAL); Preservation of Biological Habitats of Special Significance (BIOL) waters; Wildlife Habitat (WILD) waters; Rare, Threatened or Endangered Species (RARE) waters; Migration of Aquatic Organisms (MIGR); Spawning, Reproduction, or Early Development of Aquatic Organisms (SPWN); Marine Habitat (MAR) waters; Shellfish Harvesting (SHELL) waters; Estuarine Habitat (EST) waters; Potential Presence of Wetlands (WET); Water Contact Reservation (REC-1); and Non-contact Water Recreation (REC-2) (Los Angeles RWQCB 1994).

Based on the project site's hydrologic and biological resources, existing beneficial uses for Big Tujunga Reservoir that are listed in the Basin Plan include Groundwater Recharge (GWR); Warm Fresh Water Habitat (WARM); Cold Fresh Water Habitat (COLD); Wildlife Habitat (WILD); Rare, Threatened or Endangered Species (RARE) waters; Spawning, Reproduction, or Early Development of Aquatic Organisms (SPWN); Potential Presence of Wetlands (WET); Water Contact Reservation (REC-1); and Non-contact Water Recreation (REC-2). One potential beneficial use is related to the project area: Municipal and Domestic Water Supply (MUN). Possible effects to these existing and potential beneficial uses would need to be addressed as part of the request for a CWA Section 401 Water Quality Certification for this project.

GWR waters are used for natural or artificial recharge of groundwater for purposes that may include, but are not limited to, future extraction, maintaining water quality, or halting saltwater intrusion into freshwater aquifers. Perennial surface flows within Big Tujunga Canyon Creek flow into Big Tujunga Reservoir and infiltrate into the aquifer which is used for domestic potable water use. Flows that are released from Big Tujunga Reservoir flow through Big Tujunga Wash, ultimately reaching the Hansen Flood Control Basin for additional groundwater recharge.

WARM waters support warm water ecosystems that may include, but are not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife (including invertebrates). Big Tujunga Canyon Creek is a perennial stream that contains southern willow woodland and associated riparian resources that is utilized by wildlife. The proposed project activities will be implemented in a manner that will preserve these existing aquatic habitats, vegetation, fish, and wildlife resources consistent with this policy.

COLD waters support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates. The proposed project activities will be implemented in a manner that will preserve these existing cold water ecosystem resources containing aquatic habitats, vegetation, fish, and wildlife resources consistent with this policy.

WILD waters support wildlife habitats that may include, but are not limited to, the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife. As previously noted, Big Tujunga Canyon Creek provides wildlife habitat for waterfowl and other wildlife consistent with this policy.

RARE waters support habitats necessary, at least partially, for the survival and successful maintenance of plant or animal species established under State or federal law as Rare, Threatened, or Endangered. Surveys for special status species conducted in 2016 identified the

following State or federal Threatened or Endangered species: (1) arroyo toad (*Anaxyrus californicus*) was observed at the upstream end of Big Tujunga Reservoir (Psomas 2017b); (2) least Bell's vireo (*Vireo bellii pusillus*) was also incidentally observed during arroyo toad surveys near the upstream end of Big Tujunga Reservoir (Psomas 2017b); and (3) Santa Ana sucker (*Catostomus santaanae*) was observed downstream of Big Tujunga Dam (Psomas 2017c). Proposed project activities will be implemented in a manner that will protect these existing State and federally listed species consistent with this policy. Other species for which potentially suitable habitat exists in the project vicinity but were not encountered during focused surveys include: (1) southwestern willow flycatcher (*Empidonax traillii extimus*) (BonTerra Psomas 2016a) and (2) Sierra Madre yellow-legged frog (*Rana muscosa*) (BonTerra Psomas 2016b).

SPWN waters support high quality aquatic habitats that are suitable for reproduction and early development of fish. The proposed project activities will be implemented in a manner that will preserve these existing aquatic habitats, vegetation, fish, and wildlife resources consistent with this policy.

WET waters support wetland ecosystems including, but not limited to, preservation or enhancement of wetland habitats, vegetation, fish, or wildlife, and other unique wetland functions which enhance water quality. Wetland vegetation and hydrology occur throughout the project site along Upper Big Tujunga Creek and Big Tujunga Wash, however, no wetland soils were encountered. No wetland areas occur in the Maple Canyon area. Impacts to wetland vegetation and hydrology will be temporary for sediment removal activities.

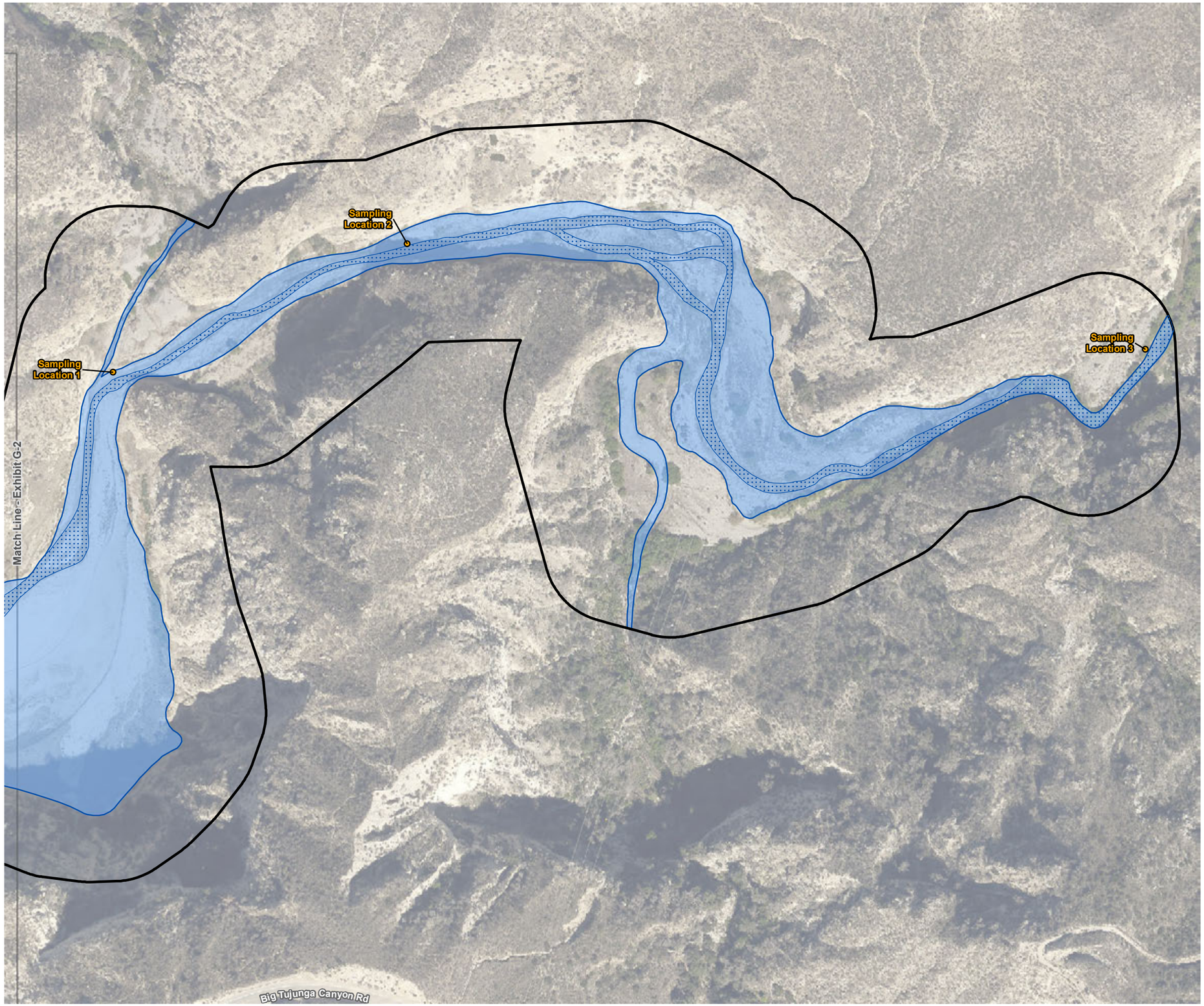
REC-1 waters support recreational activities involving body contact with water, such as swimming, wading, and fishing. Since public access is restricted from the project area, proposed project activities will not affect this beneficial use.

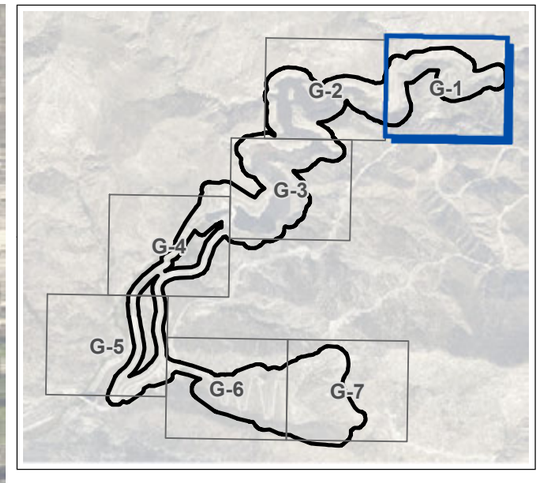
REC-2 waters support recreational activities involving proximity to water, but not normally involving body contact with water, such as picnicking, hiking, camping, and boating. Since public access is restricted from the project area, proposed project activities will not affect this beneficial use.

MUN waters support community, military, or individual water supply systems including, but not limited to, drinking water supply. Big Tujunga Dam and Reservoir are part of water supply systems owned and operated that are the Los Angeles County Department of Public Works; both are consistent with the policy.

ATTACHMENT G

MAP OF USACE JURISDICTIONAL WATERS





Sampling Location

Survey Area

Open Water

USACE/RWQCB Jurisdictional Waters

RWQCB Isolated "waters of the State"

NOTE: The USACE issued new regulatory text defining waters of the U.S. in 2020. One of the major changes to the definition is that ephemeral waters are no longer subject to USACE regulation under the Clean Water Act. As such, waters of the U.S. in Maple Canyon SPS would no longer be under the jurisdiction of USACE.

N
W E
S

200 100 0 200
Feet

Aerial Source: LAR-IAC 2014

USACE/RWQCB Jurisdictional Waters Exhibit G-1

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

(Rev: 12/22/2020 MMD) R:\Projects\DPW\3DPW029305\Graphics\JD\

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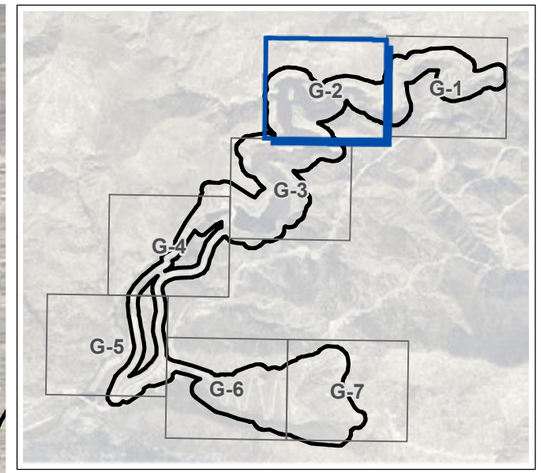

- Sampling Location
- Survey Area
- Open Water
- USACE/RWQCB Jurisdictional Waters
- RWQCB Isolated "waters of the State"

NOTE: The USACE issued new regulatory text defining waters of the U.S. in 2020. One of the major changes to the definition is that ephemeral waters are no longer subject to USACE regulation under the Clean Water Act. As such, waters of the U.S. in Maple Canyon SPS would no longer be under the jurisdiction of USACE.

N
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200 100 0 200
Feet

Aerial Source: LAR-IAC 2014

USACE/RWQCB Jurisdictional Waters Exhibit G-2

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

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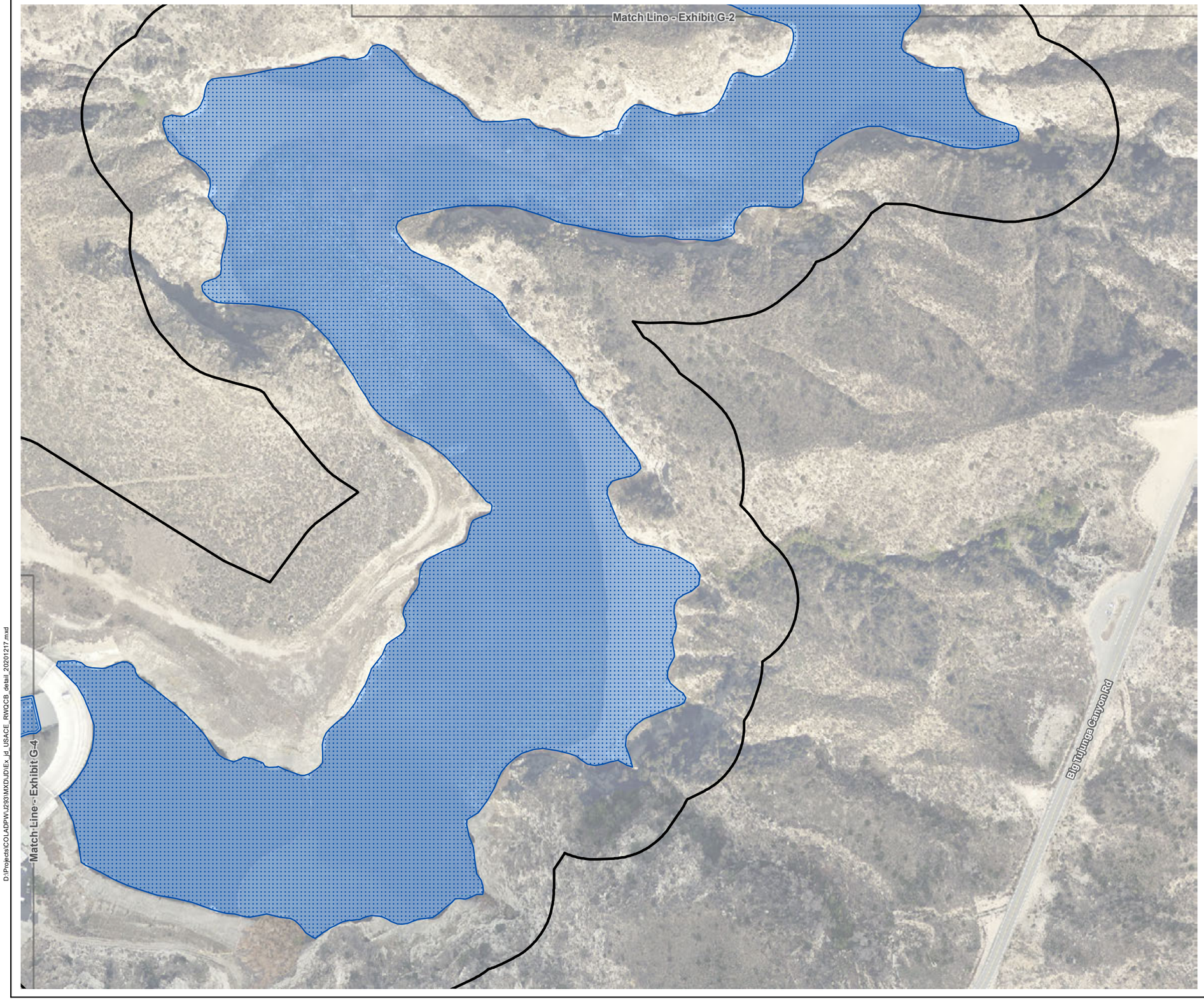

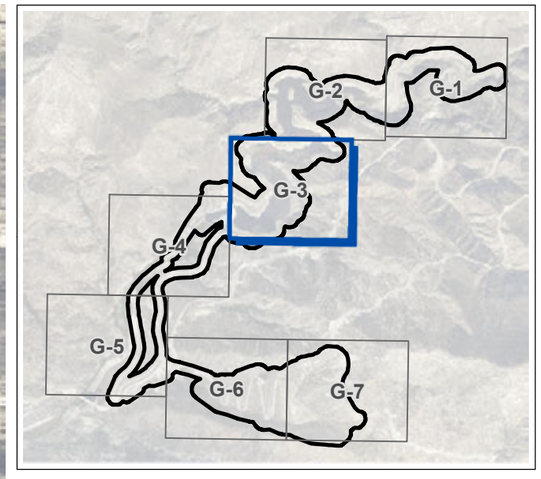

- Sampling Location
- Survey Area
- Open Water
- USACE/RWQCB Jurisdictional Waters
- RWQCB Isolated "waters of the State"

NOTE: The USACE issued new regulatory text defining waters of the U.S. in 2020. One of the major changes to the definition is that ephemeral waters are no longer subject to USACE regulation under the Clean Water Act. As such, waters of the U.S. in Maple Canyon SPS would no longer be under the jurisdiction of USACE.

N
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200 100 0 200
Feet

Aerial Source: LAR-IAC 2014

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USACE/RWQCB Jurisdictional Waters Exhibit G-3

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

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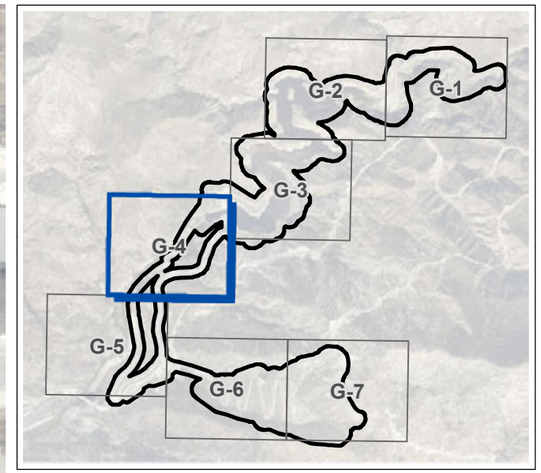

- Sampling Location
- Survey Area
- Open Water
- USACE/RWQCB Jurisdictional Waters
- RWQCB Isolated "waters of the State"

NOTE: The USACE issued new regulatory text defining waters of the U.S. in 2020. One of the major changes to the definition is that ephemeral waters are no longer subject to USACE regulation under the Clean Water Act. As such, waters of the U.S. in Maple Canyon SPS would no longer be under the jurisdiction of USACE.

N
W E
S

200 100 0 200
Feet

Aerial Source: LAR-IAC 2014

USACE/RWQCB Jurisdictional Waters Exhibit G-4

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

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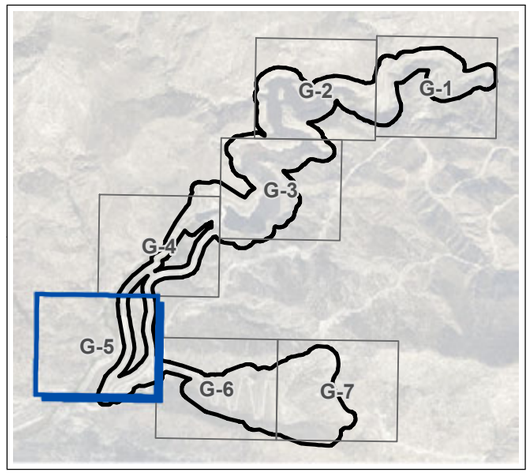

- Sampling Location
- Survey Area
- Open Water
- USACE/RWQCB Jurisdictional Waters
- RWQCB Isolated "waters of the State"

NOTE: The USACE issued new regulatory text defining waters of the U.S. in 2020. One of the major changes to the definition is that ephemeral waters are no longer subject to USACE regulation under the Clean Water Act. As such, waters of the U.S. in Maple Canyon SPS would no longer be under the jurisdiction of USACE.

N
W E
S

200 100 0 200
Feet

Aerial Source: LAR-IAC 2014

USACE/RWQCB Jurisdictional Waters Exhibit G-5

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

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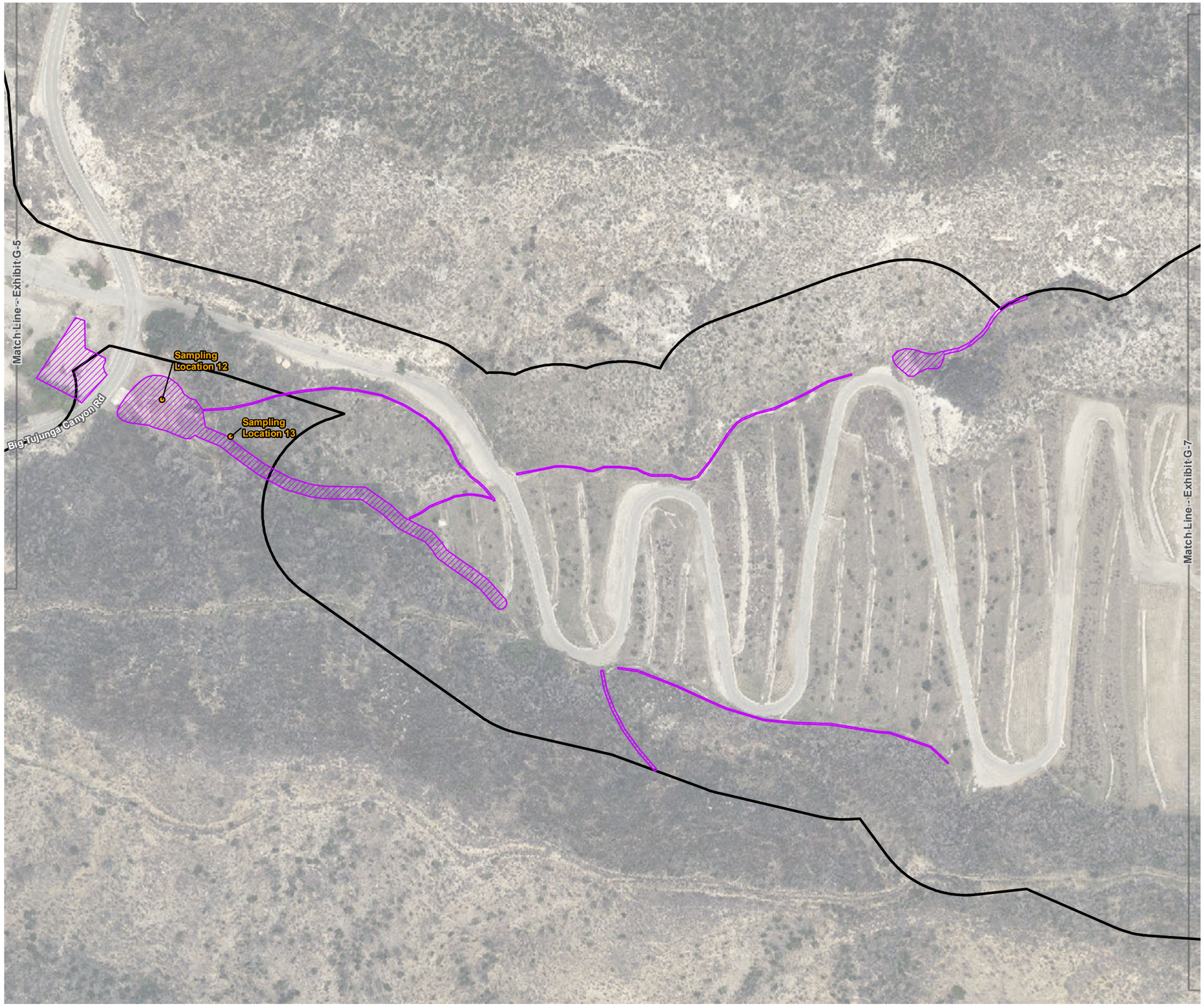

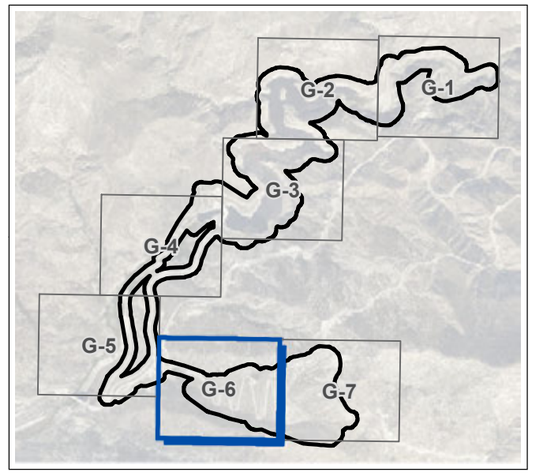

- Sampling Location
- Survey Area
- Open Water
- USACE/RWQCB Jurisdictional Waters
- RWQCB Isolated "waters of the State"

NOTE: The USACE issued new regulatory text defining waters of the U.S. in 2020. One of the major changes to the definition is that ephemeral waters are no longer subject to USACE regulation under the Clean Water Act. As such, waters of the U.S. in Maple Canyon SPS would no longer be under the jurisdiction of USACE.

N
W E
S

200 100 0 200
Feet

Aerial Source: LAR-IAC 2014

USACE/RWQCB Jurisdictional Waters Exhibit G-6

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

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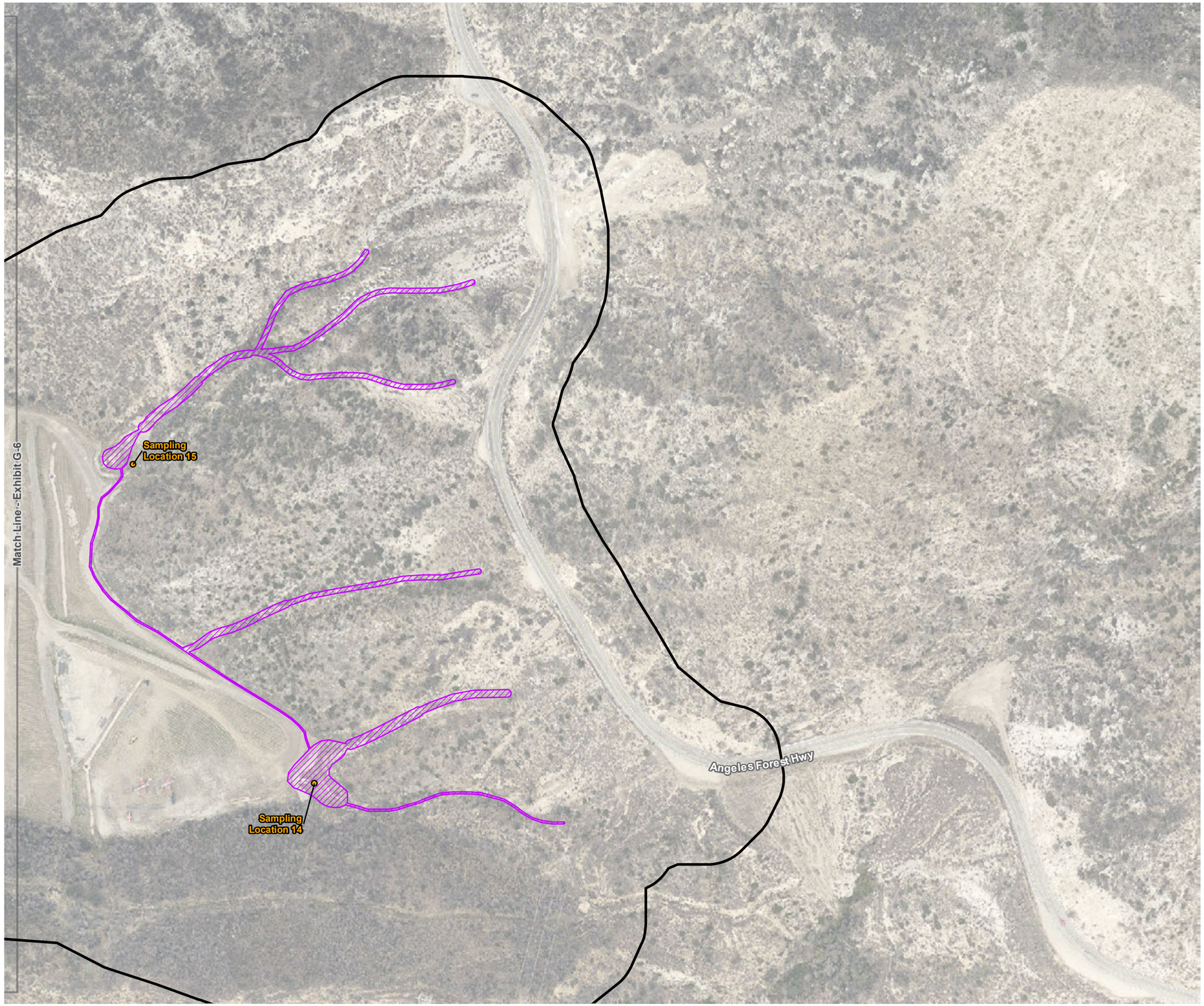

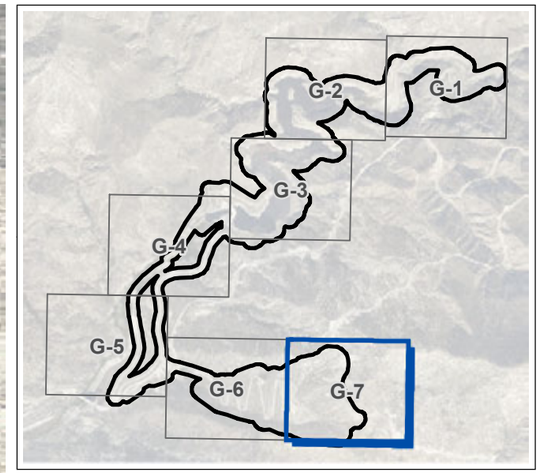

Sampling Location

Survey Area

Open Water

USACE/RWQCB Jurisdictional Waters

RWQCB Isolated "waters of the State"

NOTE: The USACE issued new regulatory text defining waters of the U.S. in 2020. One of the major changes to the definition is that ephemeral waters are no longer subject to USACE regulation under the Clean Water Act. As such, waters of the U.S. in Maple Canyon SPS would no longer be under the jurisdiction of USACE.

N
W E
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200 100 0 200
Feet

Aerial Source: LAR-IAC 2014

USACE/RWQCB Jurisdictional Waters Exhibit G-7

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

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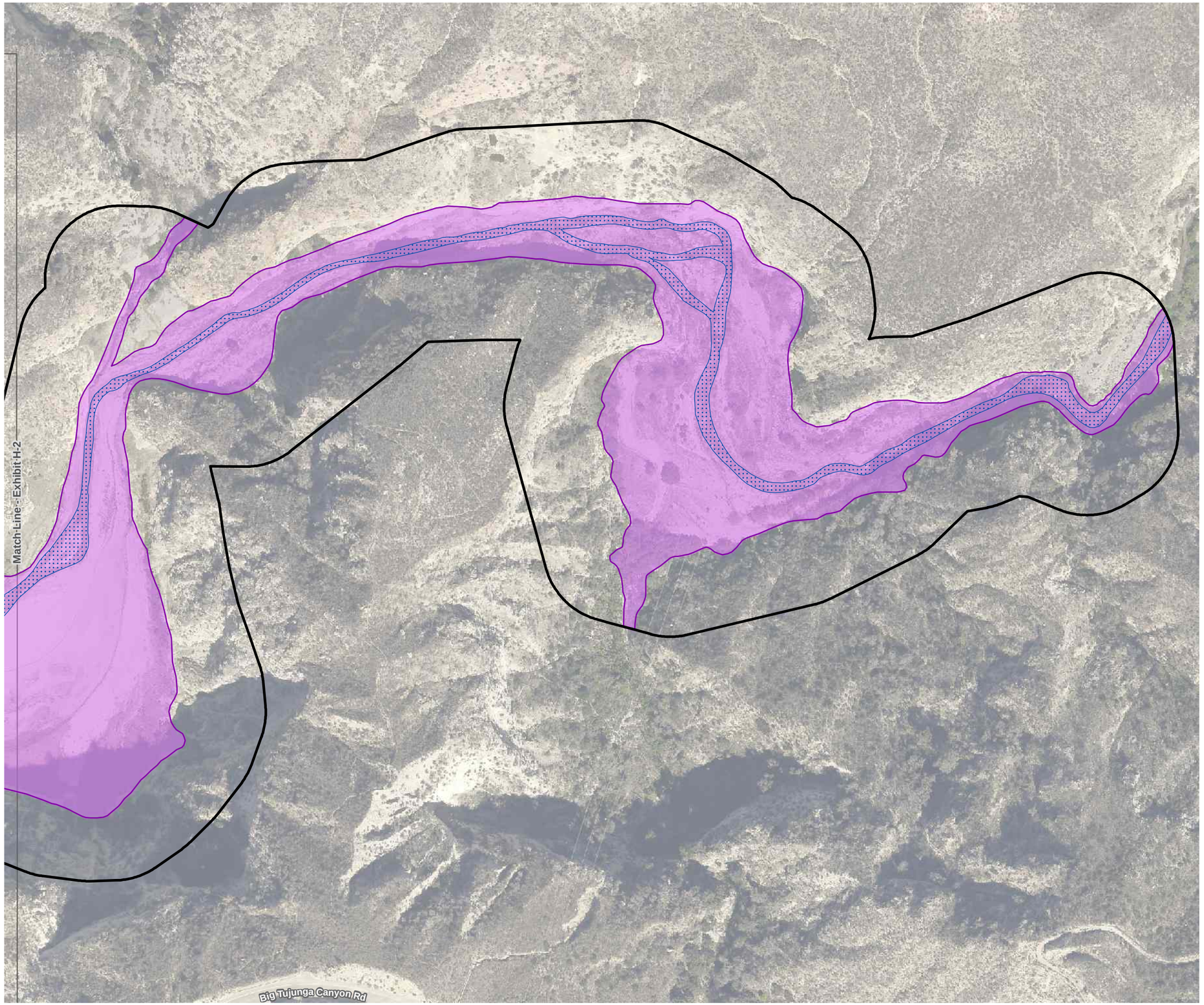
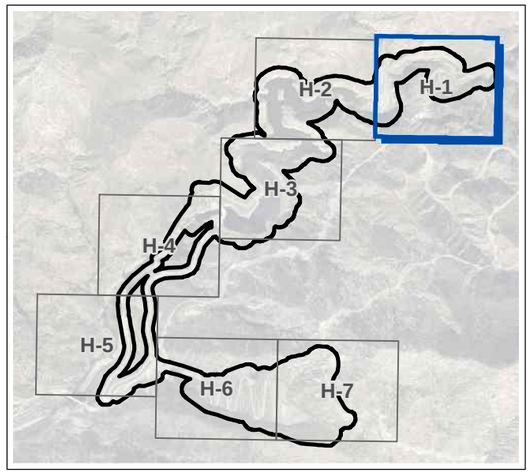
ATTACHMENT H

MAP OF CDFW JURISDICTIONAL WATERS





Survey Area
Open Water
CDFW Jurisdictional Waters

N
W E
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200 100 0 200
Feet

Aerial Source: LAR-IAC 2014

CDFW Jurisdictional Waters Exhibit H-1

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

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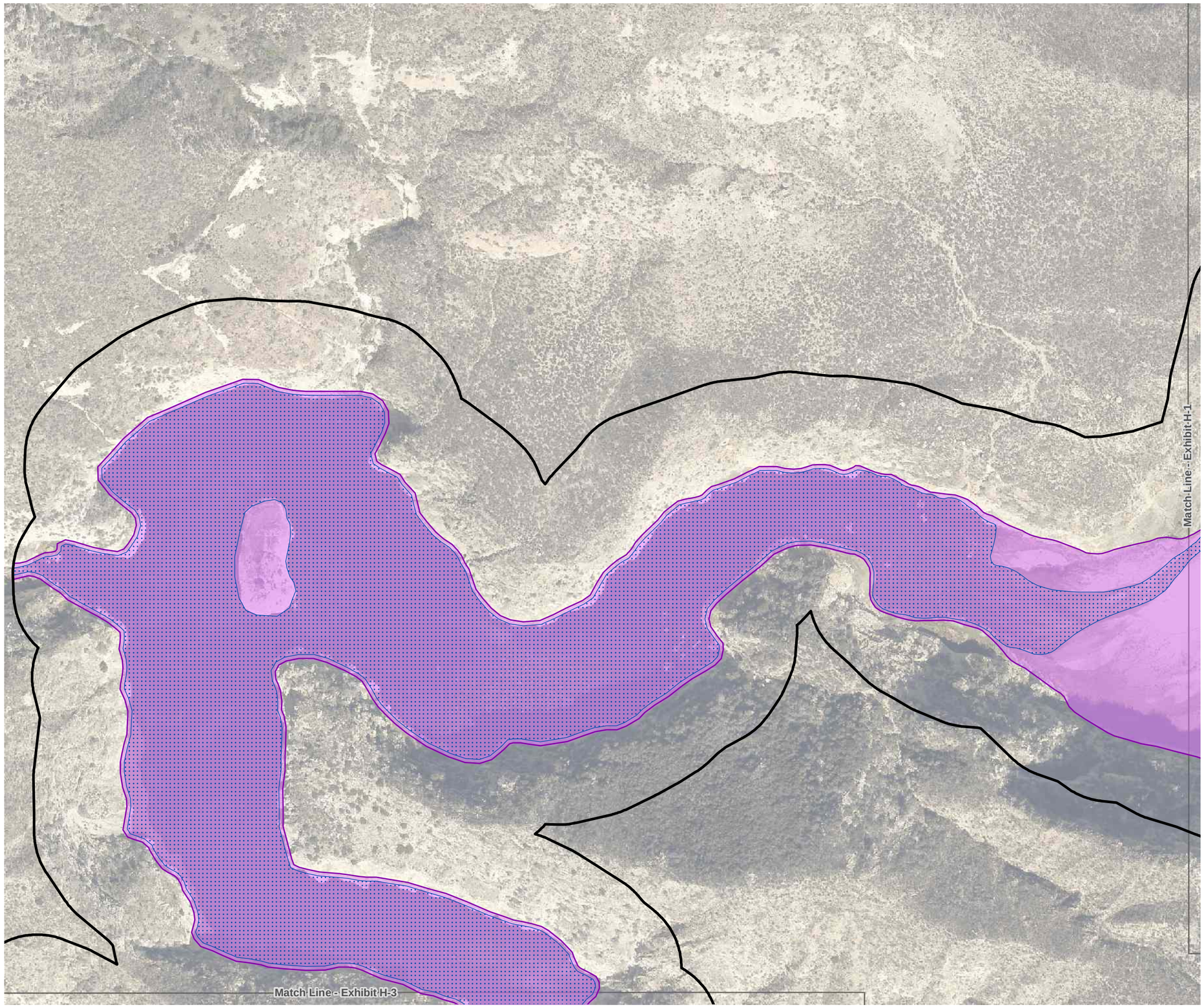

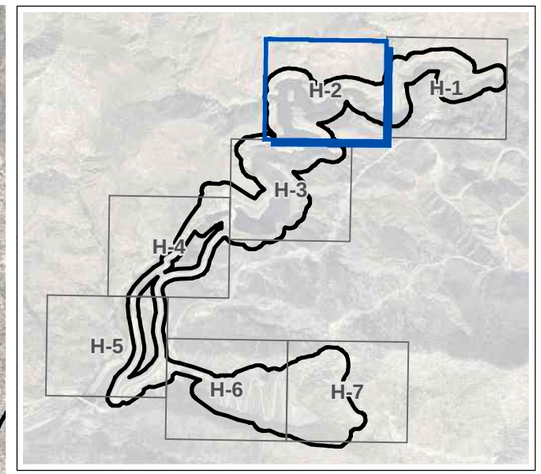

Survey Area
Open Water
CDFW Jurisdictional Waters

N
W E
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200 100 0 200
Feet

Aerial Source: LAR-IAC 2014

CDFW Jurisdictional Waters Exhibit H-2

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

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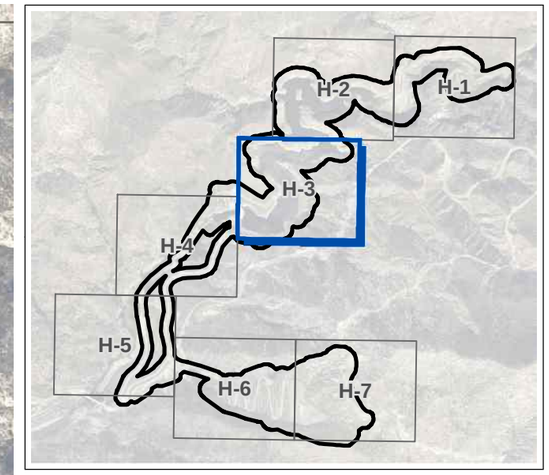
Match Line - Exhibit H-2

Match Line - Exhibit H-4

Big Tujunga Canyon Rd



Survey Area

Open Water

CDFW Jurisdictional Waters

N

W E

S

200 100 0 200

Feet

Aerial Source: LAR-IAC 2014

CDFW Jurisdictional Waters Exhibit H-3

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

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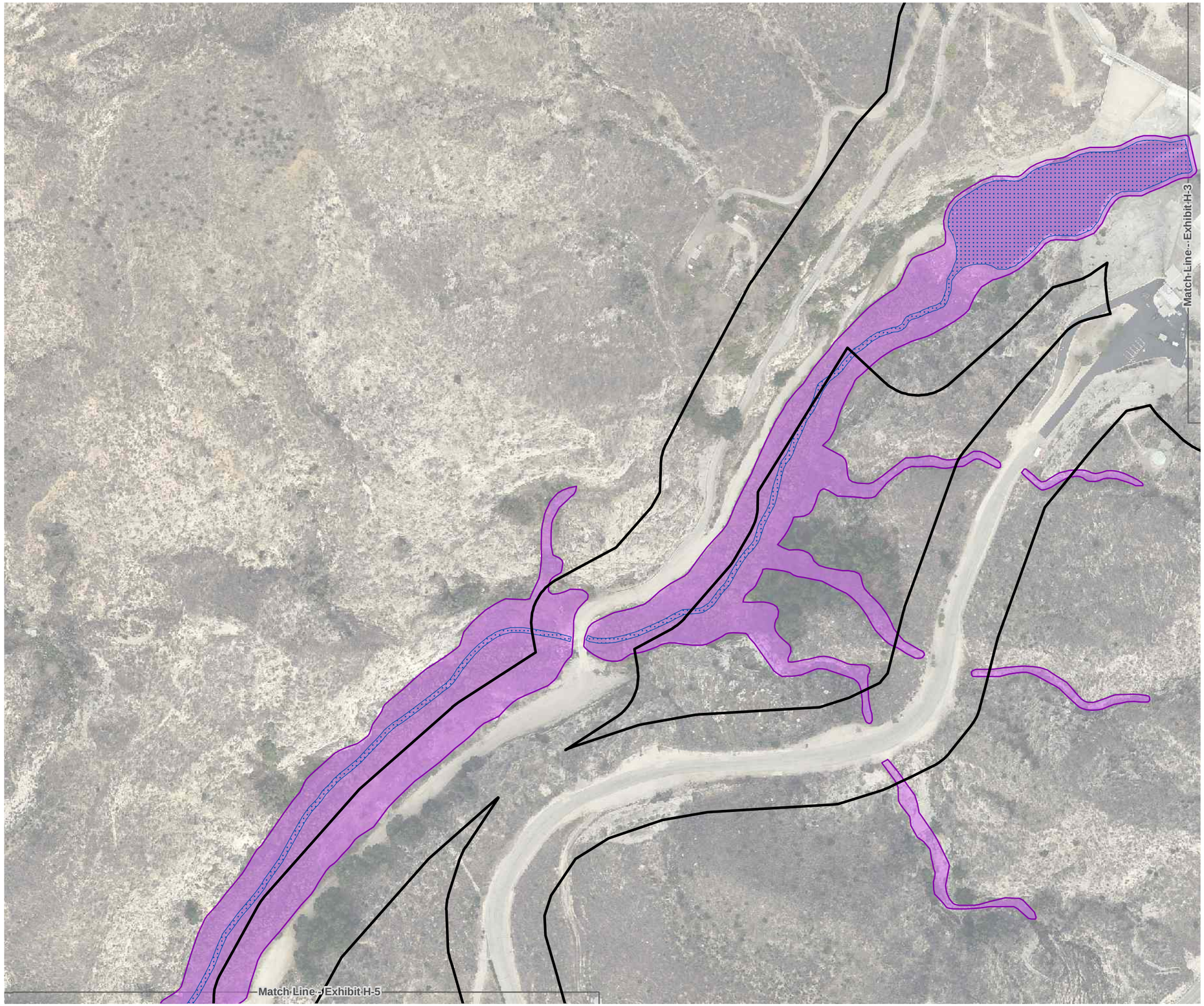

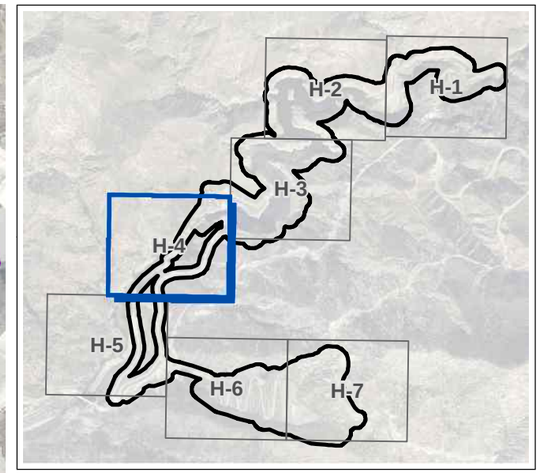

Survey Area

Open Water

CDFW Jurisdictional Waters

N
W E
S

200 100 0 200
Feet

Aerial Source: LAR-IAC 2014

CDFW Jurisdictional Waters Exhibit H-4

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

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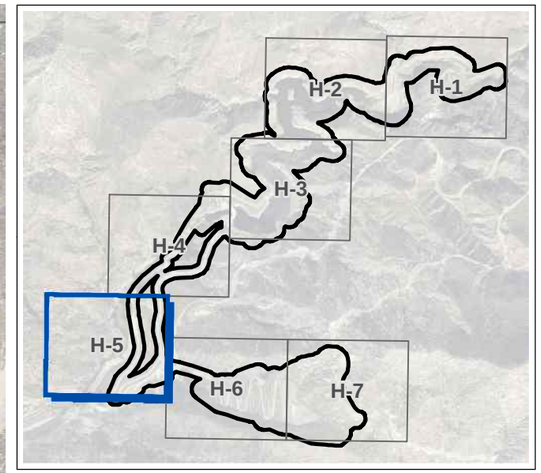
Match Line - Exhibit H-4

Match Line - Exhibit H-6

Big Tujunga Canyon Rd



Survey Area

Open Water

CDFW Jurisdictional Waters

N

W E

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200 100 0 200

Feet

Aerial Source: LAR-IAC 2014

CDFW Jurisdictional Waters Exhibit H-5

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

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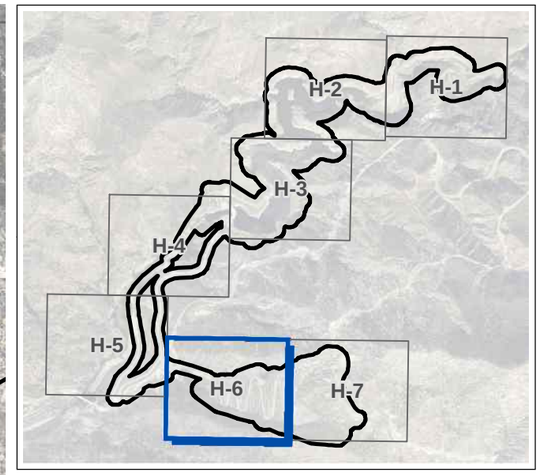
Match-Line--Exhibit H-5

Big Tujunga Canyon Rd

Match-Line--Exhibit H-7



Survey Area

Open Water

CDFW Jurisdictional Waters

N

W E

S

200 100 0 200

Feet

Aerial Source: LAR-IAC 2014

CDFW Jurisdictional Waters Exhibit H-6

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

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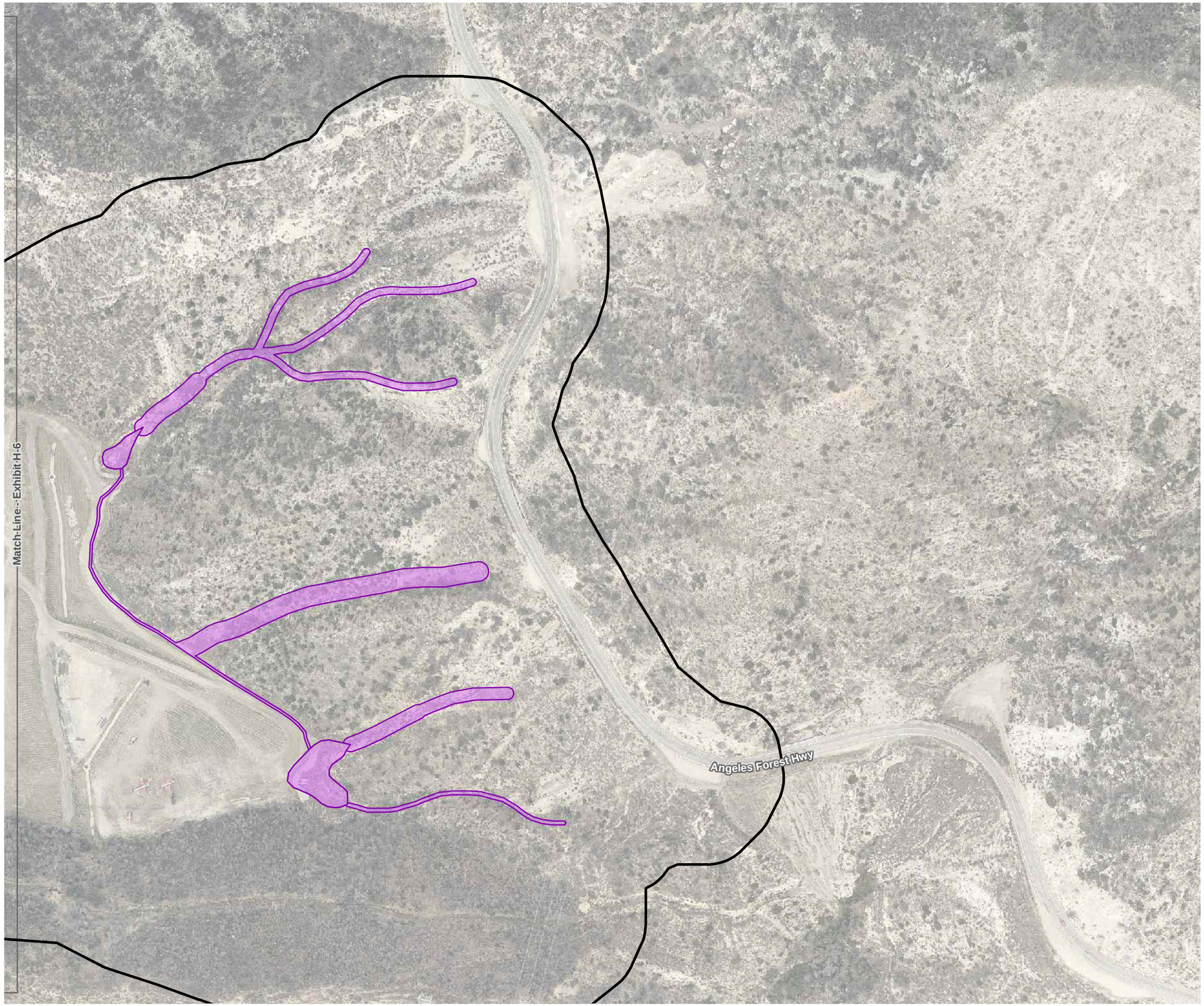

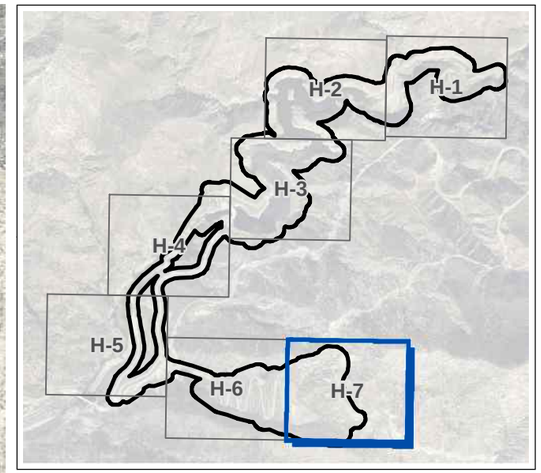

Survey Area
Open Water
CDFW Jurisdictional Waters

N
W E
S

200 100 0 200
Feet

Aerial Source: LAR-IAC 2014

CDFW Jurisdictional Waters Exhibit H-7

Jurisdictional Delineation Report for the Big Tujunga Reservoir Sediment Removal Project

PSOMAS

(Rev: 05/24/2018 CJS) R:\Projects\DPW\3DPW029305\Graphics\JD\

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ATTACHMENT I

NATIONWIDE PERMIT SUMMARY

The following is a summary of Nationwide Permit 3 (Maintenance).

NATIONWIDE PERMIT 3: MAINTENANCE

a. the repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project or within the boundaries of the structure or fill. This NWP also authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the district engineer, provided the permittee can demonstrate funding, contract, or other similar delays.

b. This NWP also authorizes the removal of accumulated sediments and debris in the vicinity of existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) and/or the placement of new or additional riprap to protect the structure. The removal of sediment is limited to the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend farther than 200 feet in any direction from the structure. This 200 foot limit does not apply to maintenance dredging to remove accumulated sediments blocking or restricting outfall and intake structures or to maintenance dredging to remove accumulated sediments from canals associated with outfall and intake structures. All dredged or excavated materials must be deposited and retained in an area that has no waters of the United States unless otherwise specifically approved by the district engineer under separate authorization. The placement of new or additional riprap must be the minimum necessary to protect the structure or to ensure the safety of the structure. Any bank stabilization measures not directly associated with the structure will require a separate authorization from the district engineer.

c. This NWP also authorizes temporary structures, fills, and work necessary to conduct the maintenance activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

d. This NWP does not authorize maintenance dredging for the primary purpose of navigation. This NWP does not authorize beach restoration. This NWP does not authorize new stream channelization or stream relocation projects.

Notification: For activities authorized by paragraph (b) of this NWP, the permittee must submit a pre-construction notification to the district engineer prior to commencing the activity (see general condition 31). The pre-construction notification must include information regarding the original design capacities and configurations of the outfalls, intakes, small impoundments, and canals. (Sections 10 and 404)

Note: This NWP authorizes the repair, rehabilitation, or replacement of any previously authorized structure or fill that does not qualify for the Clean Water Act Section 404(f) exemption for maintenance.

APPENDIX B-3

ARROYO TOAD SURVEY LETTER REPORT

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October 11, 2011

Ms. Erin M. McCarthy
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011

VIA EMAIL
erin_mccarthy@fws.gov

Subject: Results of Focused Presence/Absence Surveys for Arroyo Toad for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles County, California

Dear Ms. McCarthy:

This Letter Report presents the results of focused diurnal and nocturnal surveys to determine the presence or absence of the arroyo toad (*Anaxyrus californicus*) upstream of the Big Tujunga Reservoir for the Big Tujunga Reservoir Sediment Removal Project.

Survey Area

The survey area for these focused surveys consists of Big Tujunga Creek extending approximately two river miles upstream of Big Tujunga Dam. The study area is located in Big Tujunga Canyon on the southern edge of the San Gabriel Mountains, within the Angeles National Forest (ANF) (Exhibit 1). It is represented on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute topographic quadrangle at Township 3 North, Range 12 West, within Sections 29, 31, and 32 (Exhibit 2). Topography in the survey area consists of sheer cliffs and steep slopes to the canyon bottom, with elevations ranging from approximately 2,150 to 3,400 feet above mean sea level (msl). The survey area consists of open space.

Survey Area Conditions

Big Tujunga Creek travels roughly west, and several tributaries from the north and south join it as it flows to Big Tujunga Reservoir. Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels. Erosion has deposited alluvium (including boulders, cobbles, gravels, and coarse to fine sandy soils) within the stream course. Topography is irregular, and stream grade and flow velocity range across a moderate spectrum. Stream morphology includes portions with narrow, incised, fast-moving streams with plunge pools; wider, slow-moving streams; and a relatively broad alluvial wash with multiple meanders where the creek flows into the reservoir. Representative photographs of the study area are provided in Attachment A.

Vegetation within the survey area consists mainly of willow riparian forest dominated by arroyo willow (*Salix lasiolepis*) and red willow (*Salix laevigata*); however, in some areas it is co-dominated by white alder (*Alnus rhombifolia*) and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*). Other common species

present include mule fat (*Baccharis salicifolia*), nettle (*Urtica dioica*), and mugwort (*Artemisia douglasiana*). In upland areas, coast live oaks (*Quercus agrifolia*) and western sycamores (*Platanus racemosa*) are also present. In less mature/more recently disturbed areas within the wash, southern riparian scrub is present, dominated by mule fat, arroyo willow, and red willow.

In alluvial terraces and slopes above the main stream course, alluvial scrub and chaparral are present, dominated by scale-broom (*Lepidospartum squamatum*); other common species include thick-leaf yerba santa (*Eriodictyon crassifolium*), California buckwheat (*Eriogonum fasciculatum*), Our Lord's candle (*Yucca whipplei*), black sage (*Salvia mellifera*), deerweed (*Acmispon glaber* [*Lotus scoparius*]), and laurel sumac (*Malosma laurina*). Portions of the survey area burned in the 2009 Station Fire. Many of the burned trees and shrubs are resprouting from the base. Poodledog bush (*Turricula parryi*), a fire-following species, is widespread throughout the survey area.

Background Information

The arroyo toad was listed as a federally Endangered species by the U.S. Fish and Wildlife Service (USFWS) on December 16, 1994, and is considered a California Species of Special Concern (USFWS 1994; CDFG 2011). At the time of listing, the arroyo toad (*Anaxyrus californicus*) was considered a subspecies of southwestern arroyo toad (*Bufo microscaphus)* until genetic studies (Gergus 1998) separated the arroyo toad (*B. californicus*) from the Arizona toad (*B. microscaphus*). Recent research (Frost et al. 2006) places both species in the genus *Anaxyrus*.

The arroyo toad is stocky and uniformly warty, with a light-colored stripe across the head between and including the eyelids. The parotid glands are oval-shaped, widely separated, and pale toward the front. The underside of the arroyo toad is usually buff-colored and unspotted, and the cranial crests are absent or weak. Reproductive adult toads typically range from 2 to 2.6 inches snout-vent length (svl) for males and 2.6 to 3.1 inches for females (Sweet 1992, 1993). Tadpoles reach an average maximum length of 1.3 inches (maximum of 1.6 inches) and are black in coloration at hatching, developing tan dorsum and crossbars on the tail and an opaque, white venter before metamorphosing (Sweet 1992).

Early descriptions of the habitat requirements for the arroyo toad are based on detailed life history studies conducted over a period of years by Dr. Samuel Sweet (1992, 1993). Much of that work was conducted in the Los Padres National Forest in Santa Barbara County. Subsequent to this work, additional studies of populations in other portions of the range have resulted in a somewhat broader habitat description (e.g., Griffin et al. 1999; Ramirez 1999, 2000, 2001, 2002a, 2002b, 2002c). It can generally be said that the arroyo toad frequents third order washes, streams, and arroyos in semiarid parts of the southwest. Stream substrates range from sands to small cobble, with sandy banks supporting mule fat, willows (*Salix* spp.), cottonwoods (*Populus* spp.), and/or sycamores. The arroyo toad breeds both within streams and in small backwater pools that form along the stream margins, usually in relatively shallow water (ten centimeters or four inches) with sand or gravel substrate.

Arroyo toads are nocturnal and will move extensively in upland habitats and seasonally. Adult males will sometimes travel 1.2 to 1.9 miles along a stream coarse, often becoming more sedentary once reaching a large size (Sweet 1992). Females are more sedentary, typically maintaining an area of movement less than 330 feet in diameter (Sweet 1992). Adults feed primarily on ants, particularly nocturnal, trail-forming tree ants (*Liometopum occidentale*), but will also consume other invertebrates (Sweet 1992). Tadpoles are substrate gleaners, feeding on detritus and microbial mats from just beneath the surface layer of fine sediments or within the interstices of gravel deposits (Sweet 1992).

During the breeding season, typically from February to July, males will make advertisement vocalizations above water from shallow areas along the creek margins. The advertisement call is a whistling trill that lasts from 4 to 9 seconds in duration and is audible up to 300 meters under ideal conditions (Gergus et al. 1997). Egg strings of 2,000 to 10,000 eggs are deposited in shallow water (less than 4 inches in depth) on fine sediment with very low current and hatch 4 to 6 days later (Sweet 1992). Larval stage length ranges from 65 to 80 days post-hatching (Sweet 1992).

On February 7, 2001, the USFWS published a final rule designating 182,360 acres of land in Monterey, Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties, California as critical habitat for the arroyo toad (USFWS 2001). Following the designation of critical habitat, several lawsuits were filed challenging various aspects of the designation. In response to these lawsuits, the critical habitat designation was vacated and the USFWS was instructed by the court to re-evaluate its previous position.

On April 13, 2005, the USFWS published a final rule designating 11,695 acres of critical habitat for the arroyo toad in portions of Santa Barbara, Ventura, Los Angeles, Riverside, and San Bernardino Counties, California (USFWS 2005). The final critical habitat designation reflects the exclusion of 13 units totaling 67,584 acres based solely on economic considerations. These units are located in Santa Barbara, Ventura, Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties. Portions of two other units in Orange and San Diego Counties were excluded from critical habitat based on economic considerations and a combination of other factors. All proposed critical habitat in Monterey, Orange, and San Diego Counties has been excluded in the final rule.

Following a challenge of the 2005 critical habitat designation by the Centers for Biological Diversity (CBD) on December 19, 2007, a settlement agreement was reached in which the USFWS would reconsider the designation and submit a proposed revised critical habitat rule for the arroyo toad to the Federal Register by October 1, 2009. The revised critical habitat rule was released on February 8, 2011 (USFWS 2011).

The survey area is within designated critical habitat Unit 7 (Upper Los Angeles River Basin), which includes 1,190 acres in the ANF. Unit 7 encompasses (1) approximately 8 miles of upper Big Tujunga Creek from immediately above Big Tujunga Reservoir upstream to 1.2 miles above the confluence with Alder Creek; (2) approximately 3.7 miles of Mill Creek from the Monte Cristo Creek confluence downstream to Big Tujunga Creek; and (3) 1.9 miles of Alder Creek from the Mule Fork confluence downstream to Big Tujunga Creek. Unit 7 supports an arroyo toad population that is considered important because it occurs at a relatively high elevation considered atypical for the species, and it is the only known population remaining in the coastal foothills of the San Gabriel Mountains.

Survey Methodology

An initial site assessment was conducted by BonTerra Consulting Senior Biologist Sam Stewart on March 17, 2011, to determine the extent of potentially suitable habitat for the arroyo toad. The site assessment determined that Big Tujunga Creek upstream from the reservoir provides potentially suitable habitat for the arroyo toad. In accordance with the arroyo toad protocol (USFWS 1999), surveys were conducted in suitable habitat up to 1 kilometer from the project limits of disturbance, which includes Big Tujunga Creek from the reservoir to the Fall Creek Campground/USFS Road 3N27 approximately one kilometer upstream. Prior to conducting the focused surveys, a search of the California Natural Diversity Database (CNDDB) (CDFG 2011) and other relevant available documents (Jennings and Hayes 1994; Campbell et al. 1996) was conducted to determine if and to what extent the arroyo toad occurs in the project vicinity.

Surveys for arroyo toad were conducted by Mr. Stewart and BonTerra Consulting Biologists Jason Mintzer and Jonathan Aguayo according to the USFWS-established survey methodology. Mr. Stewart was the Principal Investigator and was present during all surveys. Six survey visits were conducted between April 20 and June 27, 2011, each including diurnal and nocturnal components completed within the same 24-hour period.

Diurnal surveys were conducted from approximately 3:00 PM until dusk, and nocturnal surveys were conducted from one hour after dusk until approximately 1:00 AM. Surveys focused on detecting toads by visual identification; listening for the advertising call of adult males; and checking potentially suitable breeding habitat for tadpoles and/or eggs. Survey biologists scanned pools for eggs, larvae, metamorphs, juveniles, and breeding and/or calling adults in potentially suitable breeding locations along the stream, and for foraging individuals in the adjacent riparian and upland areas. Surveyors moved in a downstream direction during the diurnal surveys, and moved in an upstream direction during the nocturnal surveys. Headlamps (Black Diamond Icon – 100 lumens), flashlights (Surefire E2L Outdoorsman - 60 lumens), and binoculars (Pentax DCF SP 10x42) were used to visually identify toads, frogs, and their larvae detected at night. Nocturnal surveys were conducted during appropriate environmental conditions conducive to the activity patterns for the arroyo toad. Generally, these conditions are night time temperatures in excess of 50 degrees Fahrenheit (°F) at dusk, with low winds (less than 10 miles per hour), and avoiding nights with a full or nearly full moon. Survey dates, times, and weather data are shown in Table 1.

Any arroyo toads detected during surveys were documented in field notes. The following data were collected for all arroyo toad observations: (1) time of initial observation; (2) meteorological conditions at time of initial observation (including temperature, relative humidity, wind speed, and barometric pressure); (3) geographic positioning system (GPS) coordinates; (4) dorsal photographs; and (5) snout-vent length as measured utilizing calipers or by placing a scale adjacent during the dorsal photograph.

TABLE 1
SUMMARY OF ARROYO TOAD SURVEY CONDITIONS

Survey	Survey Date	Survey Type	Surveying Biologists	Start/End Time	Wind (miles/hour)		Temperature (°F)		Relative Humidity (%)		Cloud Cover
					Start	End	Start	End	Start	End	
1	4/20/2011	Diurnal	S. Stewart, J. Mintzer	15:45–19:30	2–5	0–1	65	61	40	47	clear
		Nocturnal		20:15–23:45	0–1	calm	61	58	47	52	clear
2	5/3/2011	Diurnal	S. Stewart, J. Mintzer	15:30–20:00	2–6	1–3	81	75	25	39	clear
		Nocturnal		20:30–00:05	3–5	2–3	67	64	42	43	clear
3	5/10/2011	Diurnal	S. Stewart, J. Mintzer	14:45–19:50	3–5	1–3	72	64	31	42	clear
		Nocturnal		20:27–00:35	calm	calm	56	55	57	70	clear
4	5/31/2011	Diurnal	S. Stewart, J. Mintzer	15:15–20:00	3–5	0–1	70	64	40	38	10%
		Nocturnal		20:45–01:10	calm	calm	59	55	45	55	clear
5	6/14/2011	Diurnal	S. Stewart, J. Mintzer	15:10–20:15	1–3	2–4	90	80	23	35	clear
		Nocturnal		21:10–01:35	2–3	2–3	75	72	44	41	clear
6	6/27/2011	Diurnal	S. Stewart, J. Aguayo	15:20–20:15	0–5	1–3	93	82	28	27	clear
		Nocturnal		21:15–01:25	calm	calm	74	67	27	17	clear

Survey Results

Arroyo toad was detected in the survey area upstream of the dam during the 2011 focused surveys. One individual adult male was observed during surveys conducted on May 10, May 31, and June 14, 2011. No arroyo toads were observed on the other survey dates. Based on comparison of dorsal photographs taken during each survey, the adult male toad was determined to be the same individual repeatedly detected during each survey. While this particular toad was observed vocalizing on May 10 and May 31, no evidence of successful breeding was detected in the survey area on these or subsequent visits. The locations of the arroyo toad observations are presented on Exhibit 3. Dorsal photographs taken during surveys are presented in Attachment A.

Other amphibian species detected during surveys include western toad (*Anaxyrus boreas*), California treefrog (*Pseudacris cadaverina*), and Baja California treefrog (*Pseudacris hypochondriaca*). A list of all wildlife species observed within the survey area is included in Attachment B to this letter report.

Three non-target special status species were observed during surveys. These include two California Species of Special Concern: two-striped garter snake (*Thamnophis hammondii*) and yellow warbler (*Dendroica petechia*). The American peregrine falcon (*Falco peregrinus anatum*) was also detected. This species was recently delisted by both the USFWS and the State of California as an Endangered species, but it is still considered a State Fully Protected species. CNDDB forms are found in Attachment C for the arroyo toad and two-striped garter snake sightings, but no forms are included for the avian species as the sightings were brief and it is unknown whether these species were breeding in or near the survey area.

BonTerra Consulting appreciates the opportunity to assist with this project. Please contact David Hughes or Sam Stewart at (626) 351-2000 with any questions or comments.

Sincerely,

BONTERRA CONSULTING

David T. Hughes
Senior Project Manager

Samuel C. Stewart, IV
Project Manager

Enclosures: Exhibits 1, 2, and 3
Attachment A – Photographs
Attachment B –Wildlife Compendium
Attachment C – CNDDB Forms

cc: Kavita Mahulikar, Los Angeles County Department of Public Works
Ryan Butler, Los Angeles County Department of Public Works

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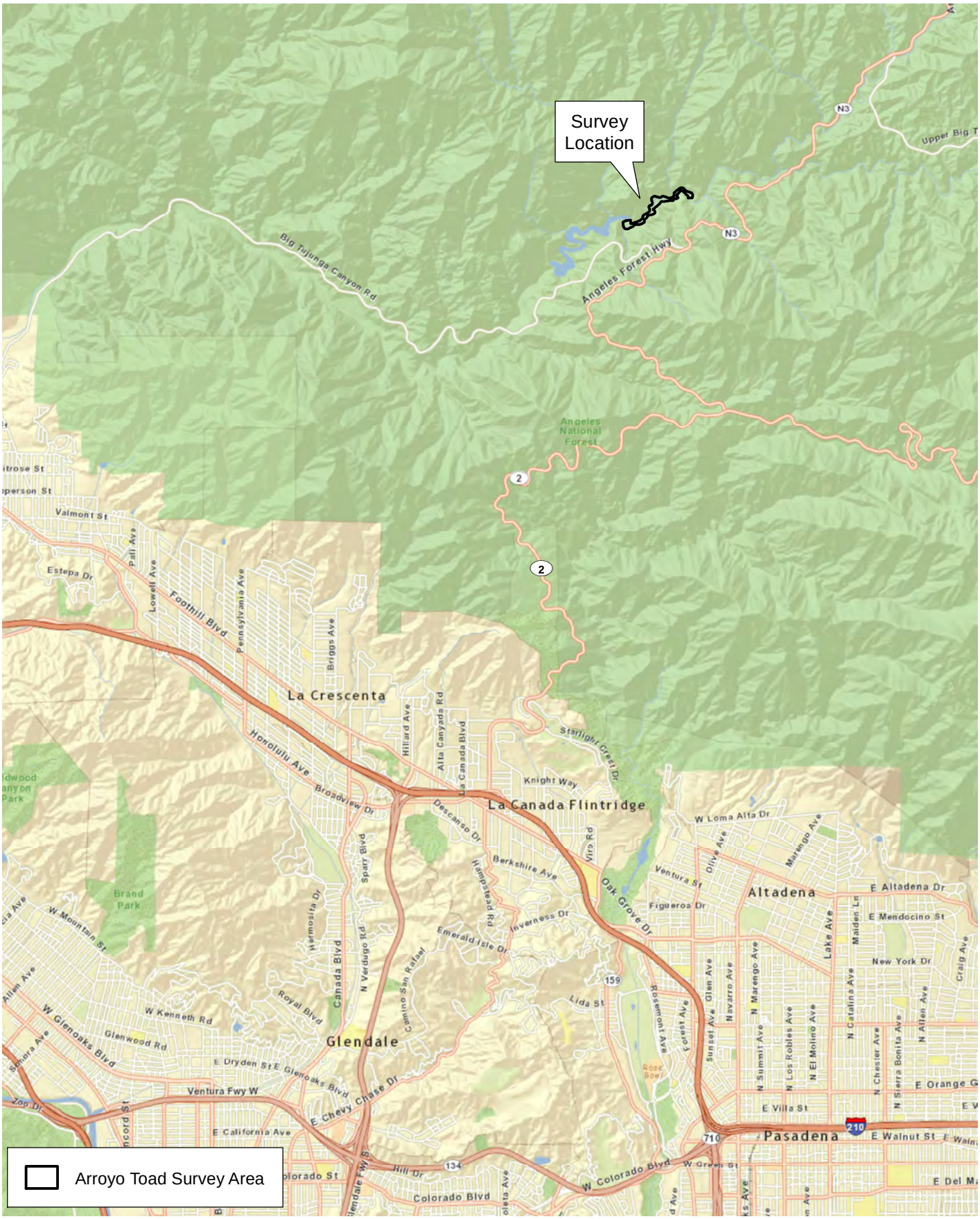

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Local Vicinity

Exhibit 1

Big Tujunga Reservoir Sediment Removal Project

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S

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Feet

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Source: USGS 7.5 Minute Quadrangle, Condor Peak, CA
USFWS Critical Habitat, 2011F

Arroyo Toad Survey Area

Exhibit 2

Big Tujunga Reservoir Sediment Removal Project

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2,000 1,000 0 2,000
Feet

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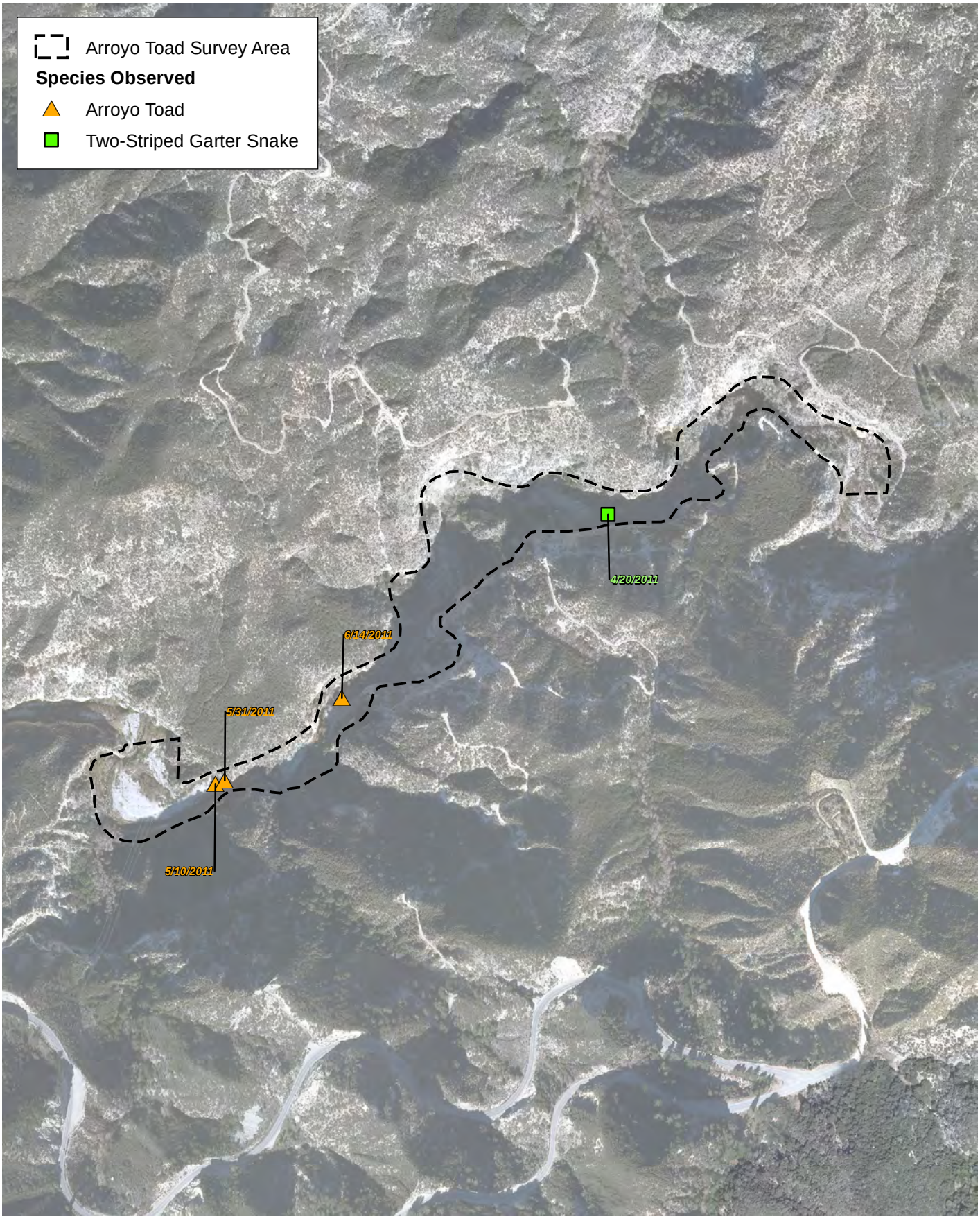

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Arroyo Toad Focused Survey Results

Exhibit 3

Big Tujunga Reservoir Sediment Removal Project

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700 350 0 700

Feet

BonTerra CONSULTING

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ATTACHMENT A

PHOTOGRAPHS



Central portion of survey area facing upstream (April 20, 2011).



Western end of survey area facing downstream toward Big Tujunga Reservoir (April 20, 2011).

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Survey Area Photographs

Exhibit A-1

Big Tujunga Reservoir Sediment Removal Project

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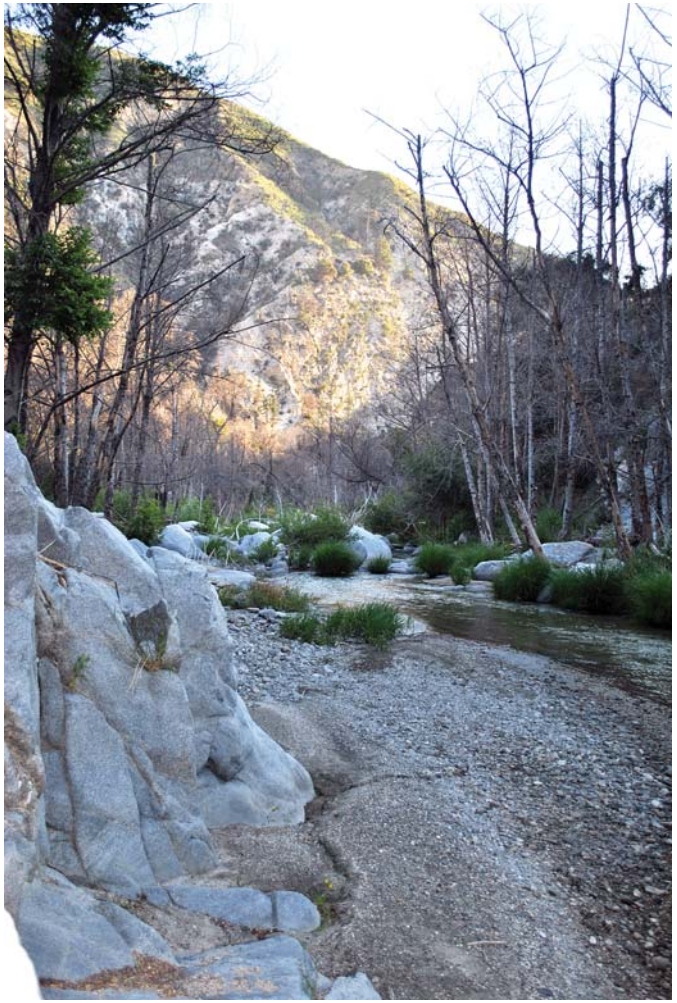

Eastern end of survey area facing downstream (June 14, 2011).



Western end of survey area facing upstream (April 20, 2011). Location of May 10 and 31, 2011 arroyo toad observations in foreground.

Survey Area Photographs

Exhibit A-2

Big Tujunga Reservoir Sediment Removal Project

BonTerra CONSULTING

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Male arroyo toad observed in Big Tujunga Creek survey area on May 10, 2011



Male arroyo toad observed in Big Tujunga Creek survey area on May 31, 2011



Male arroyo toad photographed beneath the water surface in Big Tujunga Creek survey area on June 14, 2011

Note: These photographs are provided to illustrate the identical pattern and black pigmentation on the dorsum of the toad observed on May 10th, 31st and June 14th 2011, presumed to be the same individual. The variation in the overall coloration of the toad is due to physiological activation of chromatophores in the skin to better camouflage the toad against the variable substrate, as well as differences in light and aspect during photography.

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Arroyo Toad Photographs

Exhibit A-3

Big Tujunga Reservoir Sediment Removal Project

ATTACHMENT B

WILDLIFE COMPENDIUM

WILDLIFE COMPENDIUM

Species
Amphibians
BUFONIDAE - TRUE TOADS
Anaxyrus boreas [*Bufo boreas*] western toad
Anaxyrus californicus [*Bufo microscaphus californicus*] arroyo toad
HYLIDAE - TREEFROGS
Pseudacris [Hyla] cadaverina California treefrog
Pseudacris hypochondriaca [*Hyla regilla*] Baja California treefrog
Reptiles
PHRYNOSOMATIDAE - ZEBRA-TAILED, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, & HORNED LIZARDS
Sceloporus occidentalis western fence lizard
Uta stansburiana side-blotched lizard
SCINCIDAE - SKINKS
Plestidon [*Eumeces*] *skiltonianus* western skink
TEIIDAE - WHIPTAIL LIZARDS
Aspidoscelis [Cnemidophorus] tigris stejnegeri coastal western whiptail
ANGUIDAE - ALLIGATOR LIZARDS
Elgaria multicarinata southern alligator lizard
COLUBRIDAE - COLUBRID SNAKES
Thamnophis hammondii two-striped garter snake
Birds
ANATIDAE - WATERFOWL
Anas platyrhynchos mallard
PHALACROCORACIDAE - CORMORANTS
Phalacrocorax auritus double-crested cormorant
ARDEIDAE - HERONS, BITTERNS, & ALLIES
Ardea herodias great blue heron
Nycticorax nycticorax black-crowned night-heron
ACCIPITRIDAE - HAWKS, KITES, EAGLES, & ALLIES
Buteo jamaicensis red-tailed hawk

WILDLIFE COMPENDIUM (Continued)

Species
FALCONIDAE - FALCONS
Falco sparverius peregrine falcon
Falco peregrinus peregrine falcon
COLUMBIDAE - PIGEONS & DOVES
Streptopelia chinensis * spotted dove
Zenaida macroura mourning dove
CAPRIMULGIDAE - GOATSUCKERS
Phalaenoptilus nuttallii common poorwill
APODIDAE - SWIFTS
Aeronautes saxatalis white-throated swift
TROCHILIDAE - HUMMINGBIRDS
Archilochus alexandri black-chinned hummingbird
Calypte costae Costa's hummingbird
Selasphorus sasin Allen's hummingbird
PICIDAE - WOODPECKERS
Picoides nuttallii Nuttall's woodpecker
Colaptes auratus northern flicker
TYRANNIDAE - TYRANT FLYCATCHERS
Contopus sordidulus western wood-pewee
Empidonax hammondii Hammond's flycatcher
Empidonax difficilis Pacific-slope flycatcher
Sayornis nigricans black phoebe
Myiarchus cinerascens ash-throated flycatcher
VIREONIDAE - VIREOS
Vireo cassinii Cassin’s vireo
CORVIDAE - CROWS & JAYS
Aphelocoma californica western scrub-jay
Corvus brachyrhynchos American crow
Corvus corax common raven

WILDLIFE COMPENDIUM (Continued)

Species
Cyanocitta stelleri steller's jay
HIRUNDINIDAE - SWALLOWS
Tachycineta thalassina violet-green swallow
Stelgidopteryx serripennis northern rough-winged swallow
Petrochelidon pyrrhonota cliff swallow
Baeolophus inornatus oak titmouse
TROGLODYTIDAE - WRENS
Salpinctes obsoletus rock wren
Catherpes mexicanus canyon wren
Thryomanes bewickii Bewick's wren
CINCLIDAE - DIPPERS
Cinclus mexicanus American dipper
PTILOGONATIDAE - SILKY-FLYCATCHERS
Phainopepla nitens phainopepla
PARULIDAE - WARBLERS
Oreothlypis [*Vermivora*] *celata* orange-crowned warbler
Dendroica petechia yellow warbler
Dendroica coronata yellow-rumped warbler
Dendroica nigrescens black-throated gray warbler
Wilsonia pusilla Wilson's warbler
EMBERIZIDAE - SPARROWS & JUNCOS
Pipilo maculatus spotted towhee
Melozone [*Pipilo*] *crissalis* California towhee
Amphispiza belli sage sparrow
Melospiza melodia song sparrow
Junco hyemalis dark-eyed junco

WILDLIFE COMPENDIUM (Continued)

Species
CARDINALIDAE - CARDINALS & ALLIES
Pheucticus melanocephalus black-headed grosbeak
Passerina amoena lazuli bunting
ICTERIDAE - BLACKBIRDS
Molothrus ater brown-headed cowbird
Icterus bullockii Bullock's oriole
FRINGILLIDAE - FINCHES
Carpodacus mexicanus house finch
Spinus [Carduelis] psaltria lesser goldfinch
Spinus [Carduelis] lawrencei Lawrence's goldfinch
Spinus [Carduelis] tristis American goldfinch
Mammals
MURIDAE - MICE, RATS, & VOLES
Peromyscus maniculatus deer mouse
CANIDAE - WOLVES & FOXES
Urocyon cinereoargenteus gray fox
PROCYONIDAE - RACCOONS
Procyon lotor common raccoon
MUSTELIDAE - WEASELS, SKUNKS & OTTERS
Mephitis mephitis striped skunk
CERVIDAE - DEER
Odocoileus hemionus mule deer
* introduced species

ATTACHMENT C

CNDDB FORM

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/10/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Anaxyrus californicus*

Common Name: arroyo toad

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☑ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Sam Stewart
Address: 3452 E. Foothill Blvd., Ste 420
Pasadena, CA. 91107
E-mail Address: sstewart@bonterraconsulting.com
Phone: (626) 351-2000

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☑ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: US Forest Service
Quad Name: Condor Peak Elevation: 2,253ft.
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Etrex Vista H
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 10 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐
Coordinates: 11S 3922504, 3796172 (5/10/2011); 11S 392189, 3796167 (5/31/2011); 11S 11S 392392, 3796304 (6/14/2011)

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Arroyo toad observed on north bank of Big Tujunga Creek above reservoir on sandy terrace and later advertising from stream margin. Same individual observed on two subsequent visits (5/31 & 6/14 of 2011). No other individuals observed during focused surveys at this location or for at least 1 km upstream. Appears to be a solitary male. Willow and alder riparian woodland with mule fat on banks.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: No development in vicinity. Angeles National Forest.

Visible disturbances: None.

Threats: Introduced fish and amphibian species, including black bullhead and American bullfrog (as indicated by dam operator) in the reservoir.

Comments: Solitary male. No other adults, egg masses, tadpoles, or other evidence of successful breeding observed during surveys.

Determination: *(check one or more, and fill in blanks)*

☑ Keyed (cite reference): Stebbins 2003
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: familiarity with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 04/20/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Thamnophis hammondii*

Common Name: two-striped garter snake

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☑ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Sam Stewart
Address: 3452 E. Foothill Blvd., Ste 420
Pasadena, CA. 91107
E-mail Address: sstewart@bonterraconsulting.com
Phone: (626) 351-2000

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☑ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: US Forest Service
Quad Name: Condor Peak Elevation: 2,350ft.
T 3N R 12W Sec 32, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Etrex Vista H
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 10 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐
Coordinates: 11S 392819, 3796599

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Large adult (approximately 80 cm) two-striped garter snake observed on north bank of Big Tujunga Creek above reservoir on sandy terrace. Willow and alder riparian woodland .

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: No development in vicinity. Angeles National Forest.

Visible disturbances: None.

Threats: Introduced amphibian species, including American bullfrog (as indicated by dam operator) in the reservoir.

Comments:

Determination: *(check one or more, and fill in blanks)*
- ☑ Keyed (cite reference): Stebbins 2003
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☐ Other: familiarity with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

BonTerra PSOMAS

Balancing the Natural and Built Environment

October 10, 2016

Stacey Love
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

VIA EMAIL AND MAIL
Stacey_Love@fws.gov

Subject: Results of Focused Presence/Absence Surveys for Arroyo Toad for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles, California

Dear Ms. Love:

This Letter Report presents the results of focused diurnal and nocturnal surveys to determine the presence or absence of the arroyo toad (*Anaxyrus californicus*) for the Big Tujunga Reservoir Sediment Removal Project (hereinafter referred to as the "proposed project") located in Los Angeles County, California (Exhibit 1).

PROJECT DESCRIPTION AND LOCATION

The proposed project involves the dewatering of the Big Tujunga Reservoir and the removal of sediment to the nearby Maple Canyon Sediment Placement Site. The proposed project is located on the southern edge of the San Gabriel Mountains in the Angeles National Forest and is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute topographic quadrangle (Exhibit 1). If surveys downstream of the dam are negative, no arroyo toad fencing would be required during construction, as described in the Mitigated Negative Declaration.

The survey area for the arroyo toad surveys included all habitat along Big Tujunga Creek from Big Tujunga Dam to one kilometer downstream of the proposed project (i.e., one kilometer downstream of the Big Tujunga Road Bridge over Big Tujunga Wash) (Exhibit 2). The survey area and surrounding vicinity consist of open space in the Angeles National Forest.

The survey area is characterized by relatively dense and continuous willow riparian forest dominated by mule fat (*Baccharis salicifolia*), arroyo willow (*Salix lasiolepis*), and red willow (*Salix laevigata*) with an overstory of white alder (*Alnus rhombifolia*) and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*). Emergent vegetation, dominated by cattails (*Typha latifolia*), occurs as patches throughout this lower section. Common understory species include hoary nettle (*Urtica dioica* ssp. *holosericea*) and mugwort (*Artemisia douglasiana*). Representative site photos are included in Attachment A.

3 Hutton Centre Drive
Suite 200
Santa Ana, CA 92707

Tel 714.751.7373
www.Psomas.com

SPECIES BACKGROUND

The arroyo toad was listed as a federally Endangered species by the U.S. Fish and Wildlife Service (USFWS) on December 16, 1994, and is considered a California Species of Special Concern (USFWS 1994; CDFW 2016). At the time of listing, the arroyo toad was considered a subspecies of southwestern arroyo toad (*Bufo microscaphus*) until genetic studies (Gergus 1998) separated the arroyo toad (*B. californicus*) from the Arizona toad (*B. microscaphus*). Recent research (Frost et al. 2006) places both species in the genus *Anaxyrus*.

The arroyo toad is stocky and uniformly warty, with a light-colored stripe across the head between and including the eyelids. The parotid glands are oval-shaped, widely separated, and pale toward the front. The underside of the arroyo toad is usually buff-colored and unspotted, and the cranial crests are absent or weak. Reproductive adult toads typically range from 2.0 to 2.6 inches snout-vent length (svl) for males and 2.6 to 3.1 inches for females (Sweet 1992, 1993). Tadpoles reach an average maximum length of 1.3 inches (maximum of 1.6 inches) and are black in coloration at hatching, developing tan dorsum and crossbars on the tail and an opaque, white venter before metamorphosing (Sweet 1992).

Early descriptions of the arroyo toad habitat requirements are based on detailed life history studies conducted over a period of years by Dr. Samuel Sweet (1992, 1993). Much of that work was conducted in the Los Padres National Forest in Santa Barbara County. Subsequent to this work, additional studies of populations in other portions of the range have resulted in a somewhat broader habitat description (e.g., Griffin et al. 1999; Ramirez 1999, 2000, 2001, 2002a, 2002b, 2002c). It can generally be said that the arroyo toad frequents third order washes, streams, and arroyos in semiarid parts of the southwest. Stream substrates range from sands to small cobble, with sandy banks supporting mule fat, willows (*Salix* spp), cottonwoods (*Populus* spp.), and/or sycamores (*Platanus* sp.). The arroyo toad breeds both within streams and in small backwater pools that form along the stream margins, usually in relatively shallow water (four inches) with sand or gravel substrate.

Arroyo toads are nocturnal and will move extensively in upland habitats and seasonally. Adult males will sometimes travel 1.2 to 1.9 miles along a stream course, often becoming more sedentary once reaching a large size (Sweet 1992). Females are more sedentary, typically maintaining an area of movement less than 330 feet in diameter (Sweet 1992). Adults feed primarily on ants, particularly nocturnal, trail-forming tree ants (*Liometopum occidentale*), but will also consume other invertebrates (Sweet 1992). Tadpoles are substrate gleaners, feeding on detritus and microbial mats from just beneath the surface layer of fine sediments or within the interstices of gravel deposits (Sweet 1992).

During the breeding season, typically from February to July, males will make advertisement vocalizations above water from shallow areas along the creek margins. The advertisement call is a whistling trill that lasts from 4 to 9 seconds in duration and is audible up to approximately 985 feet under ideal conditions (Gergus et al. 1997). Egg strings of 2,000 to 10,000 eggs are deposited in shallow water (less than 4 inches in depth) on fine sediment with very low current and hatch 4 to 6 days later (Sweet 1992). Larval stage length ranges from 65 to 80 days post-hatching (Sweet 1992).

On February 7, 2001, the USFWS published a final rule designating 182,360 acres of land in Monterey, Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties, California as critical habitat for the arroyo toad (USFWS 2001). Following the designation of critical habitat, several lawsuits were filed challenging various aspects of the designation. In response to these lawsuits, the critical habitat designation was vacated and the USFWS was instructed by the court to reevaluate its previous position.

On April 13, 2005, the USFWS published a final rule designating 11,695 acres of critical habitat for the arroyo toad in portions of Santa Barbara, Ventura, Los Angeles, Riverside, and San Bernardino Counties,

California (USFWS 2005). The final critical habitat designation reflects the exclusion of 13 units totaling 67,584 acres based solely on economic considerations. These units are located in Santa Barbara, Ventura, Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties. Portions of two other units in Orange and San Diego Counties were excluded from critical habitat based on economic considerations and a combination of other factors. All proposed critical habitat in Monterey, Orange, and San Diego Counties was excluded in the final rule.

Following a challenge of the 2005 critical habitat designation by the Centers for Biological Diversity (CBD) on December 19, 2007, a settlement agreement was reached in which the USFWS would reconsider the designation and submit a proposed revised critical habitat rule for the arroyo toad to the Federal Register by October 1, 2009. The revised critical habitat rule was released on February 8, 2011 (USFWS 2011).

The survey area is within designated critical habitat Unit 7 (Upper Los Angeles River Basin), which includes 1,190 acres in the Angeles National Forest. Unit 7 encompasses (1) approximately 8.0 miles of upper Big Tujunga Creek from immediately above Big Tujunga Reservoir upstream to 1.2 miles above the confluence with Alder Creek; (2) approximately 3.7 miles of Mill Creek from the Monte Cristo Creek confluence downstream to Big Tujunga Creek; and (3) 1.9 miles of Alder Creek from the Mule Fork confluence downstream to Big Tujunga Creek. Unit 7 supports an arroyo toad population that is considered important because it occurs at a relatively high elevation considered atypical for the species, and it is the only known population remaining in the coastal foothills of the San Gabriel Mountains.

SURVEY METHODS

The USFWS' 1999 Arroyo Toad Protocol requires that a minimum of six surveys be performed during the breeding season (March 15 to July 1), with at least one survey conducted in April, one in May, and one in June. The surveys included diurnal and nocturnal searches to determine the presence of eggs, tadpoles, and adults. During the diurnal surveys, water was examined for the presence of arroyo toad egg masses and tadpoles. Nocturnal surveys began one hour after dusk during weather conditions conducive to toad activity. Nocturnal search methods included walking along the creek banks and stopping periodically to listen for the breeding calls of adult males. Headlamps and flashlights were used to visually identify toads when a breeding call was heard. If any arroyo toads were found, the individual or population was documented, recorded with a Global Positioning System unit, and mapped on an aerial photograph. The number of individuals would have been noted on each subsequent visit, and data would have been collected on general habitat characteristics for any arroyo toads observed.

Consulting Biologist Brian Leatherman and BonTerra Psomas Biologist Jonathan Aguayo conducted the focused surveys in all potentially suitable habitat for arroyo toad in the survey area according to the USFWS-established survey methodology described above. The survey area included all habitat along Big Tujunga Creek. Mr. Leatherman was the Principal Investigator and was present during all surveys. Mr. Leatherman and Mr. Aguayo conducted focused surveys for the arroyo toad on April 28; May 19; and June 6, 13, 20, and 27, 2016.

Diurnal surveys were conducted from approximately 2:00 PM until dusk, and nocturnal surveys were conducted from one hour after dusk until approximately 11:00 PM. Surveys focused on detecting toads by visual identification, listening for the advertising call of adult males, and checking potentially suitable breeding habitat for tadpoles and/or eggs. Survey Biologists scanned pools for eggs, larvae, metamorphs, juveniles, and breeding and/or calling adults in potentially suitable breeding locations along the stream, and for foraging individuals in the adjacent riparian and upland areas. Surveyors moved in an upstream direction during the surveys. Headlamps, flashlights, and binoculars were used to visually identify toads, frogs, and their larvae detected at night. Nocturnal surveys were conducted during appropriate environmental conditions conducive to the activity patterns of the arroyo toad. Generally, these conditions

are nighttime temperatures in excess of 50 degrees Fahrenheit (°F) at dusk, with low winds (less than 10 miles per hour), and avoiding nights with a full or nearly full moon. Survey dates, times, and weather data are shown in Table 1.

Survey conditions and results were documented in field notes. The following data would have been collected for any arroyo toad observations: (1) time of initial observation; (2) meteorological conditions at time of initial observation (including temperature, relative humidity, wind speed, and barometric pressure); (3) Geographic Positioning System (GPS) coordinates; (4) dorsal photographs; and (5) snout-vent length as measured using calipers or by placing a scale adjacent during the dorsal photograph.

TABLE 1
SUMMARY OF SURVEY DATA AND CONDITIONS FOR ARROYO TOAD

Survey	Survey Date	Survey Type	Surveying Biologists	Start/End Time	Wind (miles/hour)		Temperature (°F)		Cloud Cover
					Start	End	Start	End	
1	4/28/2016	Diurnal	Leatherman, Aguayo	1400–1800	2–4	2–4	68	67	40%
		Nocturnal		1945–2250	0–2	calm	66	51	clear
2	5/19/2016	Diurnal	Leatherman, Aguayo	1400–1730	2–4	2–4	78	76	clear
		Nocturnal		1945–2230	2–4	calm	65	58	clear
3	6/6/2016	Diurnal	Leatherman, Aguayo	1430–1830	4–7	4–7	88	77	clear
		Nocturnal		2020–2315	0–2	calm	74	64	clear
4	6/13/2016	Diurnal	Leatherman, Aguayo	1430–1745	2–4	2–4	78	77	10%
		Nocturnal		2000–2245	0–2	2–4	70	56	clear
5	6/20/2016	Diurnal	Leatherman, Aguayo	1430–1730	2–4	2–4	105	97	clear
		Nocturnal		2000–2245	0–2	0–2	90	79	clear
6	6/27/2016	Diurnal	Leatherman, Aguayo	1420–1730	2–4	2–4	98	92	clear
		Nocturnal		2000–2230	2–4	2–4	88	80	clear

°F: degrees Fahrenheit.

SURVEY RESULTS

No arroyo toad were detected during these surveys.

Amphibian species detected during surveys include western toad (*Anaxyrus boreas*) tadpoles, California treefrog (*Pseudacris cadaverina*), Baja California treefrog (*Pseudacris hypochondriaca*), and bullfrog (*Rana catesbeiana*). A complete list of all wildlife species detected during the surveys is provided in Attachment B.

OTHER OBSERVATIONS

The Santa Ana sucker (*Catostomus santaanae*), a federally listed Threatened species, was observed during the surveys. Five California Species of Special Concern were observed during the surveys: western pond turtle (*Emys marmorata*), coastal whiptail (*Aspidoscelis tigris stejneri*), two-striped garter snake (*Thamnophis hammondii*), yellow warbler (*Setophaga petechia*), and yellow-breasted chat (*Icteria virens*). One U.S. Forest Service Sensitive species was also observed during the surveys: San Bernardino ring-necked snake (*Diadophis punctatus modestus*). California Natural Diversity Database (CNDDB) forms for western pond turtle, coastal whiptail, two-striped garter snake, San Bernardino ring-necked snake, and yellow-breasted chat are included in Attachment C and will be submitted to the California Department of Fish and Wildlife (CDFW). Observations of the yellow warbler will be reported to the CNDDB in the Least Bell's Vireo and Southwestern Willow Flycatcher Report for the proposed project and will be submitted to the CDFW with that report.

One CDFW Watch List species was also observed during the surveys: California mountain kingsnake (*Lampropeltis zonata parvirubra*). A CNDDB form for California mountain kingsnake is also included in Attachment C and will be submitted to the CDFW.

BonTerra Psomas appreciates the opportunity to assist on this project. If you have any comments or questions, please call Amber Heredia at (714) 751-7373.

Sincerely,
BonTerra Psomas

Amber O. Heredia
Senior Project Manager

Jonathan Aguayo
Biologist

Enclosures: Exhibits 1–2
Attachment A – Site Photographs
Attachment B – Wildlife Compendium
Attachment C – California Natural Diversity Database Forms

cc: Alex Ho, alho@dpw.lacounty.gov

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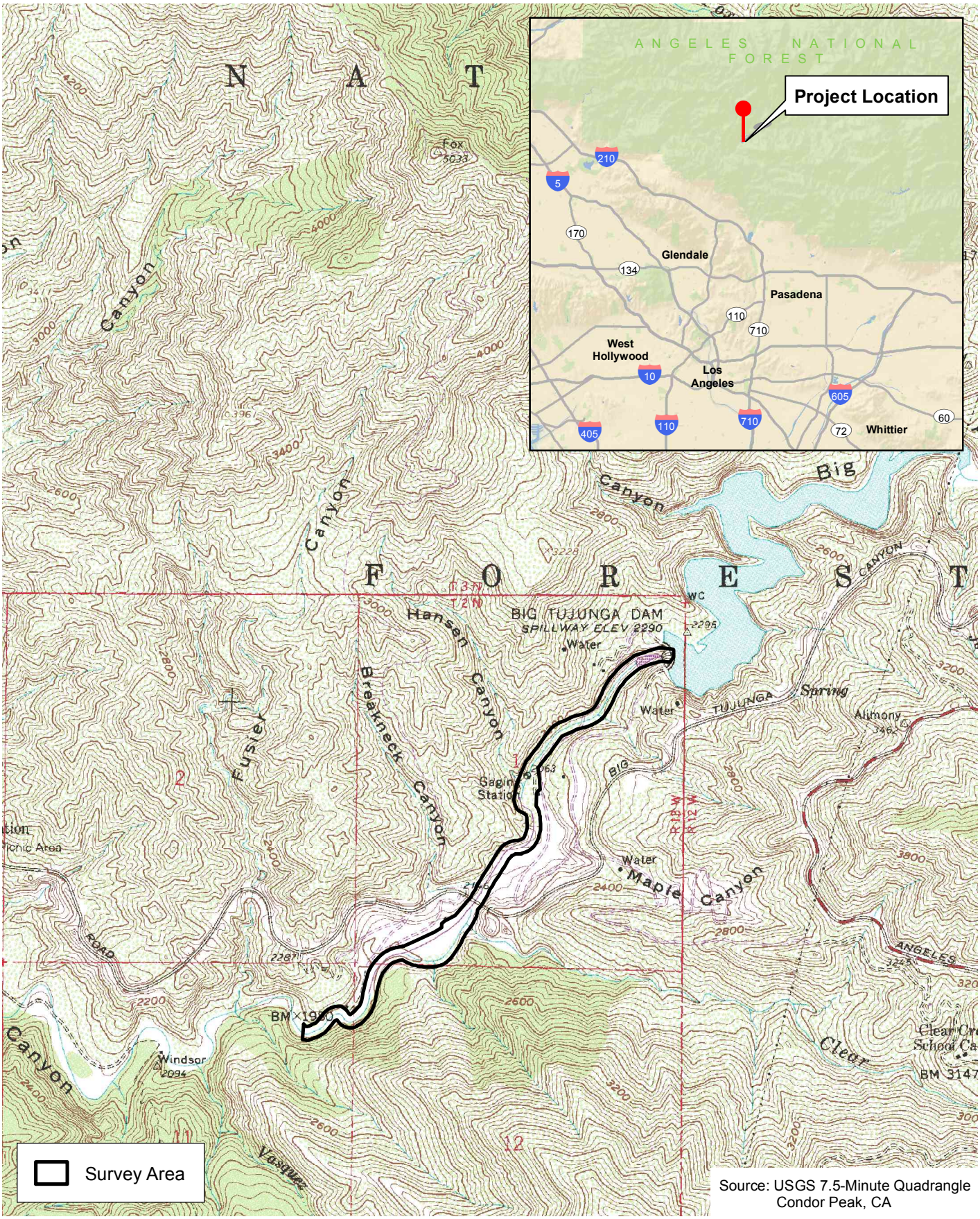

Source: USGS 7.5-Minute Quadrangle
Condor Peak, CA

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Regional Location and Local Vicinity

Exhibit 1

Big Tujunga Reservoir Sediment Removal Project

N
W E
S

2,000 1,000 0 2,000
Feet

BonTerra PSOMAS

(Rev: 09-21-2016 LEW) R:\Projects\DPW\3DPW029300\Graphics\ARTO\Ex1_RL_LV_20160821.pdf



Aerial Source: LAR-IAC 2014

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Survey Area

Exhibit 2

Big Tujunga Reservoir Sediment Removal Project

N
W E
S

1,000 500 0 1,000

Feet

BonTerra PSOMAS

(Rev: 10-10-2016 LEW) R:\Projects\DPW\3DPW029300\Graphics\ARTO\Ex2_Survey_Area_20160817.pdf

ATTACHMENT A

SITE PHOTOGRAPHS



View of the survey area from Big Tujunga Dam. Photo taken facing southwest.



View of the survey area from Big Tujunga Canyon Road Bridge. Photo taken facing southwest.

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Site Photographs

Attachment A-1

Big Tujunga Reservoir Sediment Removal Project

BonTerra PSOMAS

(08/17/2016 LEW) R:\Projects\DPW\3DPW029300\Graphics\ARTO\AttA_SP_20160817.pdf



View of riparian habitat along Big Tujunga Creek located in the southern portion of the survey area, downstream of Big Tujunga Canyon Road Bridge.



View of riparian habitat along Big Tujunga Creek located near the southern end of the survey area.

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Site Photographs

Attachment A-2

Big Tujunga Reservoir Sediment Removal Project

BonTerra PSOMAS

(08/17/2016 LEW) R:\Projects\DPW\3DPW029300\Graphics\ARTO\AttA_SP_20160817.pdf

ATTACHMENT B

WILDLIFE COMPENDIUM

WILDLIFE COMPENDIUM

Scientific Name	Common Name
FISH	
CATOSTOMIDAE - SUCKER FAMILY	
Catostomus santaanae	Santa Ana sucker
AMPHIBIANS	
BUFONIDAE - TRUE TOAD FAMILY	
Anaxyrus boreas	western toad (tadpoles)
RANIDAE - TRUE FROG FAMILY	
*Lithobates catesbeianus**	American bullfrog
HYLIDAE - TREEFROG FAMILY	
Pseudacris cadaverina	California treefrog
Pseudacris hypochondriaca	Baja California treefrog
TURTLES	
EMYDIDAE - BOX AND BASKING TURTLE FAMILY	
Emys marmorata	western pond turtle
LIZARDS	
PHRYNOSOMATIDAE - SPINY LIZARD FAMILY	
Sceloporus occidentalis	western fence lizard
Uta stansburiana	common side-blotched lizard
TEIIDAE - WHIPTAIL LIZARD FAMILY	
Aspidoscelis tigris stejnegeri	coastal whiptail
SNAKES	
COLUBRIDAE - COLUBRID SNAKE FAMILY	
Diadophis punctatus modestus	San Bernardino ring-necked snake
Lampropeltis zonata parvirubra	California mountain kingsnake
NATRICIDAE - HARMLESS LIVE-BEARING SNAKE FAMILY	
Thamnophis hammondii	two-striped garter snake
BIRDS	
ANATIDAE - SWAN, GOOSE, AND DUCK FAMILY	
Anas platyrhynchos	mallard
ODONTOPHORIDAE - NEW WORLD QUAIL FAMILY	
Oreortyx pictus	mountain quail
Callipepla californica	California quail
ACCIPITRIDAE - HAWK FAMILY	
Buteo jamaicensis	red-tailed hawk
COLUMBIDAE - PIGEON AND DOVE FAMILY	
Patagioenas fasciata	band-tailed pigeon
Zenaida macroura	mourning dove
STRIGIDAE - TYPICAL OWL FAMILY	
Megascops kennicottii	western screech-owl
Bubo virginianus	great horned owl
APODIDAE - SWIFT FAMILY	
Aeronautes saxatalis	white-throated swift
TROCHILIDAE - HUMMINGBIRD FAMILY	
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird

WILDLIFE COMPENDIUM

Scientific Name	Common Name
PICIDAE - WOODPECKER FAMILY	
Melanerpes formicivorus	acorn woodpecker
Picoides nuttallii	Nuttall's woodpecker
Picoides villosus	hairy woodpecker
Colaptes auratus	northern flicker
TYRANNIDAE - TYRANT FLYCATCHER FAMILY	
Contopus sordidulus	western wood-pewee
Sayornis nigricans	black phoebe
Myiarchus cinerascens	ash-throated flycatcher
VIREONIDAE - VIREO FAMILY	
Vireo huttoni	Hutton's vireo
CORVIDAE - JAY AND CROW FAMILY	
Aphelocoma californica	California scrub-jay
Corvus corax	common raven
HIRUNDINIDAE - SWALLOW FAMILY	
Tachycineta thalassina	violet-green swallow
Stelgidopteryx serripennis	northern rough-winged swallow
Petrochelidon pyrrhonota	cliff swallow
PARIDAE - TITMOUSE FAMILY	
Baeolophus inornatus	oak titmouse
AEGITHALIDAE - BUSHTIT FAMILY	
Psaltriparus minimus	bushtit
TROGLODYTIDAE - WREN FAMILY	
Salpinctes obsoletus	rock wren
Catherpes mexicanus	canyon wren
Troglodytes aedon	house wren
Thryomanes bewickii	Bewick's wren
TURDIDAE - THRUSH FAMILY	
Turdus migratorius	American robin
PTILOGONATIDAE - SILKY-FLYCATCHER FAMILY	
Phainopepla nitens	phainopepla
PARULIDAE - WOOD-WARBLER FAMILY	
Geothlypis trichas	common yellowthroat
Setophaga petechia	yellow warbler
Cardellina pusilla	Wilson's warbler
EMBERIZIDAE - SPARROW FAMILY	
Pipilo maculatus	spotted towhee
Melozone crissalis	California towhee
Melospiza melodia	song sparrow
CARDINALIDAE - CARDINALS, GROSBEAKS, AND ALLIES FAMILY	
Piranga ludoviciana	western tanager
Pheucticus melanocephalus	black-headed grosbeak
Passerina amoena	lazuli bunting

WILDLIFE COMPENDIUM

Scientific Name	Common Name
ICTERIDAE - BLACKBIRD, COWBIRD, AND ORIOLE FAMILY	
Agelaius phoeniceus	red-winged blackbird
*Molothrus ater**	brown-headed cowbird
Icterus cucullatus	hooded oriole
Icterus bullockii	Bullock's oriole
FRINGILLIDAE - FINCH FAMILY	
Haemorhous mexicanus	house finch
Spinus psaltria	lesser goldfinch
MAMMALS	
SCIURIDAE - SQUIRREL FAMILY	
Sciurus griseus	western gray squirrel
Otospermophilus beecheyi	California ground squirrel
CANIDAE - CANID FAMILY	
Canis latrans	coyote
Urocyon cinereoargenteus	common gray fox (scat)
CERVIDAE - CERVID FAMILY	
Odocoileus hemionus	southern mule deer
* Non-native species	

ATTACHMENT C

CALIFORNIA NATURAL DIVERSITY DATABASE FORMS

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/27/2016

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Catostomus santaanae*

Common Name: Santa Ana sucker

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, BonTerra Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☑ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Along Big Tujunga Creek, downstream of Big Tujunga Canyon Road Bridge, within Angeles National Forest.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2018 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: **NAD27** ☐ **NAD83** ☑ **WGS84** ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates: 11s 389120 m E, 3793690 m N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Relatively dense and continuous willow riparian forest dominated by mule fat (Baccharis salicifolia), arroyo willow (Salix lasiolepis), and red willow (Salix laevigata) with an overstory of white alder (Alnus rhombifolia) and Fremont cottonwood (Populus fremontii ssp. fremontii). Water depth was approximately 18 inches deep.

Other rare taxa seen at THIS site on THIS date: (separate form preferred) Western pond turtle, coastal whiptail, San Bernardino ring-necked snake, California mountain kingsnake, two-striped garter snake, YEWA, and YBCH.

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats:

Comments: Photo ID by Brian Leatherman and a few other biologists.

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☑ By another person (name): Brian Leatherman and other biologists
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/27/2016

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Emys marmorata*

Common Name: western pond turtle

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 4 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, BonTerra Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

4 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Habitat along Big Tujunga Creek from Big Tujunga Dam downstream to one kilometer downstream of the proposed project (i.e., one kilometer downstream of the Big Tujunga Road Bridge over Big Tujunga Wash) (Exhibit 2)

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2029-2270 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: Two pond turtles in a pond: 390064 E, 3794842 N; 1 turtle in a pond: 389871 E, 3794318 N; and 1 turtle in the flowing creek: 389686 E, 3794121 N

Habitat Description (plant communities, dominants, associates, substrates/soils, aspects/slope):

Relatively dense and continuous willow riparian forest dominated by mule fat (Baccharis salicifolia), arroyo willow (Salix lasiolepis), and red willow (Salix laevigata) with an overstory of white alder (Alnus rhombifolia) and Fremont cottonwood (Populus fremontii ssp. fremontii). Ponded areas have emergent vegetation, dominated by cattails (Typha latifolia).

Other rare taxa seen at THIS site on THIS date: (separate form preferred) Santa Ana sucker, coastal whiptail, San Bernardino ring-necked snake, California mountain kingsnake, two-striped garter snake, YEWA, and YBCH.

Site Information

Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats:

Comments:

Determination (check one or more, and fill in blanks)

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Familiarity with species, visually

Photographs (check one or more)

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

DFG/BDB/1747 Rev. 11/17/06

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/06/2016

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Aspidoscelis tigris stejneri*

Common Name: coastal whiptail

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 2 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, BonTerra Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown
2				

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Along Big Tujunga Creek, upstream of Big Tujunga Canyon Road bridge, within Angeles National Forest.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW
Quad Name: Condor Peak Elevation: 2018 ft
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 1: 11s 389878 m E, 3794307 m N, 2: 11s 390103 m E, 3794626 m N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

West facing slope, paved bank running parallel to Big Tujunga Creek. Few scattered shrubs such as California buckwheat (Eriogonum fasciculatum) and our lord's candle (Hesperoyucca whipplei).

Other rare taxa seen at THIS site on THIS date: Santa Ana sucker, western pond turtle, San Bernardino ring-necked snake, California mountain kingsnake, two-striped garter snake, YEWA, and YBCH.
(separate form preferred)

Site Information

Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor
Immediate AND surrounding land use: Angeles National Forest, open space
Visible disturbances:
Threats:
Comments:

Determination *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Familiarity with species, visually

Photographs *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/13/2016

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

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Scientific Name: *Thamnophis hammondii*

Common Name: two-striped garter snake

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 7 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, BonTerra Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

7 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

***Location Description* (please attach map *AND*/*OR* fill out your choice of coordinates, below)**

Habitat along Big Tujunga Creek from Big Tujunga Dam downstream to one kilometer downstream of the proposed project (i.e., one kilometer downstream of the Big Tujunga Road Bridge over Big Tujunga Wash) (Exhibit 2)

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2029-2270 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: 1: 390205 E, 3795006 N; 2: 389703 E, 3794139 N; 3: 389462 E, 3793991 N; 4: 389359 E, 3793912 N; 5: 389326 E, 3793771 N; 6: 389253 E, 3793685 N; 7: 389084 E, 3793678 N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Relatively dense and continuous willow riparian forest dominated by mule fat (Baccharis salicifolia), arroyo willow (Salix lasiolepis), and red willow (Salix laevigata) with an overstory of white alder (Alnus rhombifolia) and Fremont cottonwood (Populus fremontii ssp. fremontii).

Other rare taxa seen at THIS site on THIS date: Santa Ana sucker, western pond turtle, coastal whiptail, San Bernardino ring-necked snake, California mountain kingsnake, YEWA, and YBCH.
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats:

Comments: All found submerged in the Big Tujunga Creek/water.

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Familiarity with species, visually

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/20/2016

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Diadophis punctatus modestus*

Common Name: San Bernardino ring-necked snake

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, BonTerra Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Along Big Tujunga Creek, downstream of Big Tujunga Canyon Road bridge, within Angeles National Forest.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2018 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: **NAD27** ☐ **NAD83** ☑ **WGS84** ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates: 11s 389375 m E, 3793945 m N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Relatively dense and continuous willow riparian forest dominated by mule fat (Baccharis salicifolia), arroyo willow (Salix lasiolepis), and red willow (Salix laevigata) with an overstory of white alder (Alnus rhombifolia) and Fremont cottonwood (Populus fremontii ssp. fremontii). Found near a ponded area, on a large boulder.

Other rare taxa seen at THIS site on THIS date: (separate form preferred) Santa Ana sucker, western pond turtle, coastal whiptail, two-striped garter snake, California mountain kingsnake, YEWA, and YBCH.

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats:

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Familiarity with species, visually

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/06/2016

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Icteria virens*

Common Name: yellow-breasted chat

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, BonTerra Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Along Big Tujunga Creek, downstream of Big Tujunga Canyon Road Bridge, within Angeles National Forest.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2018 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: **NAD27** ☐ **NAD83** ☑ **WGS84** ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates: 11s 389535 m E, 3793971 m N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Relatively dense and continuous willow riparian forest dominated by mule fat (Baccharis salicifolia), arroyo willow (Salix lasiolepis), and red willow (Salix laevigata) with an overstory of white alder (Alnus rhombifolia) and Fremont cottonwood (Populus fremontii ssp. fremontii).

Other rare taxa seen at THIS site on THIS date: (separate form preferred) Santa Ana sucker, western pond turtle, coastal whiptail, SB ring-necked snake, California mountain kingsnake, two-striped garter snake, and yellow warbler.

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats: Brown-headed cowbirds were observed on survey visits

Comments: 1-singing male detected on June 6 and 13, 2016.

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Familiarity with species, visually and aurally

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/06/2016

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Lampropeltis zonata parvirubra*

Common Name: California mountain kingsnake (San Bernardino population)

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ ☐ no ☑ unk.
Yes, Occ. #

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, BonTerra Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Along Big Tujunga Creek, downstream of Big Tujunga Canyon Road bridge, within Angeles National Forest.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW
Quad Name: Condor Peak Elevation: 2018 ft
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐
Coordinates: 11s 389564 m E, 3794041 m N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Relatively dense and continuous willow riparian forest dominated by mule fat (Baccharis salicifolia), arroyo willow (Salix lasiolepis), and red willow (Salix laevigata) with an overstory of white alder (Alnus rhombifolia) and Fremont cottonwood (Populus fremontii ssp. fremontii). Found within 5 feet from Big Tujunga Creek.

Other rare taxa seen at THIS site on THIS date: Santa Ana sucker, western pond turtle, coastal whiptail, San Bernardino ring-necked snake, two-striped garter snake, YEWA, and YBCH.
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats:

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Familiarity with species, visually

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

August 10, 2017

Stacey Love
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

VIA EMAIL AND MAIL
Stacey_Love@fws.gov

Subject: Results of 2017 Focused Presence/Absence Surveys for Arroyo Toad for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles, California

Dear Ms. Love:

This Letter Report presents the results of focused diurnal and nocturnal surveys to determine the presence or absence of the arroyo toad (*Anaxyrus californicus*) for the Big Tujunga Reservoir Sediment Removal Project (hereinafter referred to as the "proposed project") located in Los Angeles County, California (Exhibit 1).

PROJECT DESCRIPTION AND LOCATION

The proposed project involves the dewatering of the Big Tujunga Reservoir and the removal of sediment to the nearby Maple Canyon Sediment Placement Site. The proposed project is located on the southern edge of the San Gabriel Mountains in the Angeles National Forest and is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute topographic quadrangle (Exhibit 1).

The survey area for the arroyo toad surveys included all habitat along Big Tujunga Creek upstream of the reservoir extending 0.62 mile (1 kilometer) upstream of the sediment removal area (Exhibit 2). The survey area and surrounding vicinity consist of open space in the Angeles National Forest.

Big Tujunga Creek travels roughly west, and several tributaries from the north and south join it as it flows to Big Tujunga Reservoir. Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels. Erosion has deposited alluvium (including boulders, cobbles, gravel, and coarse to fine sandy soils) within the stream course. Topography is irregular, and stream grade and flow velocity range across a moderate spectrum. Stream morphology includes portions with narrow, incised, fast-moving streams with plunge pools; wider, slow-moving streams; and a relatively broad alluvial wash with multiple meanders where the creek flows into the reservoir.

Habitat in the survey area consists primarily of riparian vegetation along Big Tujunga Creek that is dominated by willows (*Salix* spp.) with scattered white alder (*Alnus rhombifolia*) trees. The understory vegetation includes, but is not limited to, mule fat (*Baccharis salicifolia*), cocklebur (*Xanthium strumarium*), and broad-leaved cattail (*Typha latifolia*). A few western sycamore (*Platanus racemosa*) and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) trees are also present. Representative site photos are included in Attachment A.

225 South Lake Avenue
Suite 1000
Pasadena, CA 91101

Tel 626.351.2000
Fax 626.351.2030
www.Psomas.com

SPECIES BACKGROUND

The arroyo toad was listed as a federally Endangered species by the U.S. Fish and Wildlife Service (USFWS) on December 16, 1994, and is considered a California Species of Special Concern (USFWS 1994; CDFW 2017a). At the time of listing, the arroyo toad was considered a subspecies of southwestern arroyo toad (*Bufo microscaphus*) until genetic studies (Gergus 1998) separated the arroyo toad (*B. californicus*) from the Arizona toad (*B. microscaphus*). Recent research (Frost et al. 2006) places both species in the genus *Anaxyrus*.

The arroyo toad is stocky and uniformly warty, with a light-colored stripe across the head between and including the eyelids. The parotid glands are oval-shaped, widely separated, and pale toward the front. The underside of the arroyo toad is usually buff-colored and unspotted, and the cranial crests are absent or weak. Reproductive adult toads typically range from 2.0 to 2.6 inches snout-vent length (svl) for males and 2.6 to 3.1 inches for females (Sweet 1992, 1993). Tadpoles reach an average maximum length of 1.3 inches (maximum of 1.6 inches) and are black in coloration at hatching, developing tan dorsum and crossbars on the tail and an opaque, white venter before metamorphosing (Sweet 1992).

Early descriptions of the arroyo toad habitat requirements are based on detailed life history studies conducted over a period of years by Dr. Samuel Sweet (1992, 1993). Much of that work was conducted in the Los Padres National Forest in Santa Barbara County. Subsequent to this work, additional studies of populations in other portions of the range have resulted in a somewhat broader habitat description (e.g., Griffin et al. 1999; Ramirez 1999, 2000, 2001, 2002a, 2002b, 2002c). It can generally be said that the arroyo toad frequents third order washes, streams, and arroyos in semiarid parts of the southwest. Stream substrates range from sands to small cobble, with sandy banks supporting mule fat, willows, cottonwoods (*Populus* spp.), and/or sycamores (*Platanus* sp.). The arroyo toad breeds both within streams and in small backwater pools that form along the stream margins, usually in relatively shallow water (four inches) with sand or gravel substrate.

Arroyo toads are nocturnal and will move extensively in upland habitats and seasonally. Adult males will sometimes travel 1.2 to 1.9 miles along a stream course, often becoming more sedentary once reaching a large size. Females are more sedentary, typically maintaining an area of movement less than 330 feet in diameter. Adults feed primarily on ants, particularly nocturnal, trail-forming tree ants (*Liometopum occidentale*), but will also consume other invertebrates. Tadpoles are substrate gleaners, feeding on detritus and microbial mats from just beneath the surface layer of fine sediments or within the interstices of gravel deposits (Sweet 1992).

During the breeding season, typically from February to July, males will make advertisement vocalizations above water from shallow areas along the creek margins. The advertisement call is a whistling trill that lasts from 4 to 9 seconds in duration and is audible up to approximately 985 feet under ideal conditions (Gergus et al. 1997). Egg strings of 2,000 to 10,000 eggs are deposited in shallow water (less than 4 inches in depth) on fine sediment with very low current; these eggs hatch 4 to 6 days later. Larval stage length ranges from 65 to 80 days post-hatching (Sweet 1992).

On February 9, 2011, the USFWS published a final revised rule designating 98,366 acres of critical habitat for the arroyo toad in portions of Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties, California (USFWS 2011). The final revised critical habitat designation reflects an increase of 86,671 acres over the 2005 critical habitat designation.
The survey area is within designated critical habitat Unit 7 (Upper Los Angeles River Basin), which includes 1,190 acres in the Angeles National Forest. Unit 7 encompasses (1) approximately 8.0 miles of upper Big Tujunga Creek from immediately above Big Tujunga Reservoir upstream to 1.2 miles above the confluence with Alder Creek; (2) approximately 3.7 miles of Mill Creek from the Monte Cristo Creek confluence downstream to Big Tujunga Creek; and (3) 1.9 miles of Alder Creek from the Mule Fork

confluence downstream to Big Tujunga Creek. Unit 7 supports an arroyo toad population that is considered important because it occurs at a relatively high elevation considered atypical for the species, and it is the only known population remaining in the coastal foothills of the San Gabriel Mountains.

SURVEY METHODS

The USFWS' 1999 Arroyo Toad Protocol requires that a minimum of six surveys be performed during the breeding season (March 15 to July 1), with at least one survey conducted in April, one in May, and one in June. The surveys included diurnal and nocturnal searches to determine the presence of eggs, tadpoles, and adults. During the diurnal surveys, water was examined for the presence of arroyo toad egg masses and tadpoles. Nocturnal surveys began one hour after dusk during weather conditions conducive to toad activity. Nocturnal search methods included walking along the creek banks and stopping periodically to listen for the breeding calls of adult males. Headlamps and flashlights were used to visually identify toads when a breeding call was heard. If any arroyo toads were found, the individual or population was documented, recorded with a Global Positioning System (GPS) unit, and mapped on an aerial photograph. The number of individuals were noted on each subsequent visit, and data were collected on general habitat characteristics for any arroyo toads observed.

Consulting Senior Biologist Brian Leatherman, Psomas Biologists Jonathan Aguayo and Richard Lewis, III, and Consulting Biologist Greg Stratton conducted the focused surveys in all potentially suitable habitat for arroyo toad in the survey area according to the USFWS-established survey methodology described above. The survey area included all habitat along Big Tujunga Creek, upstream of Big Tujunga Reservoir. Mr. Leatherman and Mr. Aguayo conducted focused surveys for the arroyo toad on April 20, 2017; Mr. Stratton and Mr. Aguayo on May 3 and 31, 2017; Mr. Leatherman and Mr. Stratton on May 23, 2017; and Mr. Leatherman and Mr. Lewis on June 7 and 14, 2017.

Diurnal surveys were conducted from approximately 3:00 PM until dusk, and nocturnal surveys were conducted from one hour after dusk until approximately 11:00 PM. Surveys focused on detecting toads by visual identification; listening for the advertising call of adult males; and checking potentially suitable breeding habitat for tadpoles and/or eggs. Biologists scanned pools for eggs, larvae, metamorphs, juveniles, and breeding and/or calling adults in potentially suitable breeding locations along the creek, and for foraging individuals in the adjacent riparian and upland areas. Surveyors moved in an upstream direction during the surveys. Headlamps, flashlights, and binoculars were used to visually identify toads, frogs, and their larvae detected at night. Nocturnal surveys were conducted during appropriate environmental conditions conducive to the activity patterns of the arroyo toad. Generally, these conditions are nighttime temperatures greater than 50 degrees Fahrenheit (°F) at dusk, with low winds (less than 10 miles per hour); nights with a full or nearly full moon were avoided. Survey dates, times, and weather data are shown in Table 1. Survey conditions and results were documented in field notes.

TABLE 1
SUMMARY OF SURVEY DATA AND CONDITIONS FOR ARROYO TOAD

Survey	Survey Date	Survey Type	Surveying Biologists	Start/End Time	Wind (miles/hour)		Temperature (°F)		Cloud Cover
					Start	End	Start	End	
1	4/20/2017	Diurnal	Leatherman, Aguayo	1:45 PM–5:15 PM	0–2	2–4	81	83	clear
		Nocturnal		7:45 PM–10:35 PM	0–2	2–4	63	59	clear
2	5/3/2017	Diurnal	Aguayo Stratton	3:00 PM–5:30 PM	2–4	2–4	89	83	clear
		Nocturnal		8:00 PM–10:30 PM	2–4	2–4	72	67	clear
3	5/23/2017	Diurnal	Leatherman, Stratton	4:00 PM–6:45 PM	2–4	4–7	88	83	clear
		Nocturnal		8:00 PM–11:05 PM	0–2	2–4	80	70	clear
4	5/31/2017	Diurnal	Aguayo Stratton	3:50 PM–7:05 PM	2–4	0–2	71	65	100%
		Nocturnal		8:40 PM–11:15 PM	0–2	0–2	63	57	clear
5	6/7/2017	Diurnal	Leatherman, Lewis	3:30 PM–6:30 PM	8–12	4–7	81	76	clear
		Nocturnal		8:00 PM–11:35 PM	0–2	2–4	68	61	90%
6	6/14/2017	Diurnal	Leatherman, Lewis	3:30 PM–5:30 PM	4–7	4–7	95	90	clear
		Nocturnal		6:30 PM–10:45 PM	0–2	4–7	79	71	clear

°F: degrees Fahrenheit.

SURVEY RESULTS

The arroyo toad was present during the focused surveys upstream of the reservoir. One individual adult male was observed during surveys conducted on May 23 and 31, and June 7, 2017. Based on comparison of dorsal photographs taken during each survey, the adult male toad was determined to be the same individual repeatedly detected during each survey. While this particular toad was observed vocalizing on May 31 and June 7, no evidence of successful breeding was detected in the survey area on these or subsequent visits. The locations of the arroyo toad observations are presented on Exhibit 3. Dorsal photographs taken during surveys are presented in Attachment A.

Other amphibian species detected during surveys include western toad (*Anaxyrus boreas*), California treefrog (*Pseudacris cadaverina*), and Baja California treefrog (*Pseudacris hypochondriaca*). A complete list of all wildlife species detected during the surveys is provided in Attachment B.

A California Natural Diversity Database (CNDDB) form for arroyo toad is included in Attachment C and will be submitted to the California Department of Fish and Wildlife (CDFW).

OTHER OBSERVATIONS

Least Bell's vireo (*Vireo bellii pusillus*), a State and federally listed Endangered species, was incidentally observed during the third through sixth surveys (Exhibit 3). During the initial detections, only an adult male was detected, but based on behavior, the Biologists suspected it was paired. On the June 14, 2017, survey, an adult least Bell's vireo was observed feeding one fledgling with a second fledgling begging for food. Protocol focused surveys for least Bell's vireo were previously conducted in 2012 and 2016 and results were negative (BonTerra Consulting 2012; BonTerra Psomas 2016). This is the first detection of least Bell's vireo for the Big Tujunga project. Although least Bell's vireo are known to occur up to 4,200 feet in elevation, this least Bell's vireo observation at 2,287 feet is higher in elevation than most recorded observations. Of the 548 records of least Bell's vireo in the CNDDB with elevational information, approximately 86% of the records are from below 2,000 feet in elevation (CDFW 2017b).

Five California Species of Special Concern were observed during the surveys: western pond turtle (*Emys marmorata*), coast horned lizard (*Phrynosoma blainvillii*), coastal whiptail (*Aspidoscelis tigris stejneri*), two-striped garter snake (*Thamnophis hammondii*), and yellow warbler (*Setophaga petechia*) (Exhibit 4). CNDDB forms for least Bell's vireo, western pond turtle, coast horned lizard, coastal whiptail, two-striped garter snake, and yellow warbler are included in Attachment C and will be submitted to the CDFW.

The American peregrine falcon (*Falco peregrinus anatum*) was also detected nesting in the survey area; two juveniles were observed in the nest (Exhibit 4). This species was recently delisted by both the USFWS and the State of California as an Endangered species, but it is still considered a State Fully Protected species. A CNDDB form for peregrine falcon is also included in Attachment C and will be submitted to the CDFW.

Psomas appreciates the opportunity to assist on this project. If you have any comments or questions, please call Amber Heredia at (714) 751-7373.

Sincerely,
P S O M A S

Amber O. Heredia
Senior Project Manager

Jonathan Aguayo
Biologist

Enclosures: Exhibits 1–4
Attachment A – Site Photographs
Attachment B – Wildlife Compendium
Attachment C – California Natural Diversity Database Forms

cc: Alex Ho, alho@dpw.lacounty.gov

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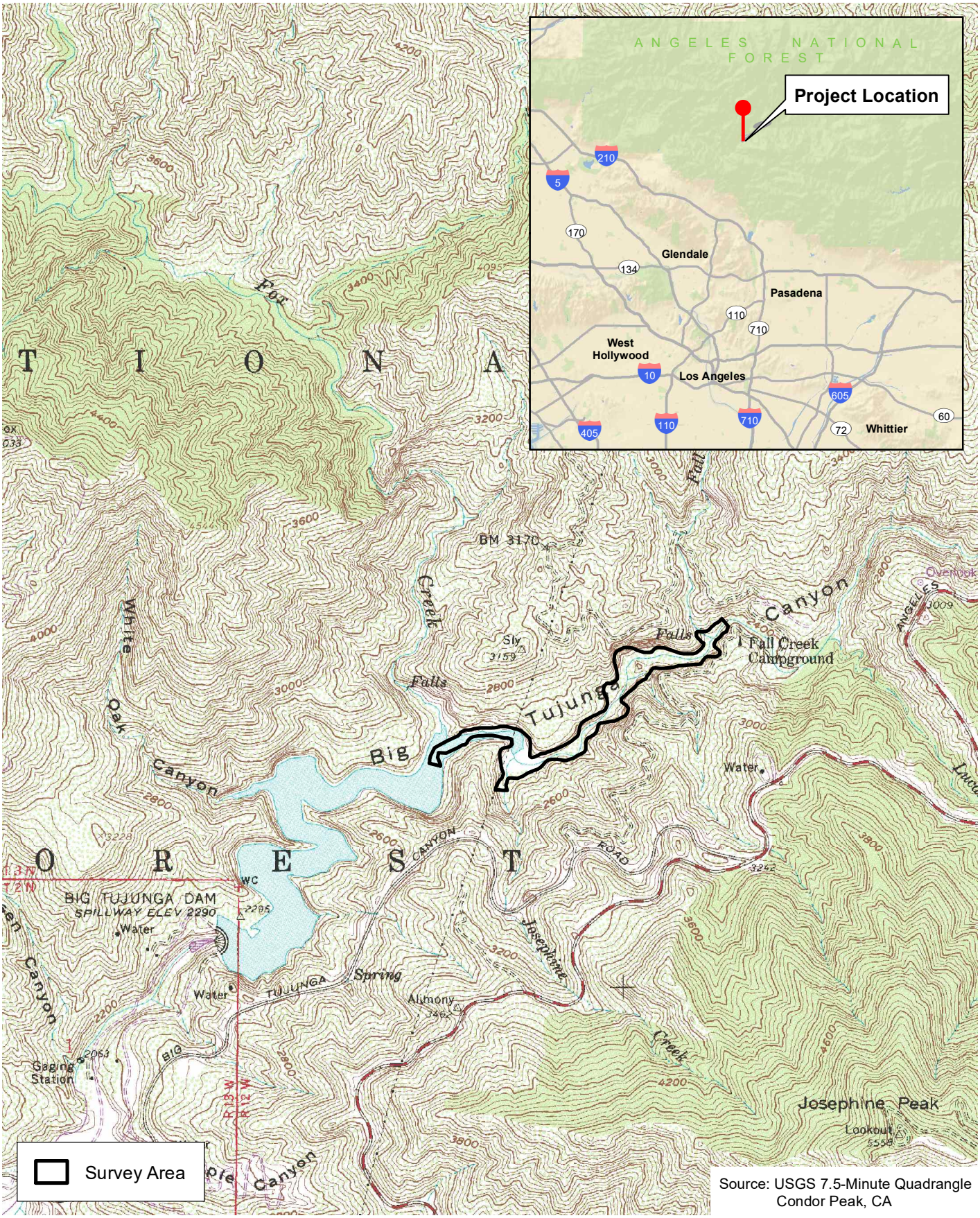

Source: USGS 7.5-Minute Quadrangle
Condor Peak, CA

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Regional Location and Local Vicinity

Exhibit 1

Big Tujunga Reservoir Sediment Removal Project

N
W E
S

2,000 1,000 0 2,000
Feet

PSOMAS

(Rev: 07-24-2017 MMD) R:\Projects\DPW\3DPW029304\Graphics\ARTO\Ex1_RL_LV_20170719.pdf



Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J293\MXD\ARTO\Ex_Survey_Area_20170724.mxd

Survey Area

Exhibit 2

Big Tujunga Reservoir Sediment Removal Project

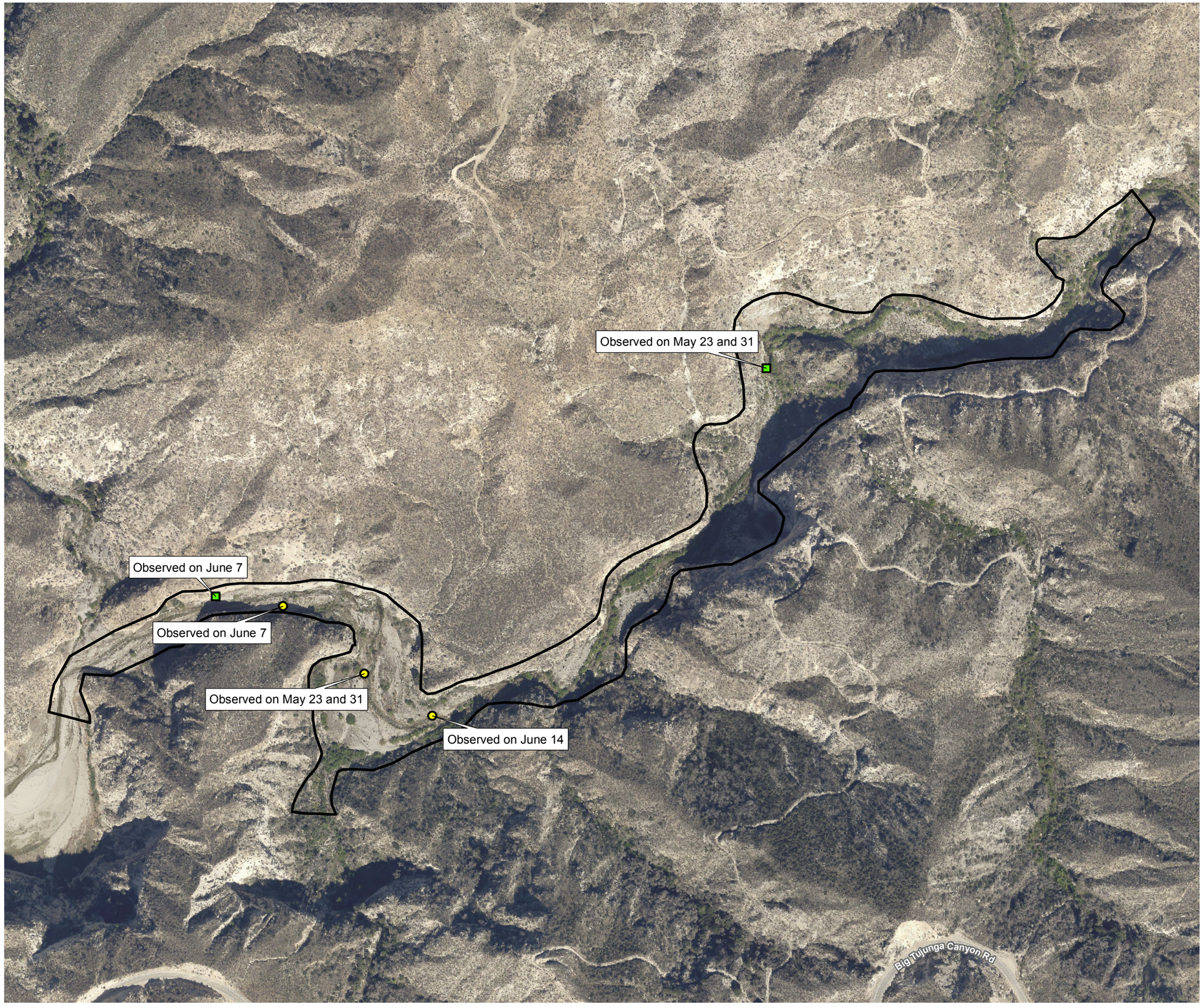
N
W E
S

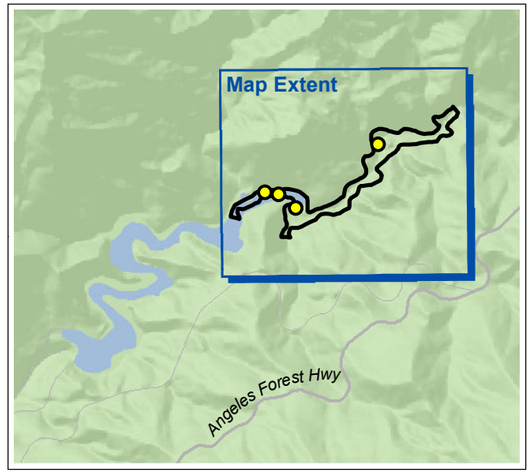
2,000 1,000 0 2,000

Feet

PSOMAS

(Rev: 07-24-2017 CJS) R:\Projects\DPW\3DPW029304\Graphics\ARTO\Ex2_Survey_Area_20170724.pdf





Survey Area

Species with Date of Observation

- Arroyo Toad*
- Least Bell's Vireo**

*Note: Arroyo toad observed was the same individual as determined through comparing photos of the individual.
**These are various observations of the same male vireo observed within his territory on different survey dates.

N
W E
S

400 200 0 400
Feet

Aerial Source: LAR-IAC 2014

Arroyo Toad Observed

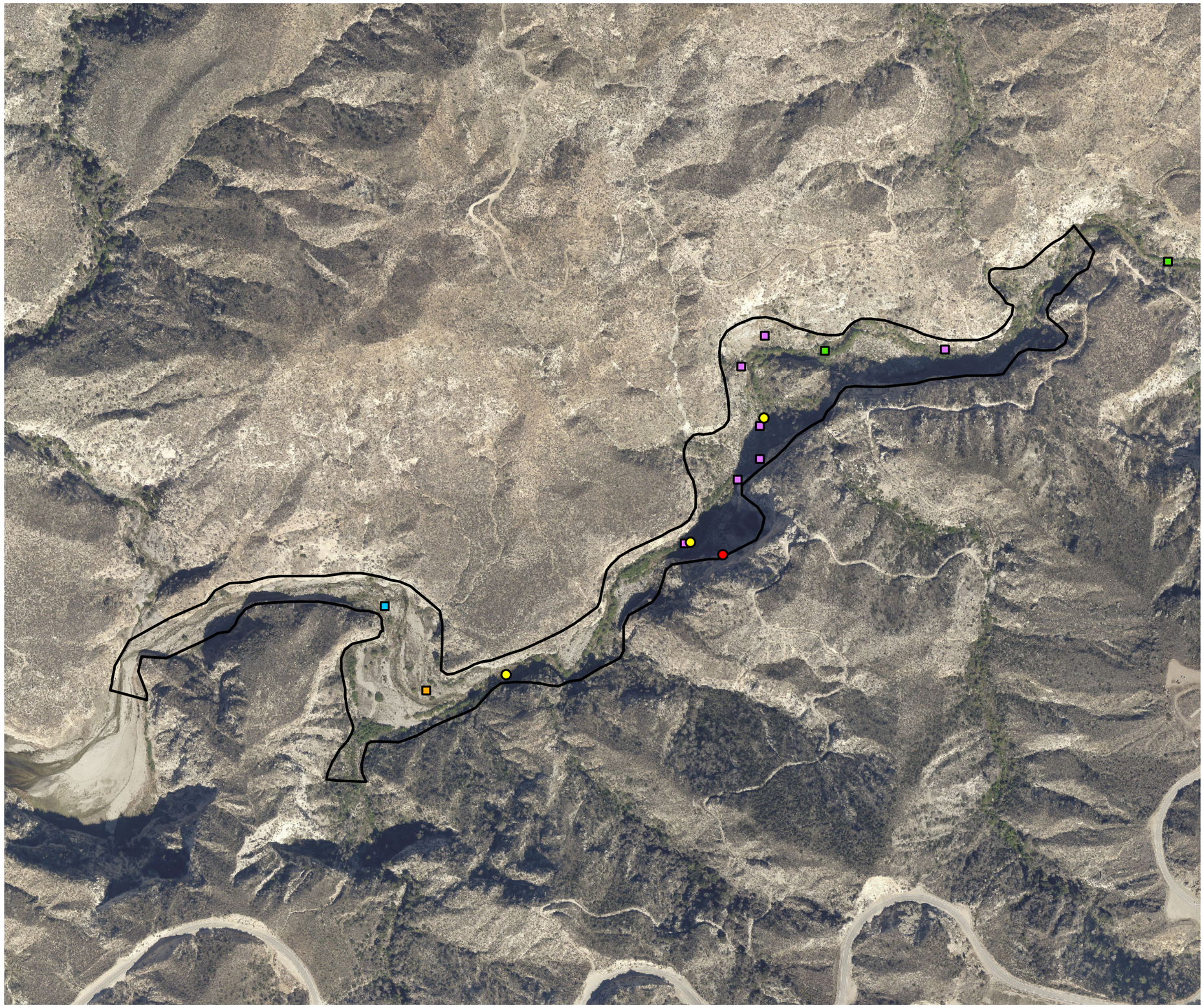
Exhibit 3

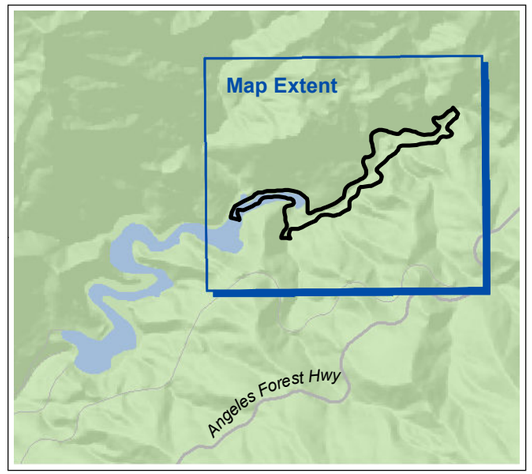
Big Tujunga Reservoir
Sediment Removal Project

PSOMAS

(Rev: 08-02-2017 CJS) R:\Projects\DPW\3DPW029304\Graphics\ARTO\Ex3_ARTO_Observed_20170731.pdf

D:\Projects\COL\DPW\J293\MXD\ART\OIEx_ARTO_Observed_20170731.mxd





Survey Area

Species

- Coast horned lizard
- Coastal whiptail
- Two-striped garter snake
- Western pond turtle
- American peregrine falcon (nest)
- Yellow warbler

N
W E
S

450 225 0 450
Feet

Aerial Source: LAR-IAC 2014

Special Status Species Observed Exhibit 4

Big Tujunga Reservoir
Sediment Removal Project

PSOMAS

(Rev: 08-01-2017 MMD) R:\Projects\DPW\3DPW029304\Graphics\ARTO\Ex4_SS_Species_20170731.pdf

D:\Projects\COLADPW\J293\MXD\ARTO\Ex_SS_Species_20170731.mxd

ATTACHMENT A

SITE PHOTOGRAPHS



Representative view of riparian habitat in the survey area, upstream of Big Tujunga Reservoir.



View of suitable habitat along Big Tujunga Creek located near the middle of the survey area.

D:\Projects\COLADPWJ293\Graphics\ARTO\Ex_SP1_20170719.ai

Site Photographs

Attachment A-1

Big Tujunga Reservoir Sediment Removal Project

PSOMAS

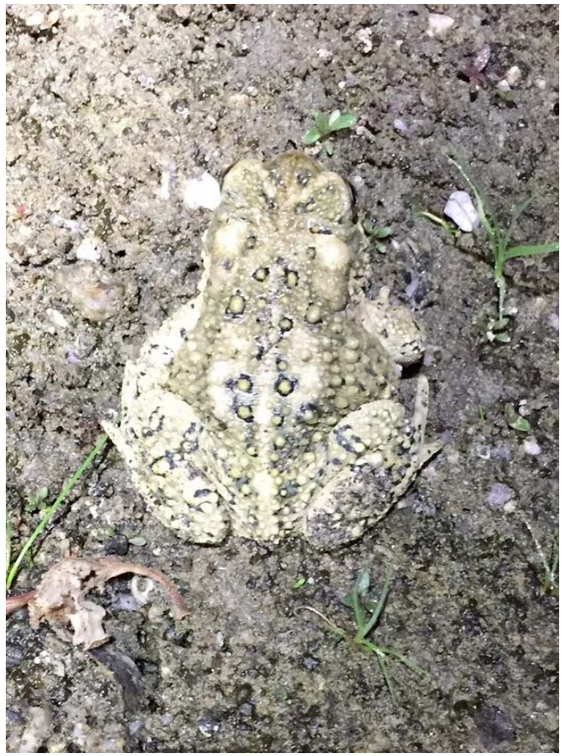
(07/20/2017 MMD) R:\Projects\DPW\3DPW029304\Graphics\ARTO\AttA_SP_20170719.pdf



View of a sandy terrace/streamside along Big Tujunga Creek, where a male arroyo toad was observed on May 23 and 31, 2017.



View of a male arroyo toad located near the middle portion of the survey area, upstream of Big Tujunga Reservoir, observed on June 7, 2017.



May 23, 2017



May 31, 2017



June 7, 2017

One male arroyo toad observed on three survey visits. Determined to be the same individual based on comparing the dorsal pattern. Variation in appearance between photos is a function of the temperature, lighting conditions, and shape; dorsal pattern appears the same.

D:\Projects\COLADPWJ293\Graphics\ARTO\Ex_ARTO_Photos_20170724.ai

Arroyo Toad Photographs

Attachment A-3

Big Tujunga Reservoir Sediment Removal Project

PSOMAS

(07/24/2017 CJS) R:\Projects\DPW\3DPW029304\Graphics\ARTO\AttA_ARTO_Photos.pdf



View of riparian habitat along Big Tujunga Creek, where a male least Bell's vireo was observed on May 23 and 31, 2017. Habitat in this location is dominated by willows and mule fat. A few white alder, western sycamore and Fremont cottonwood trees are also present.



View of riparian habitat where a least Bell's vireo was observed feeding one fledgling with a second fledgling begging for food on June 14, 2017. Habitat in this location is dominated by willows with scattered white alder trees. The understory vegetation includes, but is not limited to, mule fat, cocklebur, and broad-leaved cattail.

D:\Projects\COLADPW\J293\Graphics\ARTO\Ex_ARTO_Photos_2_20170811.ai

Site Photographs

Attachment A-4

Big Tujunga Reservoir Sediment Removal Project

PSOMAS

ATTACHMENT B

WILDLIFE COMPENDIUM

WILDLIFE COMPENDIUM

Scientific Name	Common Name
AMPHIBIANS	
BUFONIDAE – TRUE TOAD FAMILY	
Anaxyrus boreas	western toad
Anaxyrus californicus	arroyo toad
HYLIDAE – TREEFROG FAMILY	
Pseudacris cadaverina	California treefrog
Pseudacris hypochondriaca	Baja California treefrog
TURTLES	
EMYDIDAE – BOX AND BASKING TURTLE FAMILY	
Emys marmorata	western pond turtle
LIZARDS	
PHRYNOSOMATIDAE – SPINY LIZARD FAMILY	
Phrynosoma blainvillii	coast horned lizard
Sceloporus occidentalis	western fence lizard
Uta stansburiana	common side-blotched lizard
TEIIDAE – WHIPTAIL LIZARD FAMILY	
Aspidoscelis tigris stejnegeri	coastal whiptail
SNAKES	
COLUBRIDAE – COLUBRID SNAKE FAMILY	
Hypsiglena ochrorhyncha klauberi	San Diego night snake
NEW WORLD SLENDER BLIND SNAKE FAMILY	
Rena humilis humilis	southwestern threadsnake
NATRICIDAE - HARMLESS LIVE-BEARING SNAKE FAMILY	
Thamnophis hammondii	two-striped garter snake
BIRDS	
ANATIDAE – SWAN, GOOSE, AND DUCK FAMILY	
Anas platyrhynchos	mallard
ODONTOPHORIDAE – NEW WORLD QUAIL FAMILY	
Oreortyx pictus	mountain quail
PODICIPEDIDAE – GREBE FAMILY	
Podiceps nigricollis	eared grebe
COLUMBIDAE – PIGEON AND DOVE FAMILY	
Zenaida macroura	mourning dove
CAPRIMULGIDAE – NIGHTJAR FAMILY	
Phalaenoptilus nuttallii	common poorwill
APODIDAE – SWIFT FAMILY	
Aeronautes saxatalis	white-throated swift
TROCHILIDAE – HUMMINGBIRD FAMILY	
Calypte anna	Anna’s hummingbird
Calypte costae	Costa’s hummingbird
SCOLOPACIDAE – SANDPIPER FAMILY	
Actitis macularius	spotted sandpiper
PHALACROCORACIDAE – CORMORANT FAMILY	
Phalacrocorax auritus	double-crested cormorant

WILDLIFE COMPENDIUM

Scientific Name	Common Name
ARDEIDAE – HERON FAMILY	
Ardea herodias	great blue heron
Nycticorax nycticorax	black-crowned night-heron
CATHARTIDAE – NEW WORLD VULTURE FAMILY	
Cathartes aura	turkey vulture
ACCIPITRIDAE – HAWK FAMILY	
Buteo jamaicensis	red-tailed hawk
FALCONIDAE – FALCON FAMILY	
Falco sparverius	American kestrel
Falco peregrinus	peregrine falcon
TYRANNIDAE – TYRANT FLYCATCHER FAMILY	
Empidonax difficilis	Pacific-slope flycatcher
Sayornis nigricans	black phoebe
Myiarchus cinerascens	ash-throated flycatcher
VIREONIDAE – VIREO FAMILY	
Vireo bellii pusillus	least Bell's vireo
Vireo gilvus	warbling vireo
CORVIDAE – JAY AND CROW FAMILY	
Aphelocoma californica	California scrub-jay
Corvus corax	common raven
HIRUNDINIDAE – SWALLOW FAMILY	
Tachycineta thalassina	violet-green swallow
AEGITHALIDAE – BUSHTIT FAMILY	
Psaltriparus minimus	bushtit
TROGLODYTIDAE – WREN FAMILY	
Salpinctes obsoletus	rock wren
Catherpes mexicanus	canyon wren
Thryomanes bewickii	Bewick's wren
POLIOPTILIDAE – GNATCATCHER FAMILY	
Polioptila caerulea	blue-gray gnatcatcher
SYLVIIDAE – SILVIID WARBLERS FAMILY	
Chamaea fasciata	wrentit
FRINGILLIDAE – FINCH FAMILY	
Haemorhous mexicanus	house finch
Spinus psaltria	lesser goldfinch
PARULIDAE – WOOD-WARBLER FAMILY	
Vermivora celata	orange-crowned warbler
Leiothlypis ruficapilla	Nashville warbler
Setophaga petechia	yellow warbler
Setophaga nigrescens	black-throated gray warbler
Cardellina pusilla	Wilson's warbler
EMBERIZIDAE – SPARROW FAMILY	
Pipilo maculatus	spotted towhee
Melozone crissalis	California towhee
Melospiza melodia	song sparrow

WILDLIFE COMPENDIUM

Scientific Name	Common Name
Melospiza lincolnii	Lincoln's sparrow
CARDINALIDAE – CARDINALS, GROSBEAKS, AND ALLIES FAMILY	
Piranga ludoviciana	western tanager
Pheucticus melanocephalus	black-headed grosbeak
Passerina caerulea	blue grosbeak
Passerina amoena	lazuli bunting
ICTERIDAE – BLACKBIRD, COWBIRD, AND ORIOLE FAMILY	
Agelaius phoeniceus	red-winged blackbird
*Molothrus ater**	brown-headed cowbird
Icterus bullockii	Bullock's oriole
MAMMALS	
SCIURIDAE – SQUIRREL FAMILY	
Otospermophilus beecheyi	California ground squirrel
PROCYONIDAE – PROCYONID FAMILY	
Procyon lotor	northern raccoon
CERVIDAE – CERVID FAMILY	
Odocoileus hemionus	southern mule deer
* Non-native species	

ATTACHMENT C

CALIFORNIA NATURAL DIVERSITY DATABASE FORMS

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/07/2017

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Anaxyrus californicus*

Common Name: arroyo toad

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

***Location Description* (please attach map AND/OR fill out your choice of coordinates, below)**

Habitat along Big Tujunga Creek extending 0.62 mile (1 kilometer) upstream of Big Tujunga Reservoir.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW
Quad Name: Condor Peak Elevation: 2252-2370 ft
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: Arroyo toad (male) - 11s 392558 E, 3796574 N (May 23 and 31), 11s 391874 E, 3796290 (June 7)

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Habitat consists primarily of riparian vegetation along Big Tujunga Creek that is dominated by willows (Salix spp.) with scattered white alder (Alnus rhombifolia). Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels. Erosion has deposited alluvium (including boulders, cobbles, gravels, and coarse to fine sandy soils) within the stream course. Stream morphology includes portions with narrow, incised, fast-moving streams with plunge pools; wider, slow-moving streams.

Other rare taxa seen at THIS site on THIS date: (separate form preferred) western pond turtle, coast horned lizard, coastal whiptail, two-striped garter snake, American peregrine falcon, least Bell's vireo, and yellow warbler.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats: potential landslides

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Familiarity with species, visually and aurally

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/14/2017

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

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Scientific Name: *Vireo bellii pusillus*

Common Name: least Bell's vireo

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 4 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☑ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

2	2			
# adults	# juveniles	# larvae	# egg masses	# unknown

☑	☐	☐	☐	☑	☐
breeding	wintering	burrow site	rookery	nesting	other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Habitat along Big Tujunga Creek extending 0.62 mile (1 kilometer) upstream of Big Tujunga Reservoir.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW
Quad Name: Condor Peak Elevation: 2252-2370 ft
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: least Bell's vireo pair with juveniles - 11s 391958 E, 3796278 N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Habitat consists primarily of riparian vegetation along Big Tujunga Creek that is dominated by a willows (Salix spp.) with scattered white alder (Alnus rhombifolia). The understory vegetation includes, but is not limited to, mule fat (Baccharis salicifolia), cocklebur (Xanthium strumarium), and broad-leaved cattail (Typha latifolia). A few western sycamore (Platanus racemosa) and Fremont cottonwood (Populus fremontii ssp. fremontii) are also present. Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels.

Other rare taxa seen at THIS site on THIS date: (separate form preferred) arroyo toad, western pond turtle, coast horned lizard, coastal whiptail, two-striped garter snake, American peregrine falcon, and yellow warbler.

Site Information

Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor
Immediate AND surrounding land use: Angeles National Forest, open space
Visible disturbances:
Threats: potential landslides
Comments: A pair was observed feeding one of two fledglings with the second one begging for food. The male and/or pair was also observed/detected on May 23, May 31, and June 7, 2017,

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Familiarity with species, visually and aurally

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/31/2017

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Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

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California Native Species Field Survey Form

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Scientific Name: *Emys marmorata*

Common Name: western pond turtle

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 2 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

2 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Habitat along Big Tujunga Creek extending 0.62 mile (1 kilometer) upstream of Big Tujunga Reservoir.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW
Quad Name: Condor Peak Elevation: 2252-2370 ft
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: WPTU1: 392666 E, 3796621 N (May 31, 2017); WPTU2: 393146 E, 3796746 N (June 7, 2017)

Habitat Description (plant communities, dominants, associates, substrates/soils, aspects/slope):

Habitat consists primarily of riparian vegetation along Big Tujunga Creek that is dominated by willows (Salix spp.) with scattered white alder (Alnus rhombifolia). The understory vegetation includes, but is not limited to, mule fat (Baccharis salicifolia), cocklebur (Xanthium strumarium), and broad-leaved cattail (Typha latifolia). Stream morphology includes portions with narrow, incised, fast-moving streams with plunge pools; wider, slow-moving streams; and a relatively broad alluvial wash with multiple meanders where the creek flows into the reservoir.

Other rare taxa seen at THIS site on THIS date: (separate form preferred) arroyo toad, coast horned lizard, coastal whiptail, two-striped garter snake, American peregrine falcon, least Bell's vireo, and yellow warbler.

Site Information

Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats: potential landslides

Comments: 2 individuals were observed submerged in the water of Big Tujunga Creek.

Determination: (check one or more, and fill in blanks)

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Familiarity with species, visually

Photographs: (check one or more)

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/31/2017

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Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

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California Native Species Field Survey Form

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Scientific Name: *Phrynosoma blainvillii*

Common Name: coast horned lizard

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Habitat along Big Tujunga Creek extending 0.62 mile (1 kilometer) upstream of Big Tujunga Reservoir.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2252-2370 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates: 1: 392108 E, 3796146 N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Observed on an open sandy area with adjacent riparian habitat along Big Tujunga Creek that is dominated by willows (Salix spp.) with scattered white alder (Alnus rhombifolia). The understory vegetation includes, but is not limited to, mule fat (Baccharis salicifolia), cocklebur (Xanthium strumarium), and broad-leaved cattail (Typha latifolia).

Other rare taxa seen at THIS site on THIS date: (separate form preferred) arroyo toad, western pond turtle, coastal whiptail, two-striped garter snake, American peregrine falcon, least Bell's vireo, and yellow warbler.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats: potential landslides

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Familiarity with species, visually

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/31/2017

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

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Scientific Name: *Aspidoscelis tigris stejneri*

Common Name: coastal whiptail

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ ☐ no ☑ unk.
Yes, Occ. #

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Habitat along Big Tujunga Creek extending 0.62 mile (1 kilometer) upstream of Big Tujunga Reservoir.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2252-2370 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐

Source of Coordinates (GPS, topo. map & type): GPS

GPS Make & Model Garmin eTrek Vista

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐

Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: 1: 392050 E, 3796264 N

Habitat Description (plant communities, dominants, associates, substrates/soils, aspects/slope):

Observed on an open sandy area with adjacent riparian habitat along Big Tujunga Creek that is dominated by willows (Salix spp.) with scattered white alder (Alnus rhombifolia). The understory vegetation includes, but is not limited to, mule fat (Baccharis salicifolia), cocklebur (Xanthium strumarium), and broad-leaved cattail (Typha latifolia).

Other rare taxa seen at THIS site on THIS date: (separate form preferred) arroyo toad, western pond turtle, coast horned lizard, two-striped garter snake, American peregrine falcon, least Bell's vireo, and yellow warbler.

Site Information

Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats: potential landslides

Comments:

Determination: (check one or more, and fill in blanks)

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Familiarity with species, visually

Photographs: (check one or more)

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/03/2017

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Thamnophis hammondii*

Common Name: two-striped garter snake

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 10 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

10 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Habitat along Big Tujunga Creek extending 0.62 mile (1 kilometer) upstream of Big Tujunga Reservoir.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2252-2370 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates: 1: 392470 E, 3796352 N; 2-5: 392544 E, 3796441 N (4 individuals); 6: 392575 E, 3796470 N; 7: 392575 E, 3796516 N; 8: 392549 E, 3796599 N; 9: 392582 E, 3796642 N; 10: 392834 E, 3796623 N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Habitat consists primarily of riparian vegetation along Big Tujunga Creek that is dominated by willows (Salix spp.) with scattered white alder (Alnus rhombifolia). The understory vegetation includes, but is not limited to, mule fat (Baccharis salicifolia), cocklebur (Xanthium strumarium), and broad-leaved cattail (Typha latifolia). A few western sycamore (Platanus racemosa) and Fremont cottonwood (Populus fremontii ssp. fremontii) are also present. Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels.

Other rare taxa seen at THIS site on THIS date: (separate form preferred) arroyo toad, western pond turtle, coast horned lizard, coastal whiptail, American peregrine falcon, least Bell's vireo, and yellow warbler.

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats: potential landslides

Comments: 9 individuals were observed submerged in the water of Big Tujunga Creek, 1 individual was observed out of the water along the creek.

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Familiarity with species, visually

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

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Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/03/2017

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Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

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California Native Species Field Survey Form

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Scientific Name: *Setophaga petechia*

Common Name: yellow warbler

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 3 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

3 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☑ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Habitat along Big Tujunga Creek extending 0.62 mile (1 kilometer) upstream of Big Tujunga Reservoir.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2252-2370 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: YEWA1 - 11s 392220 E, 3796168 N, YEWA2 - 11s 392478 E, 3796353 N, YEWA3 - 11s 392581 E, 3796527 N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Habitat consists primarily of riparian vegetation along Big Tujunga Creek that is dominated by willows (Salix spp.) with scattered white alder (Alnus rhombifolia). The understory vegetation includes, but is not limited to, mule fat (Baccharis salicifolia), cocklebur (Xanthium strumarium), and broad-leaved cattail (Typha latifolia). A few western sycamore (Platanus racemosa) and Fremont cottonwood (Populus fremontii ssp. fremontii) are also present. Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels.

Other rare taxa seen at THIS site on THIS date: (separate form preferred) arroyo toad, western pond turtle, coast horned lizard, coastal whiptail, two-striped garter snake, American peregrine falcon, and least Bell's vireo.

Site Information

Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats: potential landslides

Comments: 1 - 3 singing males were observed/detected during the month of April, May, and June along Big Tujunga Creek upstream of Big Tujunga Reservoir.

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Familiarity with species, visually and aurally

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
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Department of Fish and Game
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Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/14/2017

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Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

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Scientific Name: *Falco peregrinus anatum*

Common Name: American peregrine falcon

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 4 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

2	2			
# adults	# juveniles	# larvae	# egg masses	# unknown

☑	☐	☐	☐	☑	☐
breeding	wintering	burrow site	rookery	nesting	other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Habitat along Big Tujunga Creek extending 0.62 mile (1 kilometer) upstream of Big Tujunga Reservoir.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW
Quad Name: Condor Peak Elevation: 2252-2370 ft
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐
Coordinates: Approximate location of the nest: 11s 392559 E, 3796346 N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels. Nest located on a steep slope with scattered shrubs such as California buckwheat (Eriogonum fasciculatum), Our Lord's candle (Hesperoyucca whipplei), black sage (Salvia mellifera), and laurel saumac (Malosma laurina).

Other rare taxa seen at THIS site on THIS date: (separate form preferred) arroyo toad, western pond turtle, coast horned lizard, coastal whiptail, two-striped garter snake, least Bell's vireo, and yellow warbler.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats: potential landslides

Comments: Pair was observed/detected during the month of April, May and June in the same general area, perching/flying near the nest. On June 14, 2017, two nestlings were observed in the nest.

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Familiarity with species, visually and aurally

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

September 25, 2018

Stacey Love
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

VIA EMAIL
Stacey_Love@fws.gov

Subject: Results of 2018 Focused Surveys for Special Status Amphibian Species for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles, California

Dear Ms. Love:

This Letter Report presents the results of the 2018 focused diurnal and nocturnal surveys to determine the presence or absence of special status amphibian species, including the arroyo toad (*Anaxyrus californicus*), California red-legged frog (*Rana draytonii*), and southern mountain [Sierra Madre] yellow-legged frog (*Rana muscosa*) for the Big Tujunga Reservoir Sediment Removal Project (hereinafter referred to as the "proposed project") located in Los Angeles County, California (Exhibit 1). A qualified Biologist with the necessary experience and a California Department of Fish and Wildlife (CDFW) scientific collecting permit conducted the surveys.

PROJECT DESCRIPTION AND LOCATION

The proposed project involves the dewatering of the Big Tujunga Reservoir and the removal of sediment to the nearby Maple Canyon Sediment Placement Site. The proposed project is located on the southern edge of the San Gabriel Mountains in the Angeles National Forest and is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute topographic quadrangle (Exhibit 1).

The survey area for the special status amphibian species surveys included all habitat along Big Tujunga Creek from Fall Creek to Big Tujunga Reservoir, and from Big Tujunga Dam downstream to 0.62 mile downstream of the Big Tujunga Canyon Road bridge (Exhibit 2). The survey area and surrounding vicinity consist of open space in the Angeles National Forest.

Big Tujunga Creek travels roughly west, and several tributaries from the north and south join it as it flows to Big Tujunga Reservoir. Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels. Erosion has deposited alluvium (including boulders, cobbles, gravel, and coarse to fine sandy soils) within the stream course. Topography is irregular, and stream grade and flow velocity range across a moderate spectrum.

Upstream of the reservoir, habitat in the survey area's upper section consists primarily of riparian vegetation along Big Tujunga Creek that is dominated by willows (*Salix* spp.) with scattered white alder (*Alnus rhombifolia*) trees. The understory vegetation includes, but is not limited to, mule fat (*Baccharis salicifolia*), cocklebur (*Xanthium strumarium*), and broad-leaved cattail (*Typha latifolia*). A few western sycamore (*Platanus racemosa*) and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) trees are also present. Stream morphology in

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Santa Ana, CA 92707

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the upper section varies with some areas that are narrow, incised, and fast-moving; areas of small pools; and areas of broad alluvial wash. From April through early June, water flowed throughout the upper section; during the later surveys, the stream was intermittent with a mix of dry segments and pools.

Downstream of the Big Tujunga Dam, riparian habitat in the survey area's lower section is characterized by relatively dense and continuous willow riparian forest dominated by Fremont cottonwood, white alder, arroyo willow (*Salix lasiolepsis*), and red willow (*S. laevigata*). Common understory species include mule fat, hoary nettle (*Urtica dioica* ssp. *holosericea*), and mugwort (*Artemisia douglasiana*). At the initiation of the surveys in April, stream morphology in the lower section was intermittent with a mix of dry segments and pools. From May through the end of the survey period, stream morphology in the lower section consisted of a slow-moving stream with large pools.

Representative site photos are included in Attachment A.

SPECIES BACKGROUND

Arroyo Toad

The arroyo is a federally listed Endangered species and a California Species of Special Concern. At the time of listing, the arroyo toad was considered a subspecies of southwestern arroyo toad (*Bufo microscaphus*) until genetic studies (Gergus 1998) separated the arroyo toad (*B. californicus*) from the Arizona toad (*B. microscaphus*). Recent research (Frost et al. 2006) places both species in the genus *Anaxyrus*.

The arroyo toad is a small, olive green or gray to tan toad with warty skin and dark spots. It has a light-colored V-shaped stripe across the head between and including the eyelids, and a light spot on each sacral hump and in the middle of its back. It normally lacks a mid-dorsal stripe (i.e., a stripe down the center of its back). The underside of the arroyo toad is usually buff-colored and unspotted. The parotid glands are oval-shaped, widely separated, and pale toward the front; and the cranial crests are absent or weak. Reproductive adult toads typically range from 2.2 to 2.6 inches snout to vent length for males and 2.6 to 3.3 inches for females (USFWS 1999a). Its movement consists of hopping rather than walking (USFWS 1994). Arroyo toads are nocturnal (i.e., active at night). Adults feed primarily on ants but will also consume beetles, spiders, larvae, caterpillars, and other invertebrates (USFWS 2009). Males become sexually mature in one to two years, and females become sexually mature in two to three years; arroyo toads can live up to five years (Sweet 1992, 1993).

Tadpoles are black in coloration at hatching and develop a tan coloration on the upper side; gold and dark crossbars on the tail; and an opaque, white venter on the underside before metamorphosing (Sweet 1992; USFWS 1999a). Tadpoles typically metamorphose at a length of 1.1 to 1.6 inches (USFWS 1999a). Juveniles have a white-gray-tan coloring with dark spots on the upper side and a white underside. The V-shaped line on the head is visible on juveniles, but the parotid glands are typically not yet visible (Sweet 1992; Sanders 1950). Juveniles usually grow to about 1.2 to 1.6 inches their first year (sometimes up to 2.0 inches) and then do not grow again until the following spring (Sweet 1992).

The arroyo toad population is currently distributed in coastal drainages and along the desert slopes of the Transverse and Peninsular Ranges from approximately 1,000 feet to 4,600 feet above mean sea level (msl); however, the species has been recorded from sea level to 8,000 feet above msl in Baja California (Patten and Myers 1992; Jennings and Hayes 1994a; Welsh 1988; Beaman et al. 1995; USFWS 1999a). It occurs in intermittent washes/streams and perennial streams. In the northern portion of their range, they

generally occur in third- to sixth-order[1] or greater streams; however, in the southern portion of their range, they can occur in first- and second-order streams (USFWS 1999a; Griffin et al. 1999; USFWS 2009). "Episodic flooding is critical to keeping the low stream terraces relatively vegetation free and soils friable enough for juveniles and adults to create burrows" (Jennings and Hayes 1994a).

The most favorable breeding habitat for arroyo toad consists of slow-moving streams with shallow pools, nearby sandbars, and adjacent stream terraces. Outside the breeding season, arroyo toads are essentially terrestrial, using a variety of upland habitats, including sycamore-cottonwood woodlands, oak woodlands, coastal sage scrub, chaparral, and grasslands (Holland 1995; Griffin et al. 1999; USFWS 2009). Adult toads burrow into sandy terraces where they shelter during the day when the surface is damp or during longer periods during the dry season (Sweet 1989). During the non-breeding season (August to January), arroyo toad will aestivate (a state of dormancy similar to hibernation) to prevent dehydration during hot or dry times of the year (Ramirez 2003).

Adult male arroyo toads will sometimes travel 1.2 to 1.9 miles along a stream course, often becoming more sedentary once reaching a large size. Females are more sedentary, typically maintaining an area of movement less than 330 feet. Adult and subadult arroyo toads can range widely into the uplands, commonly 0.3 mile, with some movements up to 1.2 miles from the stream (USFWS 1999a).

During the breeding season, typically from February to July, males will make advertisement vocalizations above water from shallow areas along the creek margins. The advertisement call is a soft, high, whistling trill that lasts from 4 to 9 seconds in duration and is audible up to approximately 985 feet under ideal conditions (Gergus et al. 1997). Two parallel egg strings of 2,000 to 10,000 eggs are deposited in shallow water (i.e., usually less than 4 inches in depth with an average of 1.4 inches) on fine sediment with very low current (0.2 foot per second) and little or no emergent vegetation (Sweet 1992; USFWS 1999a). These eggs hatch four to six days later (Sweet 1992). Streams where arroyo toad occur must have water from approximately late March through mid-June to allow tadpoles to develop (Sweet 1989). The tadpole stage usually lasts about ten weeks (USFWS 2009). Tadpoles feed on loose organic material such as interstitial algae, bacteria, and diatoms from just beneath the surface layer of fine sediments or within the interstices of gravel deposits; they do not forage on macroscopic vegetation (Sweet 1992; Jennings and Hayes 1994a; USFWS 2009). After metamorphosis in June or July, the juveniles remain on the adjacent gravel bars or sandy stream terraces for 8 to 12 weeks (depending on site conditions and rainfall), where they forage for insects (Sweet 1992; USFWS 1994).

On February 9, 2011, the USFWS published the Revised Critical Habitat for the arroyo toad. The Revised Critical Habitat designated 98,366 acres of critical habitat for the arroyo toad in portions of Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties, California (USFWS 2011). The survey area is within designated critical habitat Unit 7 (Upper Los Angeles River Basin), which includes 1,190 acres in the Angeles National Forest. Unit 7 encompasses (1) approximately 8.0 miles of upper Big Tujunga Creek from immediately above Big Tujunga Reservoir upstream to 1.2 miles above the confluence with Alder Creek; (2) approximately 3.7 miles of Mill Creek from the Monte Cristo Creek confluence downstream to Big Tujunga Creek; and (3) 1.9 miles of Alder Creek from the Mule Fork confluence downstream to Big Tujunga Creek. Unit 7 supports an arroyo toad population that is considered important because it occurs at a relatively high elevation considered atypical for the species, and it is the only known population remaining in the coastal foothills of the San Gabriel Mountains.

[1] Stream order is a relative size of streams. The smallest tributaries are referred to as first-order streams. Two first-order streams combine to create a second-order stream, and so on (Sweet 1992).

California Red-legged Frog

The California red-legged is an Endangered species and a California Species of Special Concern. This frog has been extirpated from approximately 70 percent of its historic range (USFWS 2006a). At the time of listing, the red-legged frog (*Rana aurora*) comprised two subspecies, the California red-legged frog (*R. aurora draytonii*) and the northern red-legged frog (*R. aurora aurora*) until genetic studies (Shaffer et al. 2004) determined that *R. aurora* is actually two separate species, northern red-legged frog (*R. aurora*) and California red-legged frog (*R. draytonii*). The ranges of these two species overlap in Mendocino County. Only the California red-legged frog (*R. draytonii*) occurs within the project region.

The California red-legged frog ranges in size from 1.5 to 5.5 inches in length, making it the largest native frog in the western United States (Wright and Wright 1949). Adult females are significantly longer than males, with an average snout to vent length of 5.4 inches versus 4.5 inches for adult males (Hayes and Miyamoto 1984). The hind legs and lower abdomen of adult frogs are often characterized by a reddish or salmon pink color; and the back is brown, gray, olive, or reddish brown, marked with small black flecks and larger irregular dark blotches (USFWS 2002a; Stebbins 2003). Dorsal spots often have light centers and, in some individuals, form a network of black lines (Stebbins 2003). Dorsolateral folds are prominent. Tadpoles range in length from 0.6 to 3.2 inches, and are a dark brown or olive, marked with darker spots (Storer 1925).

This species is found in humid forests, woodlands, grasslands, streams, wetlands, ponds, and lakes from sea level to 8,000 feet msl (Stebbins 2003). Preferred breeding habitat includes deep ponds and slow-moving streams where emergent vegetation is found on the bank edges (Jennings and Hayes 1994a). Although primarily aquatic, it has been recorded in damp terrestrial places up to 302 feet from water for up to 50 consecutive days (Tatarian 2008) using small mammal burrows and moist leaf litter as refugia during dry periods (Jennings and Hayes 1994b).

California red-legged frog adults tend to be primarily nocturnal, while juveniles can be active at any time of day (Hayes and Tennant 1985). Adults feed on a wide range of prey, having been recorded feeding on at least 42 different taxa in a single study (Hayes and Tennant 1985), the majority of which were terrestrial invertebrates but also included fish, other amphibians, and small rodents. The diet of red-legged frog tadpoles has not been studied but is expected to be similar to other ranid frogs that feed on algae, diatoms, and detritus by grazing the surface of rocks and vegetation (Kupferberg 1997).

During the breeding season, typically from November through April, males call to females from the margins of ponds and slow streams (Jennings and Hayes 1994a). Unlike northern red-legged frogs, which lack vocal sacs and call underwater, California red-legged frogs have paired vocal sacs and call above the water surface (Hayes and Krempels 1986), though vocalizations are relatively weak and difficult to detect. Actual mating most commonly occurs in March but can vary depending on seasonal climatic patterns. The female lays a jellylike mass of 2,000 to 5,000 reddish brown eggs attached to emergent vegetation, twigs, or other structures in still or slow-moving water. The resulting tadpoles typically require about 3 weeks to hatch and another 11 to 20 weeks to metamorphose into juvenile frogs. Metamorphosis typically occurs from July to September, although some tadpoles have been observed to delay metamorphosis until the following March or April (Bobzien et al. 2000; Fellers et al. 2001). Red-legged frogs typically reach sexual maturity approximately two years (for males) and three years (for females) from metamorphosis (Jennings and Hayes 1985).

On March 17, 2010, the USFWS published the Revised Critical Habitat for the California red-legged frog. The Revised Critical Habitat designated 1,636,609 acres of critical habitat for the arroyo toad in 27 counties in California; Southern California counties include Santa Barbara, Ventura, Los Angeles, and Riverside. The survey area is not located within designated or proposed Critical Habitat for this species.

The California red-legged frog occurred historically in the Big Tujunga Creek above Big Tujunga Dam and in several other drainages in the San Gabriel Mountains, but it has not been observed in the San Gabriel Mountains since the mid-1980s. In fact, this species was considered extirpated from the entire Angeles National Forest until small populations were rediscovered in San Francisquito Creek (Stephenson and Calcarone 1999) and in Aliso Creek near its confluence with Gleason Canyon (USFS 2009). The Aliso Creek population is the closest known for this species and is located approximately 10 miles northwest of the survey area.

Southern Mountain [Sierra Madre] Yellow-legged Frog

The southern mountain [Sierra Madre] yellow-legged frog is a federally and State listed Endangered species. This species has been extirpated from more than 90 percent of its historic range (Knapp et al. 2007). At the time of listing, the Sierra Madre and the Sierra Nevada yellow-legged frogs were considered distinct population segments of yellow-legged frog. Genetic, morphological, and acoustical studies (Vredenburg et al. 2007) have determined that they are genetically distinct; and the Sierra Nevada yellow-legged frog (*Rana sierra*) is now recognized as a new species. The northern distribution of the southern mountain [Sierra Madre] yellow-legged frog occurs on the western slopes of the Sierra Nevada Mountains from Fresno County south to Kern County, with Mather Pass representing the northern border of the species' range (Vredenburg et al. 2007). The Sierra Nevada yellow-legged frog occurs north of Mather Pass on the eastern slopes of the Sierra Nevada Mountains. The southern distribution of the southern mountain [Sierra Madre] yellow-legged frog consists of several small, isolated populations in the San Gabriel, San Bernardino, and San Jacinto Mountains, the largest of which does not exceed 100 individuals. Only the southern mountain [Sierra Madre] yellow-legged frog is known to occur in the project region.

The southern mountain [Sierra Madre] yellow-legged frog ranges in size from 1.50 to 3.25 inches snout to vent length (Jennings and Hayes 1994a). Females average slightly larger than males (Stebbins 2003). The belly and ventral (bottom) surface of the hind limbs are yellow to orange, with this pigmentation on the abdomen occasionally extending to the forelimbs (Stebbins 2003). Dorsal (top) coloration in adults is variable, exhibiting a mix of brown and yellow; but it can also be gray, red, or green-brown and usually patterned with dark spots (Jennings and Hayes 1994a). Dorsolateral (horizontal along the body) folds are apparent but not as pronounced as in the red-legged frog. Tadpoles can reach lengths of 2.8 inches and are generally mottled brown in dorsal coloration with a golden tint and faintly yellow ventral coloration (Stebbins 2003).

Within the southern range of the southern mountain [Sierra Madre] yellow-legged frog in the San Gabriel, San Bernardino, and San Jacinto Mountains, this species is found in narrow, rock-walled canyons with perennial rivers or creeks, permanent plunge pools in intermittent creeks, and pools in montane riparian and/or chaparral habitat from 1,200 to 7,500 feet above msl (Jennings and Hayes 1994a). Breeding pools must maintain water during the entire tadpole growth phase, which can last up to four years. Substrates in the aquatic habitat consist of varying proportions of silt, sand, gravel, cobble, rock, and boulders. Boulders and open gravel banks projecting above the water level are required for sunning. Aquatic refugia, including pools with overhanging banks, fallen logs, or rocks, are required to escape predation.

Southern mountain [Sierra Madre] yellow-legged frogs are primarily diurnal and maintain a small home range, likely less than 33 feet in the longest dimension (CDFW 2008). They are also highly aquatic, not venturing more than a few feet from water (CDFW 2008). Adults feed primarily on aquatic and terrestrial invertebrates, favoring terrestrial insects, but have also been observed feeding on tadpoles (Heller 1960). Yellow-legged frog tadpoles graze on algae and diatoms along rocky bottoms in shallows.

During the breeding season, typically from March to May, males will defend a territory and make advertising vocalizations to females from shallow areas along the creek margins. Calls are made above and below the water's surface. This species lacks vocal sacs, and vocalizations are therefore weak and difficult to detect. Small egg masses of 15 to 350 eggs are deposited underwater where they attach to rocks, gravel, vegetation, or under banks (Livezey and Wright 1945). Eggs hatch approximately three weeks later (Zweifel 1955). The length of the larval stage has not been studied for the southern populations of the southern mountain [Sierra Madre] yellow-legged frog. Larval stage length for Sierra Nevada yellow-legged frog was found to range from four years for the highest elevation populations to one year for the lowest elevation populations (Storer 1925; Zweifel 1955). Larval stage lengths for the southern mountain [Sierra Madre] yellow-legged frog would be expected to conform to lower elevation Sierra Nevada yellow-legged frog populations (i.e., one year). Females reach sexual maturity at 1.8 inches, with males maturing at a slightly smaller size (Zweifel 1955). There is little reliable data on age at sexual maturity, but it is considered to be at least three years after metamorphosis (Zweifel 1955).

On September 14, 2006, the USFWS published Critical Habitat for the Southern California Distinct Population Segment of the mountain yellow-legged frog (USFWS 2006b). The Critical Habitat designated 8,283 acres of critical habitat for the mountain yellow-legged frog in portions of Los Angeles, San Bernardino, and Riverside Counties, California. The survey area is not located within designated critical habitat for the mountain yellow-legged frog.

The southern mountain [Sierra Madre] yellow-legged frog occurred historically in Big Tujunga Wash immediately upstream of Foothill Boulevard and in Big Tujunga Creek, Mill Creek, and several tributary drainages above Big Tujunga Dam (CDFW 2018). No documented observations of the population between Foothill Boulevard and Big Tujunga Dam have been reported since 1939, and it is considered extirpated from Big Tujunga Creek (CDFW 2018; Jennings and Hayes 1994b). The closest known population for this species is located at Little Rock Creek, Devil's Canyon, approximately 12 miles east.

The San Diego Zoo's Institute for Conservation Research, in conjunction with the Los Angeles Zoo, Omaha's Henry Doorly Zoo and Aguarium, CDFW, USFWS, U.S. Forest Service (USFS), and USGS, has developed a Mountain Yellow-legged Frog Recovery Program which involves captive breeding and translocation for the remaining frogs from the San Bernardino Mountains (San Diego Zoo 2009). In August 2006, 75 tadpoles were collected from a drying stream bed in the San Jacinto Mountains and were used to establish the captive breeding program. In 2010, tadpole offspring from the captive breeding program were released back into the San Jacinto Mountains at sites where the species was observed historically. In June 2018, Los Angeles Zoo, CDFW, and USGS released hundreds of tadpoles raised in captivity into a San Gabriel Mountains stream (Sahagun 2018).

SURVEY METHODS

Surveys were completed in accordance with the California red-legged frog protocol with modification to also cover the arroyo toad and southern mountain [Sierra Madre] yellow-legged frog, as agreed to in consultation with CDFW (Heredia, pers. comm. 2018). The protocol for California red-legged frog requires eight surveys conducted between January and September, with two daytime surveys and four nighttime surveys conducted during the breeding season, and one daytime and one nighttime survey conducted during the non-breeding season. Each survey must be conducted at least seven days apart, and the entire survey must be at least six weeks long. One survey should be conducted between February 25 and April 30, and at least one survey must be conducted between July 1 and September 30. The USFWS protocol for arroyo toad requires six surveys during the breeding season (March 15 to July 1) with at least one survey conducted in April, one in survey in May, and one in June. Because arroyo toad surveys had been conducted in previous years, it was determined through consultation that fewer total visits could be conducted as long as nocturnal surveys were conducted with one in April, May, and June. While there is

no protocol for the southern mountain [Sierra Madre] yellow-legged frog, diurnal surveys are recommended between March and May. In order to meet the best detection periods for each of the three species, the proposed methodology includes one survey in April, two surveys in May, one survey in June, and one survey in July for a total of five survey visits, which each included a diurnal and nocturnal component.

Psomas Senior Biologists Jonathan Aguayo and Lindsay Messett conducted the focused surveys in all potentially suitable habitat for special status amphibian species in the survey area, including both the upper and lower sections. The upper section included habitat along Big Tujunga Creek from Big Tujunga Reservoir upstream to Fall Creek (i.e., 0.62 mile upstream of the sediment removal area). The lower section included habitat along Big Tujunga Creek from Big Tujunga Dam to 0.62 mile downstream of the Big Tujunga Road bridge (i.e., 0.62 mile downstream of the proposed project work area/access roads) (Exhibit 2). For the upper section of the survey area, day and night surveys were conducted on April 27, May 18 and 29, June 11, and July 25, 2018. For the lower section of the survey area, day and night surveys were conducted on April 30, May 23 and 30, June 28, and July 24, 2018. With regard to the California red-legged frog protocol, the two day and four night surveys conducted from April through June constituted the breeding season surveys; day and night survey on July 24 and July 25, 2018, constituted the California red-legged frog non-breeding season survey.

The surveys included diurnal and nocturnal searches to determine the presence of eggs, tadpoles, and adults. Because surveys for these species were conducted concurrently, the timing of the surveys was scheduled to accommodate the activity patterns of all three species. Diurnal surveys were conducted from approximately 4:00 PM until dusk, and nocturnal surveys were conducted from one hour after dusk until approximately 11:00 PM. Surveys focused on detecting toads/frogs by visual identification, listening for the advertising call of adult males, and checking potentially suitable breeding habitat for tadpoles and/or eggs. Biologists scanned pools for eggs, larvae, metamorphs, juveniles, and breeding and/or calling adults in potentially suitable breeding locations along the creek and for foraging individuals in the adjacent riparian and upland areas. Headlamps, flashlights, and binoculars were used to visually identify toads, frogs, and their larvae detected at night. Nocturnal surveys were conducted during appropriate environmental conditions conducive to the activity patterns of the arroyo toad and California red-legged frog. Generally, these conditions are nighttime temperatures greater than 50 degrees Fahrenheit (°F) at dusk, with low winds (less than 10 miles per hour); nights with a full or nearly full moon were avoided. If any special status amphibians were found, the individual or population was documented, recorded with a Global Positioning System (GPS) unit, and mapped on an aerial photograph. Surveyor qualifications are presented in Attachment B of this Letter Report. California red-legged frog survey data sheets are provided in Attachment C. Survey dates, times, and weather data are shown in Tables 1 and 2.

TABLE 1
SUMMARY OF SURVEY DATA AND CONDITIONS FOR SPECIAL STATUS AMPHIBIAN SPECIES SURVEYS FOR UPPER SECTION SURVEY AREA

Survey	Survey Date	Survey Type	Surveying Biologists	Start/End Time	Wind (mph)		Temperature (°F)		Cloud Cover (%)
					Start	End	Start	End	
1	4/27/2018	Diurnal	Aguayo, Messett	4:40 PM–7:30 PM	1	1	72	68	0
		Nocturnal		8:30 PM–11:00 PM	1	3–5	60	50s	0
2	5/18/2018	Diurnal	Aguayo, Messett	4:25 PM–7:10 PM	1–2	2–4	72	62	50-60
		Nocturnal		8:10 PM–10:55 PM	1	0–1	57	52	10-25
3	5/29/2018	Diurnal	Aguayo, Messett	4:40 PM–7:22 PM	3	1	84	69	60-65
		Nocturnal		8:25 PM–11:15 PM	1	1	67	58	70-75
4	6/11/2018	Diurnal	Aguayo, Messett	4:40 PM–7:20 PM	2	0–1	90	76	0
		Nocturnal		8:40 PM–11:20 PM	0–1	0–1	71	68	0
5	7/25/2018	Diurnal	Aguayo, Messett	5:30 PM–7:10 PM	3	0–1	102	86	0
		Nocturnal		8:30 PM–10:30 PM	0–1	1	83	81	0

°F: degrees Fahrenheit; mph: miles per hour: %: percent

TABLE 2
SUMMARY OF SURVEY DATA AND CONDITIONS FOR SPECIAL STATUS AMPHIBIAN SPECIES SURVEYS FOR LOWER SECTION SURVEY AREA

Survey	Survey Date	Survey Type	Surveying Biologists	Start/End Time	Wind (mph)		Temperature (°F)		Cloud Cover (%)
					Start	End	Start	End	
1	4/30/2018	Diurnal	Aguayo, Messett	3:00 PM–7:00 PM	3	2	61	58	100
		Nocturnal		8:05 PM–11:00 PM	1	1	56	56	80-100
2	5/23/2018	Diurnal	Aguayo, Messett	4:24 PM–7:20 PM	1	1-2	72	65	0
		Nocturnal		8:25 PM–11:00 PM	1	0-1	63	52	0
3	5/30/2018	Diurnal	Aguayo, Messett	4:40 PM–7:30 PM	1	1	66	65	20-70
		Nocturnal		8:30 PM–11:05 PM	2	2	63	59	90
4	6/28/2018	Diurnal	Aguayo, Messett	5:00 PM–7:40 PM	1–2	1–2	81	77	0
		Nocturnal		8:40 PM–11:10 PM	1	0–1	72	69	0
5	7/24/2018	Diurnal	Aguayo, Messett	4:50 PM–7:18 PM	2	2	104	88	0
		Nocturnal		8:40 PM–10:40 PM	1	2	84	82	20-15

°F: degrees Fahrenheit; mph: miles per hour: %: percent

SURVEY RESULTS

One arroyo toad was present during one focused survey for the upper section of the survey area. The individual adult male was observed during the survey conducted on May 18, 2018 (Exhibit 3). This is similar to the 2017 arroyo toad survey results where only one adult male was documented. Based on comparison of dorsal photographs taken on 2017 of an adult male and of the 2018 individual observed, the adult male toad was determined to be the same individual. While this toad was observed vocalizing, no evidence of successful breeding was detected in the survey area. Dorsal photograph taken during surveys are presented in Attachment A. A California Natural Diversity Database (CNDDB) form for arroyo toad is included in Attachment E and will be submitted to the CDFW.

No California red-legged frog or southern mountain [Sierra Madre] yellow-legged frog were observed during the surveys. This is consistent with previous focused surveys for the southern mountain [Sierra Madre] yellow-legged frog conducted for the project in 2012 and 2016 (BonTerra Consulting 2012; BonTerra Psomas 2016).

Other amphibian species detected during surveys include California treefrog (*Pseudacris cadaverina*) and Baja California treefrog (*Pseudacris hypochondriaca*). A complete list of all wildlife species detected during the surveys is provided in Attachment D.

OTHER OBSERVATIONS

Seven California Species of Special Concern were observed during the surveys: arroyo chub (*Gila orcutti*), western pond turtle (*Actinemys pallida*), coast horned lizard (*Phrynosoma blainvillii*), coastal whiptail (*Aspidoscelis tigris stejneri*), two-striped garter snake (*Thamnophis hammondii*), Vaux's swift (*Chaetura vauxi*), and yellow warbler (*Setophaga petechia*) (Exhibit 4). CNDDB forms for arroyo chub, western pond turtle, coast horned lizard, coastal whiptail, and two-striped garter snake are included in Attachment E and will be submitted to the CDFW. Vaux's swift was observed on only one visit and does not nest in the project region; therefore, no CNDDB form will be submitted for this species. Observations of the yellow warbler have been reported in the *Results of the 2018 Least Bell's Vireo and Southwestern Willow Flycatcher Surveys for the Big Tujunga Reservoir Sediment Removal Project* Report (Psomas 2018).

The American peregrine falcon (*Falco peregrinus anatum*) was also detected in the survey area; a pair was observed consistently in the same general area, potentially nesting. This species was recently delisted by both the USFWS and CDFW as an Endangered species, but it is still considered a CDFW Fully Protected species. Observations of the American peregrine falcon have also been reported in the *Results of the 2018 Least Bell's Vireo and Southwestern Willow Flycatcher Surveys for the Big Tujunga Reservoir Sediment Removal Project* Report (Psomas 2018).

Psomas appreciates the opportunity to assist on this project. If you have any comments or questions, please call Amber Heredia at (714) 751-7373.

Sincerely,
PSOMAS

Amber O. Heredia
Senior Project Manager

Jonathan Aguayo
Senior Biologist

Enclosures: Exhibits 1–4
Attachment A – Site Photographs
Attachment B – Surveyor Qualifications
Attachment C – California Red-Legged Frog Survey Data Sheets
Attachment D – Wildlife Compendium
Attachment E – California Natural Diversity Database Forms

cc: Alex Ho, alho@dpw.lacounty.gov

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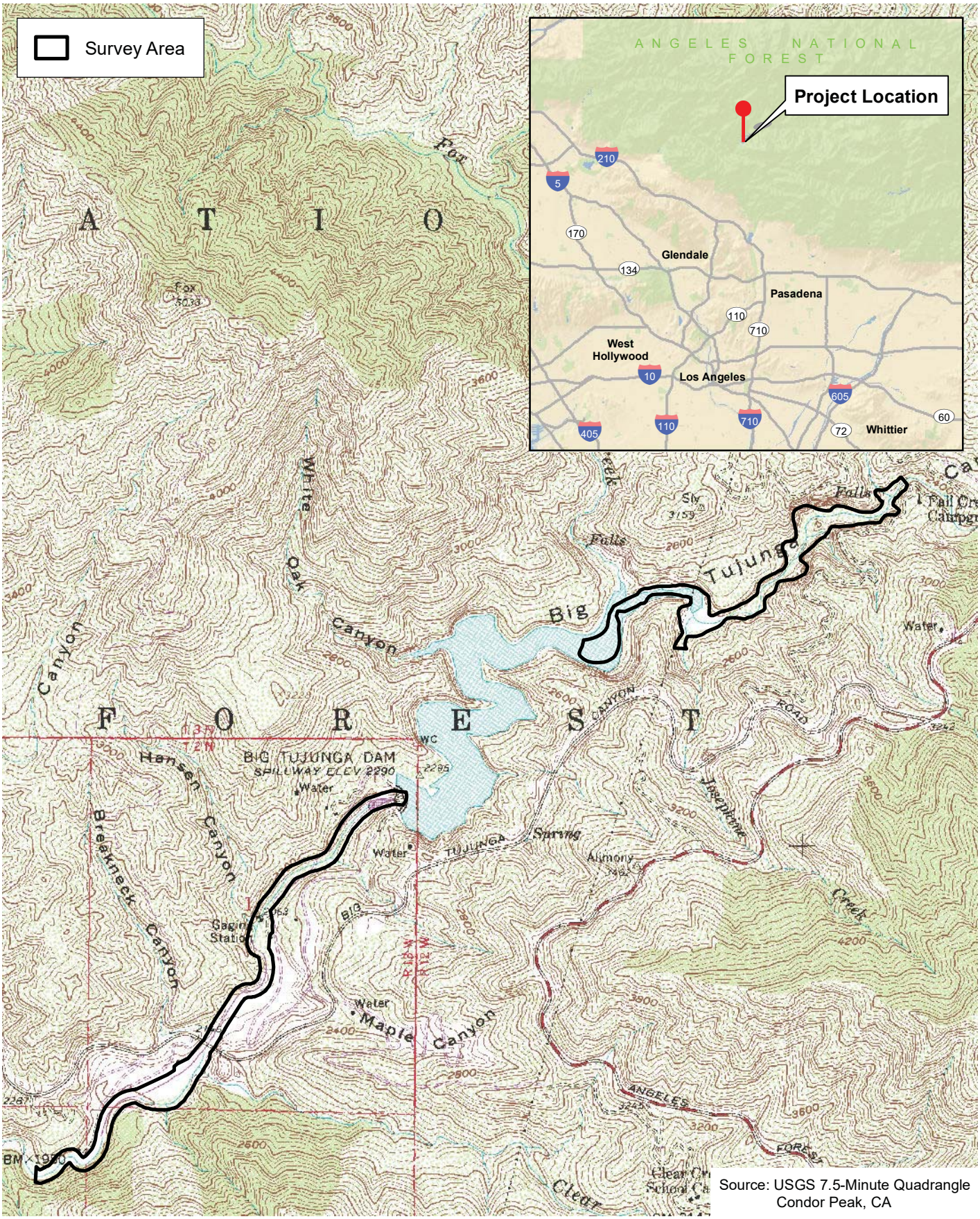

Source: USGS 7.5-Minute Quadrangle
Condor Peak, CA

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Regional Location and Local Vicinity

Exhibit 1

Big Tujunga Reservoir Sediment Removal Project

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Survey Area

Exhibit 2

Big Tujunga Reservoir Sediment Removal Project

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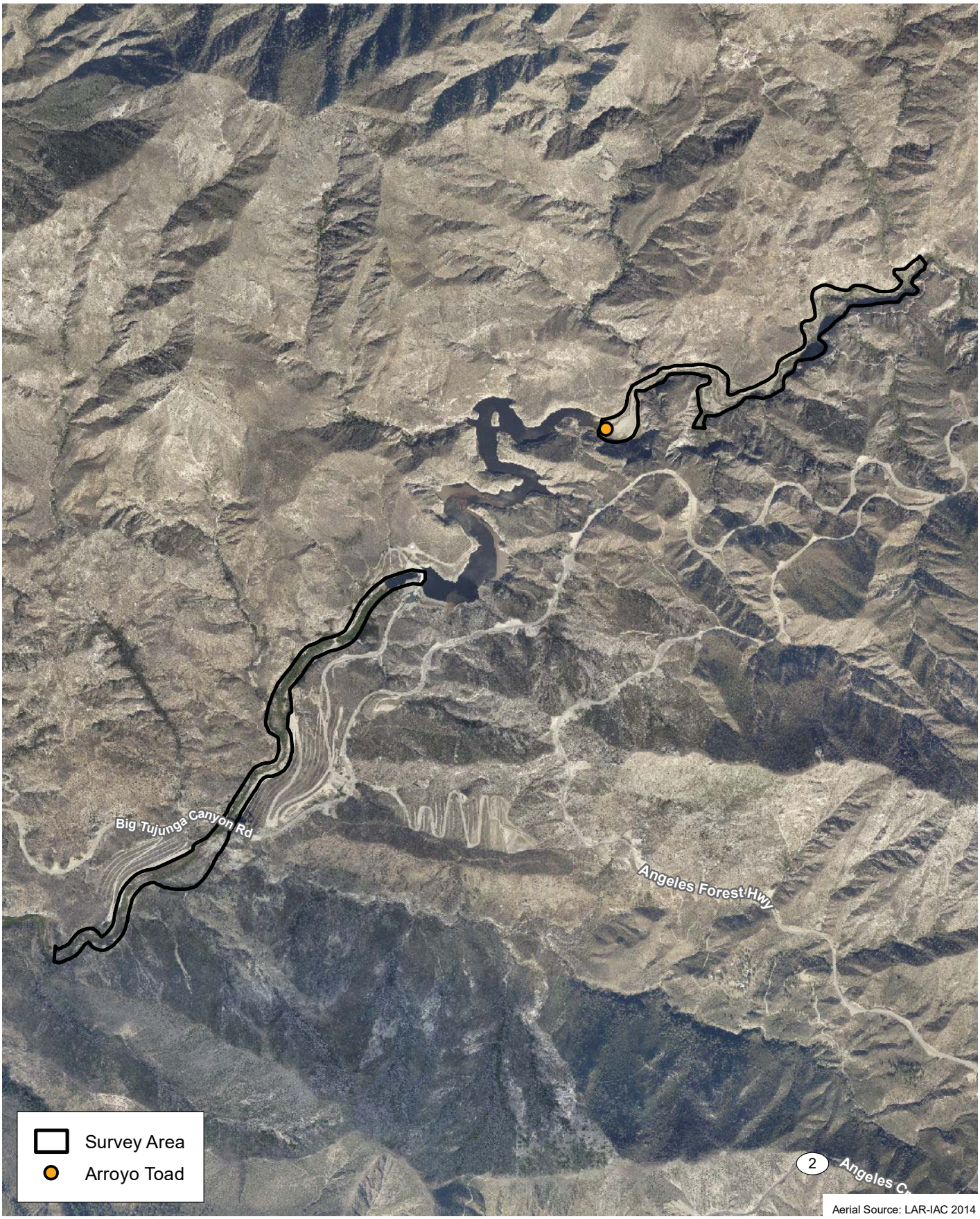

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Arroyo Toad Observed

Exhibit 3

Big Tujunga Reservoir Sediment Removal Project

N W E S

2,000 1,000 0 2,000 Feet

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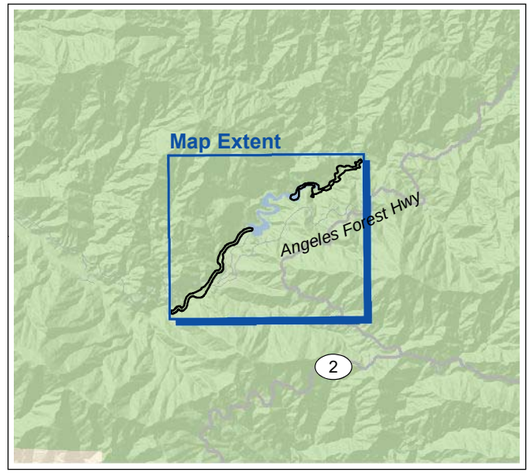

Survey Area

Special Status Species

- Arroyo Chub
- Arroyo Toad
- Coast Horned Lizard
- Coastal Whiptail
- Two-striped Garter Snake
- Western Pond Turtle

N
W E
S

1,100 550 0 1,100 Feet

Aerial Source: LAR-IAC 2014

Special Status Species Observed

Exhibit 4

Big Tujunga Reservoir Sediment Removal Project

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ATTACHMENT A

SITE PHOTOGRAPHS



Representative view of riparian habitat in the upper section of the survey area, upstream of Big Tujunga Reservoir.



Representative view of riparian habitat in the lower section of the survey area, downstream of Big Tujunga Dam.

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Site Photographs

Attachment A-1

Big Tujunga Reservoir Sediment Removal Project

PSOMAS

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View of suitable habitat for southern mountain [Sierra Madre] yellow-legged frog along Big Tujunga Creek located near the middle of the upper section of the survey area.



View of suitable habitat for California red-legged frog located in the Big Tujunga Dam plunge pool in the lower portion of the survey area.

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View of a sandy terrace/streamside along Big Tujunga Creek upstream of Big Tujunga Reservoir where a male arroyo toad was observed on May 18, 2018.



View of a male arroyo toad located near the southwestern end of the upper section of the survey area observed on May 18, 2018.



June 7, 2017



May 18, 2018.

*One male arroyo toad was observed in 2017 and 2018. Determined to be the same individual based on comparing the dorsal pattern. Variation in appearance between photos is a function of the temperature, lighting conditions, and shape; dorsal pattern appears the same.

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Arroyo Toad Photographs

Attachment A-4

Big Tujunga Reservoir Sediment Removal Project

PSOMAS

ATTACHMENT B

SURVEYOR QUALICATIONS

Jonathan Aguayo

Biologist

EDUCATION

2007 / Bachelor of Science, Environmental Science & Resource Management / California State University Channel Islands

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS

10(a)(1)(A) Permit for coastal California gnatcatcher/No. TE96514A-1/U.S. Fish and Wildlife Service, permit for southwestern willow flycatcher and California red-legged frog pending

Authorization for Flat-tailed Horned Lizards/California Department of Fish and Wildlife

Scientific Collecting Permit/SC-11733/California Department of Fish and Wildlife

Independent Researcher for Psomas' CDFW Entity Scientific Collecting Permit/SC-004535/California Department of Fish and Wildlife

Jonathan Aguayo has over ten years of experience as a Biologist in providing environmental and biological services for a variety of projects. He has a solid knowledge of California's flora and fauna gained from work experience, professional affiliations, and personal interest. Mr. Aguayo has contributed to the preparation of various technical reports addressing State and federal laws, including the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), federal and State Endangered Species Acts (FESA, CESA), and the Clean Water Act (CWA). Mr. Aguayo has conducted general biological reconnaissance surveys throughout a variety of habitats including chaparral, coastal sage scrub, riparian, oak woodland, forest, grassland, and desert. He is experienced in conducting focused surveys for arroyo toad, western spadefoot, southern mountain [Sierra Madre] yellow-legged frog, California red-legged frog, western pond turtle, coastal California gnatcatcher, least Bell's vireo, and western burrowing owl. He has also conducted relocation efforts for the western spadefoot toad at project sites.

Experience with California Red-legged Frog

Mr. Aguayo has accompanied permitted biologists on intensive surveys for California red-legged frog projects in California. Mr. Aguayo has over 40 hours of documented field experience conducting surveys including capture (hand, dipnet, seine) under the direct supervision of a permitted biologist. Mr. Aguayo has acquired survey experience at seven independent survey events and six separate geographic locations in which the California red-legged frog was encountered. During the approximately 43 hours of focused activity, Mr. Aguayo successfully captured, handled, measured, and released adults, juvenile, larvae, and egg masses of California red-legged frog. Sympatric species handled included California tiger salamander larvae, rough-skinned newt, California newt, western toad, American bullfrog, Sierran treefrog, foothill yellow-legged frog, western pond turtle, western terrestrial gartersnake, and California red-sided gartersnake.

Additionally, outside of work, Mr. Aguayo has visited the habitats of known populations of California red-legged frog in southern California such as San Francisquito Creek (Angeles National Forest), Las Virgenes Creek (Upper Las Virgenes Canyon Open Space Reserve/Santa Monica mountains), and San Antonio Creek (City of Ojai). Mr. Aguayo observed species from a distance; no handling was conducted during these visits.

Special Training

Rare Pond Species Survey Techniques workshop, Laguna de Santa Rosa Foundation, 2017 – aquatic survey techniques for the California tiger salamander, California red-legged frog, and western pond turtle.

Ecology of the California Red-Legged Frog classroom and hands-on skilled-based training, Certificate of Completion, Elkhorn Slough Coastal Training Program, 2017

California Red-Legged Frog – Level II workshop, Laguna de Santa Rosa Foundation, 2016-2017

Amphibians of the San Francisco Bay Area workshop, Laguna de Santa Rosa Foundation, 2016

Introduction to Surveying, Monitoring, and Handling Techniques workshop, Desert Tortoise Council, 2010

Flat Tailed Horned Lizard training, Certificate of Completion, Southwest Partners in Amphibian and Reptile Conservation, 2017

Representative Herpetology Project Experience

Big Tujunga Dam Reservoir Sediment Removal Project, Focused Surveys for Arroyo Toad, California Red-legged Frog, Sierra Madre Yellow-legged Frog, Least Bell's Vireo, and Southwestern Willow Flycatcher; Western Pond Turtle Visual Surveys and Trapping, Los Angeles County. Mr. Aguayo serves as Biologist for Big Tujunga Dam Reservoir Sediment Removal Project in Los Angeles County. The project would involve dewatering Big Tujunga Reservoir and removing sediment, which would be placed in the nearby Maple Canyon Sediment Placement Site. The project is located on the southern edge of the San Gabriel Mountains in the Angeles National Forest. Mr. Aguayo has conducted multiple years of focused surveys for arroyo toad, California red-legged frog, Sierra Madre yellow-legged frog, and least Bell's vireo, both upstream and downstream of Big Tujunga Reservoir. He has also assisted with focused surveys for southwestern willow flycatcher upstream of Big Tujunga Reservoir. Mr. Aguayo has also conducted visual surveys and turtle trapping for western pond turtle in Big Tujunga Reservoir and downstream of Big Tujunga Dam.

California Red-Legged Frog Surveys/Research, Sonoma Mountain Ranch Preservation Foundation site, Sonoma County. Mr. Aguayo assisted permitted biologists Jeff Alvarez (TE-27427) and Jeff Wilcox (TE-068745) in surveying for and handling California red-legged frogs. Other species handled (dip-netted) during these surveys included California newt (adult and larvae), rough-skinned newt (adult and larvae), western toad (metamorphs), Sierra treefrogs (metamorphs), foothill yellow-legged frog (metamorphs), western pond turtles, and terrestrial garter snake (juvenile).

Pacoima Dam Sediment Removal Project, Focused Surveys for Arroyo Toad and Sierra Madre Yellow-legged Frog, Los Angeles County. Mr. Aguayo serves as Biologist for Pacoima Dam Sediment Removal Project in Los Angeles County. The project will remove approximately three million cubic yards of sediment from Pacoima Reservoir. Mr. Aguayo has conducted focused surveys for arroyo toad (downstream of the dam) and Sierra Madre yellow-legged frog (upstream of the dam).

Los Angeles County Flood Control District (LACFCD) Soft-Bottom Channels Maintenance Clearing Project, Focused Surveys for Arroyo Toad, Los Angeles County. Mr. Aguayo serves as Biologist for Pacoima Dam Sediment Removal Project in Los Angeles County. The LACFCD performs minor grading and annual vegetation clearing in channels to retrain channel flows consistent with the clearing limits established by the permitted maintenance plan. This ongoing program is necessary to

maintain the design capacities of the channels and to ensure the proper functioning of these facilities located within the LACFCD boundaries. Mr. Aguayo has conducted focused surveys for arroyo toad at 11 channel reaches. Non-native African clawed frog was regularly encountered.

Frank R. Bowerman Landfill, Focused Surveys for Western Spadefoot, Least Bell's Vireo, and Coastal California Gnatcatcher, Orange County. Mr. Aguayo serves as Biologist for Frank R. Bowerman Landfill. The approximately 800-acre project is an active landfill that is owned and operated by OC Waste & Recycling. The project is located along the coastal side of the Lomas de Santiago foothills, east of the City of Irvine. Specifically, the landfill is east of State Route (SR) 241 and east of SR-133 at the terminus of Bee Canyon Access Road. Mr. Aguayo has conducted focused surveys for western spadefoot, least Bell's vireo, and coastal California gnatcatcher. Additionally, he assisted with preparation of the Western Spadefoot Management Plan for the landfill, which included identification of avoidance and minimization measures, translocation methods, and identification of both an onsite potential receiver basin and an offsite potential receiver basin.

Former Whittaker-Bermite Project, Focused Surveys for Western Spadefoot, Coastal California Gnatcatcher, and Western Spadefoot Translocation, Santa Clarita, CA. Mr. Aguayo serves as a Biologist for the Former Whittaker-Bermite Project. The Whittaker-Bermite property is an undeveloped 996-acre site located in the center of the City of Santa Clarita. This former munition testing and manufacturing site has contamination issues which include perchlorate, volatile organic compounds, and both soil and groundwater contamination. The former Whittaker-Bermite Project consists of site clean-up of the former munition facility. Mr. Aguayo has conducted focused surveys and pre-construction surveys for western spadefoot at multiple sites over multiple years. As part of this Project, Mr. Aguayo conducted pre-construction translocation of western spadefoot (eggs, tadpoles, metamorphs) from basins/ponds that would be impacted to basins/ponds that are outside the impact area. Additionally, he assisted with preparation of the Western Spadefoot Management Plan for the project, which included identification of avoidance and minimization measures, translocation methods, and identification of both an onsite potential receiver basin and an offsite potential receiver basin.

City of Simi Valley Shooting Range/Training Facility, Focused Surveys for Western Spadefoot, Simi Valley, CA. Mr. Aguayo served as a Biologist for the project. The project consisted of building a police department training facility on lands owned by the Simi Valley Landfill and Recycling Center. Mr. Aguayo conducted focused surveys for western spadefoot.

Simi Valley Landfill and Recycling Center Habitat Restoration and Management Plan, Focused Surveys for Western Spadefoot, and Coastal California Gnatcatcher, Simi Valley, CA: Mr. Aguayo serves as Biologist for the Simi Valley Landfill Project. The project is located in southeast Ventura County and is bounded by Alamos Canyon to the west, Brea Canyon to the east, undeveloped open space to the north, and SR-118 to the south. The approximately 887-acre project property is operated by the Simi Valley Landfill and Recycling Center. Mr. Aguayo has

conducted focused surveys for western spadefoot toad and coastal California gnatcatcher.

Professional Affiliations

Sea & Sage Audubon, Science Committee and former Board Director

The Wildlife Society, Western Section

Professional Experience

Psomas, January 2014 –present
BonTerra Consulting, February 2011–December 2013 (Psomas acquired BonTerra Consulting)
AECOM, 2008–2011
California State Parks, Malibu Section, 2006–2008
Oxnard Waste Water Treatment Plant, Intern

Professional References

Jeff Wilcox, Managing Ecologist
Sonoma Mountain Ranch Preservation Foundation
3124 Sonoma Mountain Road
Petaluma, CA 94975-0842
Mail to: P.O. Box 750842
Petaluma, CA 94975-0842
510.917.6059/ 707.996.5049
jtwilcox@comcast.net

Jeff Alvarez
The Wildlife Project
P.O. Box 188888
Sacramento, CA 95818
209.815.5660
Jeff@thewildlifeproject.com

Lindsay Messett, CWB®

Senior Biologist

EDUCATION

1999/BS/Ecology and Systematic Biology, Concentration: Wildlife Biology/California State Polytechnic University, San Luis Obispo

CERTIFICATIONS

10(a)(1)(A) Permit for Quino checkerspot butterfly, coastal California gnatcatcher, yellow-billed cuckoo, and southwestern willow flycatcher/No. TE067064-3/U.S. Fish and Wildlife Service

Independent Researcher for Psomas' CDFW Entity Scientific Collecting Permit/SC-004535/California Department of Fish and Wildlife

Scientific Collecting Permit/SC-007530 for western spadefoot and Benthic macroinvertebrate surveys/California Department of Fish and Wildlife

Certified Wildlife Biologist®/The Wildlife Society

Lindsay Messett is a Certified Wildlife Biologist® with a specialty in wildlife biology. She has over 18 years of experience in data collection, field research, resource management, and environmental document preparation. She has conducted focused surveys and habitat assessments for several special status wildlife species, including arroyo toad, California red-legged frog, western spadefoot, desert tortoise, Quino checkerspot butterfly, least Bell's vireo, coastal California gnatcatcher, southwestern willow flycatcher, western yellow-billed cuckoo, burrowing owl, Santa Ana sucker, arroyo chub, and Santa Ana speckled dace. She has also managed a brown-headed cowbird trapping program and worked with several species of marine mammals. Lindsay has conducted general biological reconnaissance surveys and nesting bird surveys throughout a variety of habitats, including desert, chaparral, coastal sage scrub, riparian, and grassland. She has also performed construction monitoring for the California red-legged frog, California tiger salamander, desert tortoise, coastal California gnatcatcher, least Bell's vireo, snowy plover, and California least tern. In addition, she has authored the biological resources sections of numerous Biological Technical Reports, focused survey reports for special status species, habitat assessments, monitoring reports, and general biological constraints analyses and contributed to Biological Resources sections of environmental documents (i.e., Mitigated Negative Declarations, Environmental Impact Reports).

Special Training

Central Coast Aquatic and Semi-Aquatic Herp Workshop, The Wildlife Society, Central Coast Chapter, 2018. Lectures included ecology, conservation, identification, and survey methods of aquatic and semi-aquatic herpetofauna incuding California red-legged frog, foothill yellow-legged frog, arroyo toad, western spadefoot, California newt, California tiger salamander, slender salamander, two-striped garter snake, and western pond turtle. Field training included spotlighting as well as daytime and nighttime protocol surveys for California red-legged frog and other species such as the western pond turtle. During this workshop, Ms. Messett aquired eight hours of documented field experience conducting daytime and nighttime surveys for California red-legged frog under the direct supervision of a permitted biologist. Survey tecniques included capture (hand, dipnet, seine). During the approximately eight hours of focused activity, Ms. Messett successfully captured, handled, measured, and released adult and juvenile California red-legged frog as well as adult California newt and their egg massess.

Arroyo Toad Workshop, The Wildlife Society, Southern California Chapter, 2018. Lecture addressed the identification, life history, ecology, and range of the arroyo toad and relationship with the highly-variable Mediterranean climate of southern California. Current listing status, protocol survey requirements, and methods to assess impacts were also discussed. Following the lecture, an evening field

portion included a practice survey following U.S. Fish and Wildlife Service (USFWS) guidelines in occupied arroyo toad habitat.

Introduction to Surveying, Monitoring, and Handling Techniques Workshop, Desert Tortoise Council, 2003

Representative Herpetology Project Experience

Level 3 Communications Infrastructure Project, Construction Monitoring and Focused Surveys for Red-Legged Frog, and California Tiger Salamander, San Luis Obispo, Santa Barbara, and Ventura Counties. Ms. Messett served as a Biologist for this long distance fiber-optic project. She conducted pre-construction surveys for California red-legged frog and California tiger salamander and provided biological monitoring for areas that were either occupied or provided potential habitat for these species.

Big Tujunga Mitigation Bank Focused Suveys for Arroyo Toad, Los Angeles County. Ms. Messett served as a Biologist for this ongoing mitigation bank project site. She conducted several years of focused surveys for arroyo toad and least Bell's vireo, as well as supervised a brown-headed cowbird trapping progam on the project site.

Tehachapi Renewable Transmission Project (TRTP) Biological Resources Support, Southern California. Ms. Messett served as a Biologist for this Southern California Edison project. TRTP consists of the construction of several substations and a total of 175 miles of transmission lines running from the Antelope Valley through the Angeles National Forest (ANF) and into the City of Ontario. The project's objective is to bring wind and solar sourced energy from the Tehachapi Mountains and western Antelope Valley to the Los Angeles Basin. As part of a large, multi-company team, Psomas provided a full range of biological services including vegetation mapping; focused surveys for plants, trees, birds, herpetofauna, and bats; nesting bird surveys; raptor surveys; pre-construction surveys and construction monitoring; and seed collection. Ms. Messett provided biological monitoring services to facilitate geotechnical testing of electrical transmission tower installation sites as well as the construction of equipment staging yards. She also assisted with amphibian surveys and conducted pre-construction surveys and nesting bird surveys for this project. In addition, she independently conducted focused surveys for the coastal California gnatcatcher in order to document the presence or absence of this species along two project segments. The surveys were conducted in accordance with guidelines established by the USFWS, and a report was prepared documenting the survey results.

Los Angeles County Flood Control District (LACFCD) Soft-Bottom Channels Maintenance Clearing Project, Focused Surveys for Arroyo Toad, Los Angeles County. Ms. Messett serves as Biologist for the LACFCD soft-bottom channel maintenance project. The LACFCD performs minor grading and annual vegetation clearing in channels to retrain channel flows consistent with the clearing limits established by the permitted maintenance plan. This ongoing program is necessary to maintain the design capacities of the channels and to ensure the proper functioning of these facilities located within the LACFCD boundaries. Ms. Messett has conducted focused surveys for arroyo toad at 11 channel reaches. Non-native African clawed frog was

regularly encountered. She has also conducted focused surveys for least Bell's vireo, southwestern willow flycatcher, and western yellow-billed cuckoo.

Frank R. Bowerman Landfill, Focused Surveys for Western Spadefoot, Orange County. Ms. Messett serves as Biologist for Frank R. Bowerman Landfill. The approximately 800-acre project is an active landfill that is owned and operated by OC Waste & Recycling. The project is located along the coastal side of the Lomas de Santiago foothills, east of the City of Irvine. Specifically, the landfill is east of State Route (SR) 241 and east of SR-133 at the terminus of Bee Canyon Access Road. Ms. Messett has conducted focused surveys for western spadefoot for this project.

Former Whittaker-Bermite Project, Focused Surveys for Western Spadefoot, Coastal California Gnatcatcher, and Western Spadefoot Translocation, Santa Clarita, CA. Ms. Messett serves as a Biologist for the Former Whittaker-Bermite Project. The Whittaker-Bermite property is an undeveloped 996-acre site located in the center of the City of Santa Clarita. This former munition testing and manufacturing site has contamination issues, which include perchlorate, volatile organic compounds, and both soil and groundwater contamination. The former Whittaker-Bermite Project consists of site clean-up of the former munition facility. Ms. Messett has conducted focused surveys and pre-construction surveys for western spadefoot at multiple sites over multiple years. As part of this Project, Ms. Messett conducted pre-construction translocation of western spadefoot (eggs, tadpoles, metamorphs) from basins/ponds that would be impacted to basins/ponds that are outside the impact area. Additionally, she prepared the Western Spadefoot Management Plan for the project, which included identification of avoidance and minimization measures; translocation methods; and identification of both an onsite potential receiver basin and an offsite potential receiver basin.

Simi Valley Landfill and Recycling Center Habitat Restoration and Management Plan, Focused Surveys for Western Spadefoot, and Coastal California Gnatcatcher, Simi Valley, CA: Ms. Messett serves as Biologist for the Simi Valley Landfill Project. The project is located in southeast Ventura County and is bounded by Alamos Canyon to the west, Brea Canyon to the east, undeveloped open space to the north, and SR-118 to the south. The approximately 887-acre project property is operated by the Simi Valley Landfill and Recycling Center. Ms. Messett has conducted focused surveys for western spadefoot toad and coastal California gnatcatcher.

Professional Affiliations

The Wildlife Society, Western Section, Southern California Chapter

National Audubon Society, El Dorado Chapter

Westerm Field Ornithologists

Professional Experience

Psomas, January 2014 –present
BonTerra Consulting, January 2006–December 2013
(Psomas acquired BonTerra Consulting)
Chambers Group January 2000- December 2005

ATTACHMENT C

CALIFORNIA RED-LEGGED FROG SURVEY DATA SHEETS

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 04/27/2018 (mm/dd/yyyy)

Survey Biologist: AGUAYO (Last name) JONATHAN (first name)

Survey Biologist: MESSETT (Last name) LINDSAY (first name)

Site Location: BIG TUJUNGA CREEK, UPSTREAM OF THE RESERVOIR
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**
↳ WILL BE PROVIDED ON REPORT

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:
WILL BE PROVIDED ON REPORT — PROJECT DESCRIPTION SECTION

Type of Survey (circle one): (DAY) NIGHT (BREEDING) NON-BREEDING

Survey number (circle one): (1) 2 3 4 5 6 7 8

Begin Time: 4:40 PM **End Time:** 7:30 PM

Cloud cover: 0% **Precipitation:** NONE

Air Temperature: 72° - 68° F **Water Temperature:** HIGH 60s° F

Wind Speed: 1 MPH **Visibility Conditions:** CLEAR, 10 MILES

Moon phase: 1ST **Humidity:** 64%

Description of weather conditions: CLEAR, CALM

Brand name and model of light used to conduct surveys: PELICAN HEADSUP LITE W/ 4D PACK STREAMLIGHT 74501 STINGER LED FLASHLIGHT JUSTRITE HEAD LAMP - 4D-CELL

Were binoculars used for the surveys (circle one)? (YES) NO
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 09/27/2018 (mm/dd/yyyy) **Survey Biologist:** ROJAS (Last name) JONATHAN (first name)
Survey Biologist: MESSETT (Last name) LINDSAY (first name)

Site Location: BIG TUJUNGA CREEK, UPSTREAM OF THE RESERVOIR
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:

REPORT

Type of Survey (circle one): **DAY** (**NIGHT**) (**BREEDING**) **NON-BREEDING**

Survey number (circle one): 1 (2) 3 4 5 6 7 8

Begin Time: 8:30 PM **End Time:** 11:00 PM

Cloud cover: 0% **Precipitation:** NONE, 0 INCHES

Air Temperature: 60°-50° F **Water Temperature:** —

Wind Speed: 1/3-5 MPH **Visibility Conditions:** CLEAR

Moon phase: 1 ST **Humidity:** 64%

Description of weather conditions: CLEAR, CALM

Brand name and model of light used to conduct surveys: PELICAN HEADS UP LITE STREAMLIGHT 74501 STALION JUSTAITE HEAD LAMP

Were binoculars used for the surveys (circle one)? (**YES**) **NO**
Brand, model, and power of binoculars: EAGLE OPTICS PENALT 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

4/27/2018

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
Pseudacris cadaverina	+10	O/H	ADULT	UNK	100%
Pseudacris hypochondriaca	3	O/H	ADULT	UNK	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: _____

RAINBOW TROUT, RACCOON TRACKS, BLACK BULLHEAD (RESERVOIR)

Other notes, observations, comments, *etc.*

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 05/18/2018 (mm/dd/yyyy)

Survey Biologist: AGUAYO (Last name) JONATHAN (first name)

Survey Biologist: MESSETT (Last name) LINDSAY (first name)

Site Location: BIG TUJUNGA CREEK, UPSTREAM OF RESERVOIR
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:
SEE REPORT

Type of Survey (circle one): (**DAY**) **NIGHT** (**BREEDING**) **NON-BREEDING**

Survey number (circle one): **1** **2** (**3**) **4** **5** **6** **7** **8**

Begin Time: 4:25 PM **End Time:** 7:10 PM

Cloud cover: 50-60% **Precipitation:** NONE

Air Temperature: 72°/62° F **Water Temperature:** HIGH 60°s F°

Wind Speed: 1-2 / 2-4 MPH **Visibility Conditions:** CLEAR

Moon phase: New Moon **Humidity:** 70%

Description of weather conditions: SCATTERED CLOUDS, CALM

PELICAN HEADS UP LITE
Brand name and model of light used to conduct surveys: STREAMLIGHT 74501 STINGER

Were binoculars used for the surveys (circle one)? (**YES**) **NO**
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 05/18/2018 (mm/dd/yyyy) **Survey Biologist:** AGUAYO (Last name) JONATHAN (first name)
Survey Biologist: MESSETT (Last name) LINDSAY (first name)

Site Location: BIG TUJUNGA CREEK, UPSTREAM OF RESERVOIR
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**
↳ WITHIN REPORT

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:
FOUND WITHIN REPORT

Type of Survey (circle one): **DAY** (**NIGHT**) (**BREEDING**) **NON-BREEDING**

Survey number (circle one): **1** **2** **3** (**4**) **5** **6** **7** **8**

Begin Time: 8:10 PM **End Time:** 10:55 PM

Cloud cover: 10-25% **Precipitation:** NONE

Air Temperature: 57°/52° F **Water Temperature:** —

Wind Speed: 0-1 MPH **Visibility Conditions:** CLEAR

Moon phase: New **Humidity:** 70%

Description of weather conditions: CALM

Brand name and model of light used to conduct surveys: PELICAN HEADS UP LITE STREAMLIGHT T4501 STRION LED

Were binoculars used for the surveys (circle one)? (**YES**) **NO**
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

5/18/2018

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
CALIFORNIA TREEFROG	+12	O/H	TADPOLES/ ADULT		100%
BAJA CA. TREEFROG	8	O/H	ADULT		100%
ARROYO TOAD	1	O/H	ADULT		100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: _____

FISH (VARIOUS), BIRDS (E.G. MALLARD), RACCOON (TRACKS), TWO-STRIPED [redacted] GARTER SNAKES

Other notes, observations, comments, *etc.*

* Adult male arroyo toad

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 05/29/2008 (mm/dd/yyyy)

Survey Biologist: AGUAYO (Last name) JONATHAN (first name)

Survey Biologist: MESSETT (Last name) LINDSAY (first name)

Site Location: BIG TUJUNGA CREEK, UPSTREAM OF RESERVOIR
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**
↳ WITHIN REPORT

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:

FOUND WITHIN REPORT

Type of Survey (circle one): **DAY** (**NIGHT**) (**BREEDING**) **NON-BREEDING**

Survey number (circle one): 1 2 3 4 (5) 6 7 8

Begin Time: 8:25 PM **End Time:** 11:15 PM

Cloud cover: 70-75% **Precipitation:** NONE

Air Temperature: 67°/58° F **Water Temperature:** MID 60's F

Wind Speed: 1 MPH **Visibility Conditions:** CLEAR

Moon phase: CLOSE TO FULL MOON **Humidity:** 65%

Description of weather conditions: HIGH CLOUDS BUT NO FOG OR RAIN.

Brand name and model of light used to conduct surveys: PELICAN HEADS UP LITE STREAMLIGHT T4501 STRION LED

Were binoculars used for the surveys (circle one)? (**YES**) **NO**
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

5/29/18

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
CALIFORNIA TREEFROG	+15	O/H	TADPOLES/ ADULT		100%
BAJA CA. TREEFROG	+10	O/H	TADPOLES/ ADULT		100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: _____

FISH (VARIOUS), BIRDS (E.G. MALLARD), RACCOON (TRACKS), TWO-STRIPED GARTER SNAKE

Other notes, observations, comments, *etc.*

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 6/11/18 (mm/dd/yyyy)

Survey Biologist: AGUAYO (Last name) JONATHAN (first name)

Survey Biologist: MESSETT (Last name) LINDSAY (first name)

Site Location: BIG TUJUNGA CREEK, UPSTREAM OF RESERVOIR
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**
↳ WITHIN REPORT

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:

FOUND WITHIN REPORT

Type of Survey (circle one): **DAY** (**NIGHT**) (**BREEDING**) **NON-BREEDING**

Survey number (circle one): 1 2 3 4 5 (6) 7 8

Begin Time: 8:40 PM **End Time:** 11:20 PM

Cloud cover: 0% **Precipitation:** NONE

Air Temperature: 71°/68° F **Water Temperature:** MAYBE 70°

Wind Speed: 0-1 MPH **Visibility Conditions:** CLEAR

Moon phase: LAST QUARTER (HALF) **Humidity:** 79%

Description of weather conditions: CLEAR AND CALM

Brand name and model of light used to conduct surveys: PELICAN HEADS UP LITE STREAMLIGHT T4501 STRION LED

Were binoculars used for the surveys (circle one)? (**YES**) **NO**
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

6/11/18

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
CALIFORNIA TREEFROG	+25	O/H	TADPOLES/ ADULTS		100%
BAJA CA. TREEFROG	8-10	O/H	ADULTS		100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: _____

FISH (VARIOUS), BIRDS (E.G. MALLARD), RACCOON (TRACKS), TWO-STRIPED GARTER SNAKE

Other notes, observations, comments, *etc.*

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 07/25/2018 (mm/dd/yyyy)

Survey Biologist: AGUAYO (Last name) JONATHAN (first name)

Survey Biologist: MESSETT (Last name) LINDSAY (first name)

Site Location: BIG TUJUNGA CREEK, UPSTREAM OF RESERVOIR
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**
↳ WITHIN REPORT

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:
FOUND WITHIN REPORT

Type of Survey (circle one) (**DAY**) **NIGHT** **BREEDING** (**NON-BREEDING**)

Survey number (circle one): **1** **2** **3** **4** **5** **6** (**7**) **8**

Begin Time: 5:30 pm **End Time:** 7:10 PM

Cloud cover: 0% **Precipitation:** NONE

Air Temperature: 102°/86° F **Water Temperature:** LOW 70°s F

Wind Speed: 0-1 / 3 MPH **Visibility Conditions:** CLEAR

Moon phase: FIRST QUARTER **Humidity:** 31%

Description of weather conditions: CALM AND CLEAR

Brand name and model of light used to conduct surveys: PELICAN HEADS UP LITE STREAMLIGHT T4502 STRION LED

Were binoculars used for the surveys (circle one)? (**YES**) **NO**
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 7/25/18 (mm/dd/yyyy)

Survey Biologist: AGUAYO (Last name) JONATHAN (first name)

Survey Biologist: MESSETT (Last name) LINDSAY (first name)

Site Location: BIG TUJUNGA CREEK, UPSTREAM OF RESERVOIR
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**
↳ WITHIN REPORT

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:
FOUND WITHIN REPORT

Type of Survey (circle one): **DAY** (**NIGHT**) **BREEDING** (**NON-BREEDING**)

Survey number (circle one): 1 2 3 4 5 6 7 (8)

Begin Time: 8:30 PM **End Time:** 10:30 PM

Cloud cover: 0% **Precipitation:** NONE

Air Temperature: 83°/81° F **Water Temperature:** —

Wind Speed: 0-1 MPH **Visibility Conditions:** CLEAR

Moon phase: FIRST QUARTER **Humidity:** 28%

Description of weather conditions: CALM AND CLEAR

Brand name and model of light used to conduct surveys: PELICAN HEADS UP LITE STREAMLIGHT T4501 STRION LED

Were binoculars used for the surveys (circle one)? (**YES**) **NO**
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

7/25/18

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
CALIFORNIA TREEFROG	6-8	O/H	TADPOLES & ADULTS		100%
BAJA CA. TREEFROG	2	O	ADULT		100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: _____

FISH (RAINBOW TROUT WARMWATER), BIRDS (E.G. MALLARD), RACCOON (TRACKS), ~~BULLFROGS~~ CRAYFISH TWO-STRIPED GARTER SNAKE

Other notes, observations, comments, *etc.*

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 04/30/2018 (mm/dd/yyyy) **Survey Biologist:** AGUATO JONATHAN (Last name) (first name)
Survey Biologist: MESSETT LINDSAY (Last name) (first name)

Site Location: BIG TUJUNGA CREEK DOWNSTREAM OF BIG TUJUNGA DAM
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**
↳ PROVIDED WITH REPORT

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:

WILL BE PROVIDED ON REPORT

Type of Survey (circle one): (DAY) NIGHT (BREEDING) NON-BREEDING

Survey number (circle one): (1) 2 3 4 5 6 7 8

Begin Time: 3:30 PM **End Time:** 7:00 PM

Cloud cover: 100% **Precipitation:** NONE, 0 IN

Air Temperature: 61°-58° F **Water Temperature:** MID 60's F

Wind Speed: 3/2 MPH **Visibility Conditions:** CLEAR

Moon phase: ~~[illegible]~~ FULL **Humidity:** 66%

Description of weather conditions: HIGH CLOUDS BUT NO FOG OR RAIN. CALM AND CLEAR

Brand name and model of light used to conduct surveys: PELICAN HEADSUP LITE - 40 PACK STREAMLIGHT 74501 STRION LUXTRITE HEAD LAMP - 40

Were binoculars used for the surveys (circle one)? (YES) NO
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 04/30/2018 (mm/dd/yyyy) **Survey Biologist:** ROVATO (Last name) JONATHAN (first name)
Survey Biologist: MESSETT (Last name) LINDSAY (first name)

Site Location: BIG TUJUNGA CREEK DOWNSTREAM OF BIG TUJUNGA DAM
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:

WILL BE PROVIDED ON REPORT

Type of Survey (circle one): **DAY** (**NIGHT**) (**BREEDING**) **NON-BREEDING**

Survey number (circle one): 1 (2) 3 4 5 6 7 8

Begin Time: 8:05 PM **End Time:** 11:00 PM

Cloud cover: 80-100% **Precipitation:** NONE

Air Temperature: 56° **Water Temperature:** —

Wind Speed: 1 MPH **Visibility Conditions:** CLEAR

Moon phase: FULL **Humidity:** 66%

Description of weather conditions: HIGH CLOUDS BUT NO FOG OR RAIN.

Brand name and model of light used to conduct surveys: STREAMLIGHT 74501 STRION PELICAN HEADS UP LITE JUSTRITE HEAD LAMP

Were binoculars used for the surveys (circle one)? (**YES**) **NO**
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

4/30/2018

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
CALIFORNIA TREEFROG	4	O/H	ADULT	-	100%
BAJA CA. TREEFROG	+15	O/H	ADULT	—	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: _____

VARIOUS FISH, RACCOON (TRACKS), MALLARD, RED-SWAMP CRAYFISH, GREAT HORNED OWL

Other notes, observations, comments, *etc.*

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 5/23/18 (mm/dd/yyyy)

Survey Biologist: AGUATO JONATHAN (Last name) (first name)

Survey Biologist: MESSETT LINDSAY (Last name) (first name)

Site Location: BIG TUJUNGA CREEK, DOWNSTREAM OF BIG TUJUNGA DAM
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**
↳ WITHIN REPORT

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:
FOUND WITHIN REPORT

Type of Survey (circle one): **DAY** / **NIGHT** **BREEDING** / **NON-BREEDING**

Survey number (circle one): 1 2 (3) 4 5 6 7 8

Begin Time: 4:24 PM **End Time:** 7:20 PM

Cloud cover: 0% **Precipitation:** NONE

Air Temperature: 72°/65° F **Water Temperature:** —

Wind Speed: 1-2 MPH **Visibility Conditions:** CLEAR

Moon phase: FIRST QUARTER **Humidity:** 63%

Description of weather conditions: CLEAR AND CALM

Brand name and model of light used to conduct surveys: PELICAN HEADS UP LITE STREAMLIGHT 74507 STRION LED

Were binoculars used for the surveys (circle one)? **YES** / **NO**
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 5/23/18 (mm/dd/yyyy)

Survey Biologist: AGUATO JONATHAN (Last name) (first name)

Survey Biologist: MESSETT LINDSAY (Last name) (first name)

Site Location: BIG TUJUNGA CREEK, DOWNSTREAM OF BIG TUJUNGA DAM
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**
↳ WITHIN REPORT

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:

FOUND WITHIN REPORT

Type of Survey (circle one): (DAY) NIGHT (BREEDING) NON-BREEDING

Survey number (circle one): 1 2 3 (4) 5 6 7 8

Begin Time: 8:25 PM **End Time:** 11:00 PM

Cloud cover: 0% **Precipitation:** NONE

Air Temperature: 63°/52° F **Water Temperature:** —

Wind Speed: 0-1 MPH **Visibility Conditions:** CLEAR

Moon phase: FIRST QUARTER **Humidity:** 63%

Description of weather conditions: CLEAR AND CALM

Brand name and model of light used to conduct surveys: PELICAN HEADS UP LITE STREAMLIGHT 74507 STRION LED

Were binoculars used for the surveys (circle one)? (YES) NO
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

5/23/18

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
CALIFORNIA TREEFROG	+10	O / H	ADULT	-	100%
BAJA CA. TREEFROG	+10	O / H	ADULT	-	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: _____

FISH (VARIOUS), BIRDS (E.G. MALLARD), RACCOON (TRACKS), RED-SWAMPED CRAYFISH

Other notes, observations, comments, *etc.*

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 05/30/2018 (mm/dd/yyyy)

Survey Biologist: AGUATO JONATHAN (Last name) (first name)

Survey Biologist: MESSETT LINDSAY (Last name) (first name)

Site Location: BIG TUJUNGA CREEK, DOWNSTREAM OF BIG TUJUNGA DAM
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

↳ WITHIN REPORT

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:

FOUND WITHIN REPORT

Type of Survey (circle one): **DAY** (**NIGHT**) (**BREEDING**) **NON-BREEDING**

Survey number (circle one): 1 2 3 4 (5) 6 7 8

Begin Time: 8:30 PM **End Time:** 11:05 PM

Cloud cover: 90% **Precipitation:** NONE

Air Temperature: 63°/59° F **Water Temperature:** M.O 60°S F

Wind Speed: 2 MPH **Visibility Conditions:** CLEAR

Moon phase: FULL **Humidity:** 68%

Description of weather conditions: HIGH CLOUDS OUT NO FOG OR RAIN

Brand name and model of light used to conduct surveys: PELICAN HEADS UP LITE STREAMLIGHT 74507 STRION LED

Were binoculars used for the surveys (circle one)? (**YES**) **NO**
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

5/30/18

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
CALIFORNIA TREEFROG	7		ADULT		
BAJA CA. TREEFROG	+/6		ADULT/ TADPOLES		

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: _____

FISH (VARIOUS), BIRDS (E.G. MALLARD), RACCOON (TRACKS), RED-SWAMPED CRAYFISH, BLACK BEAR (TRACKS)

Other notes, observations, comments, *etc.*

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 06/28/2018 (mm/dd/yyyy)

Survey Biologist: AGUATO JONATHAN (Last name) (first name)

Survey Biologist: MESSETT LINDSAY (Last name) (first name)

Site Location: BIG TUJUNGA CREEK, DOWNSTREAM OF BIG TUJUNGA DAM
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**
↳ WITHIN REPORT

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:

FOUND WITHIN REPORT

Type of Survey (circle one): **DAY** (**NIGHT**) (**BREEDING**) **NON-BREEDING**

Survey number (circle one): 1 2 3 4 5 (6) 7 8

Begin Time: 8:40 PM **End Time:** 11:10 PM

Cloud cover: 0% **Precipitation:** NONE

Air Temperature: 72°/69° F **Water Temperature:** HIGH 60s °F

Wind Speed: 0 - 1 MPH **Visibility Conditions:** CLEAR

Moon phase: THIRD QUARTER (HALF) **Humidity:** 67%

Description of weather conditions: CALM AND CLEAR

Brand name and model of light used to conduct surveys: PELICAN HEADS UP LITE STREAMLIGHT 74507 STRION LED

Were binoculars used for the surveys (circle one)? (**YES**) **NO**
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

6/28/18

Appendix E.
California Red-legged Frog Survey Data Sheet

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
CALIFORNIA TREEFROG	14-16	O/H	TADPOLES/ ADULT		100%
BAJA CA. TREEFROG	2	H	ADULT		100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: _____

FISH (VARIOUS), BIRDS (E.G. MALLARD), RACCOON (TRACKS), RED-SWAMPED CRAYFISH

Other notes, observations, comments, *etc.*

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 7/24/2018 (mm/dd/yyyy)

Survey Biologist: AGUATO JONATHAN (Last name) (first name)

Survey Biologist: MESSETT LINDSAY (Last name) (first name)

Site Location: BIG TUJUNGA CREEK, DOWNSTREAM OF BIG TUJUNGA DAM
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**
↳ WITHIN REPORT

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:

FOUND WITHIN REPORT

Type of Survey (circle one) (DAY) NIGHT BREEDING (NON-BREEDING)

Survey number (circle one): 1 2 3 4 5 6 (7) 8

Begin Time: 4:50 pm **End Time:** 7:18 pm

Cloud cover: 0% **Precipitation:** NONE

Air Temperature: 104°/88° f **Water Temperature:** LOW 70's f

Wind Speed: 2 mph **Visibility Conditions:** CLEAR

Moon phase: — **Humidity:** 29%

Description of weather conditions: CALM AND CLEAR

Brand name and model of light used to conduct surveys: PELICAN HEADS UP LITE STREAMLIGHT 74507 STRION LED

Were binoculars used for the surveys (circle one)? (YES) NO
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 7/24/18 (mm/dd/yyyy)

Survey Biologist: AGUATO (Last name) JONATHAN (first name)

Survey Biologist: MESSETT (Last name) LINDSAY (first name)

Site Location: BIG TUJUNGA CREEK, DOWNSTREAM OF BIG TUJUNGA DAM
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**
↳ WITHIN REPORT

Proposed project name: BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
Brief description of proposed action:

FOUND WITHIN REPORT

Type of Survey (circle one): **DAY** (**NIGHT**) **BREEDING** (**NON-BREEDING**)

Survey number (circle one): 1 2 3 4 5 6 7 (8)

Begin Time: 8:40 PM **End Time:** 10:40 PM

Cloud cover: 20-15 % **Precipitation:** NONE

Air Temperature: 84°/82° F **Water Temperature:** —

Wind Speed: 1-2 MPH **Visibility Conditions:** CLEAR

Moon phase: FIRST QUARTER **Humidity:** 27%

Description of weather conditions: CALM AND CLEAR

Brand name and model of light used to conduct surveys: PELICAN HEADS UP LITE STREAMLIGHT 74507 STRION LED

Were binoculars used for the surveys (circle one)? (**YES**) **NO**
Brand, model, and power of binoculars: EAGLE OPTICS DENALI 8X42

Appendix E.
California Red-legged Frog Survey Data Sheet

7/24/18

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
CALIFORNIA TREEFROG	82	O/H	ADULTS		100%
BAJA CA. TREEFROG	7	O/H	ADULTS		100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: _____

FISH (VARIOUS), BIRDS (E.G. MALLARD), RACCOON (TRACKS), RED-SWAMPED CRAYFISH

Other notes, observations, comments, *etc.*

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

ATTACHMENT D

WILDLIFE COMPENDIUM

WILDLIFE COMPENDIUM

Scientific Name	Common Name
FISH	
CYPRINIDAE - MINNOW FAMILY	
Gila orcutti	arroyo chub
ICTALURIDAE - BULLHEAD CATFISH FAMILY	
*Ameiurus melas**	black bullhead
SALMONIDAE - SALMON AND TROUT FAMILY	
Oncorhynchus mykiss	rainbow trout
CENTRARCHIDAE - SUNFISH FAMILY	
*Micropterus salmoides**	largemouth bass
AMPHIBIANS	
BUFONIDAE – TRUE TOAD FAMILY	
Anaxyrus californicus	arroyo toad
HYLIDAE – TREEFROG FAMILY	
Pseudacris cadaverina	California treefrog
Pseudacris hypochondriaca	Baja California treefrog
TURTLES	
EMYDIDAE – BOX AND BASKING TURTLE FAMILY	
Emys pallida	western pond turtle
EMYDIDAE - BOX AND BASKING TURTLE FAMILY	
*Trachemys scripta elegans**	red-eared slider
LIZARDS	
PHRYNOSOMATIDAE – SPINY LIZARD FAMILY	
Phrynosoma blainvillii	coast horned lizard
Sceloporus occidentalis	western fence lizard
Uta stansburiana	common side-blotched lizard
TEIIDAE – WHIPTAIL LIZARD FAMILY	
Aspidoscelis tigris stejnegeri	coastal whiptail
ANGUIDAE - ALLIGATOR LIZARD FAMILY	
Elgaria multicarinata	southern alligator lizard
SNAKES	
NATRICIDAE - HARMLESS LIVE-BEARING SNAKE FAMILY	
Thamnophis hammondii	two-striped garter snake
VIPERIDAE - VIPER AND PITVIPER FAMILY	
Crotalus oreganus helleri	southern Pacific rattlesnake
BIRDS	
ANATIDAE – SWAN, GOOSE, AND DUCK FAMILY	
Branta canadensis	Canada goose
Anas platyrhynchos	mallard
ODONTOPHORIDAE – NEW WORLD QUAIL FAMILY	
Oreortyx pictus	mountain quail
PODICIPEDIDAE – GREBE FAMILY	
Podiceps nigricollis	eared grebe
COLUMBIDAE – PIGEON AND DOVE FAMILY	
*Columba livia**	rock pigeon
Patagioenas fasciata	band-tailed pigeon
Zenaida macroura	mourning dove

WILDLIFE COMPENDIUM

Scientific Name	Common Name
CAPRIMULGIDAE – NIGHTJAR FAMILY	
Chordeiles acutipennis	lesser nighthawk
Phalaenoptilus nuttallii	common poorwill
APODIDAE – SWIFT FAMILY	
Chaetura vauxi	Vaux's swift
Aeronautes saxatalis	white-throated swift
TROCHILIDAE – HUMMINGBIRD FAMILY	
Calypte anna	Anna’s hummingbird
CHARADRIIDAE – PLOVER FAMILY	
Charadrius vociferus	killdeer
SCOLOPACIDAE – SANDPIPER FAMILY	
Actitis macularius	spotted sandpiper
PHALACROCORACIDAE – CORMORANT FAMILY	
Phalacrocorax auritus	double-crested cormorant
ARDEIDAE – HERON FAMILY	
Ardea herodias	great blue heron
Nycticorax nycticorax	black-crowned night-heron
CATHARTIDAE – NEW WORLD VULTURE FAMILY	
Cathartes aura	turkey vulture
ACCIPITRIDAE – HAWK FAMILY	
Buteo jamaicensis	red-tailed hawk
STRIGIDAE - TYPICAL OWL FAMILY	
Megascops kennicottii	western screech-owl
Bubo virginianus	great horned owl
ALCEDINIDAE - KINGFISHER FAMILY	
Megaceryle alcyon	belted kingfisher
PICIDAE - WOODPECKER FAMILY	
Melanerpes formicivorus	acorn woodpecker
Picoides villosus	hairy woodpecker
Colaptes auratus	northern flicker
FALCONIDAE – FALCON FAMILY	
Falco sparverius	American kestrel
Falco peregrinus anatum	American peregrine falcon
TYRANNIDAE – TYRANT FLYCATCHER FAMILY	
Contopus sordidulus	western wood-pewee
Sayornis nigricans	black phoebe
Myiarchus cinerascens	ash-throated flycatcher
VIREONIDAE – VIREO FAMILY	
Vireo gilvus	warbling vireo
CORVIDAE – JAY AND CROW FAMILY	
Cyanocitta stelleri	Steller's jay
Aphelocoma californica	California scrub-jay
Corvus corax	common raven

WILDLIFE COMPENDIUM

Scientific Name	Common Name
HIRUNDINIDAE – SWALLOW FAMILY	
Tachycineta thalassina	violet-green swallow
Petrochelidon pyrrhonota	cliff swallow
PARIDAE - TITMOUSE FAMILY	
Baeolophus inornatus	oak titmouse
AEGITHALIDAE – BUSHTIT FAMILY	
Psaltriparus minimus	bushtit
TROGLODYTIDAE – WREN FAMILY	
Salpinctes obsoletus	rock wren
Catherpes mexicanus	canyon wren
Troglodytes aedon	house wren
Thryomanes bewickii	Bewick's wren
Campylorhynchus brunneicapillus	cactus wren
POLIOPTILIDAE – GNATCATCHER FAMILY	
Polioptila caerulea	blue-gray gnatcatcher
CINCLIDAE - DIPPER FAMILY	
Cinclus mexicanus	American dipper
SYLVIIDAE – SILVIID WARBLERS FAMILY	
Chamaea fasciata	wrentit
TURDIDAE - THRUSH FAMILY	
Sialia mexicana	western bluebird
Catharus guttatus	hermit thrush
Turdus migratorius	American robin
PTILOGONATIDAE - SILKY-FLYCATCHER FAMILY	
Phainopepla nitens	phainopepla
FRINGILLIDAE – FINCH FAMILY	
Haemorhous mexicanus	house finch
Spinus psaltria	lesser goldfinch
PARULIDAE – WOOD-WARBLER FAMILY	
Setophaga petechia	yellow warbler
Cardellina pusilla	Wilson's warbler
EMBERIZIDAE – SPARROW FAMILY	
Pipilo maculatus	spotted towhee
Melozone crissalis	California towhee
Spizella atrogularis	black-chinned sparrow
Melospiza melodia	song sparrow
CARDINALIDAE – CARDINALS, GROSBEAKS, AND ALLIES FAMILY	
Pheucticus melanocephalus	black-headed grosbeak
Passerina amoena	lazuli bunting
ICTERIDAE – BLACKBIRD, COWBIRD, AND ORIOLE FAMILY	
Agelaius phoeniceus	red-winged blackbird
*Molothrus ater**	brown-headed cowbird
Icterus cucullatus	hooded oriole
Icterus bullockii	Bullock's oriole

WILDLIFE COMPENDIUM

Scientific Name	Common Name
MAMMALS	
SCIURIDAE – SQUIRREL FAMILY	
Sciurus griseus	western gray squirrel
Otospermophilus beecheyi	California ground squirrel
CRICETIDAE - NEW WORLD RATS AND MICE FAMILY	
Neotoma sp.	woodrat
VESPERTILIONIDAE - VESPERTILIONID BAT FAMILY	
Parastrellus hesperus	canyon bat
URSIDAE - BEAR FAMILY	
*Ursus americanus**	black bear - tracks
MEPHITIDAE - SKUNK FAMILY	
Mephitis mephitis	striped skunk
Spilogale gracilis	western spotted skunk
PROCYONIDAE – PROCYONID FAMILY	
Procyon lotor	northern raccoon - tracks
CERVIDAE – CERVID FAMILY	
Odocoileus hemionus	southern mule deer
* Non-native species	

ATTACHMENT E

CALIFORNIA NATURAL DIVERSITY DATABASE FORMS

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/18/2018

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Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

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California Native Species Field Survey Form

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Scientific Name: *Anaxyrus californicus*

Common Name: arroyo toad

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Habitat along Big Tujunga Creek extending from Reservoir upstream to Fall Creek and downstream of Big Tujunga Dam to 0.62 mile downstream of the Big Tujunga Canyon Road bridge

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2,252-2,370 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: **NAD27** ☐ **NAD83** ☑ **WGS84** ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates: Arroyo toad (male) - 11s 391569 E, 3796017 N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Habitat consists primarily of riparian vegetation along Big Tujunga Creek that is dominated by willows (Salix spp.) with scattered white alder (Alnus rhombifolia). Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels. Erosion has deposited alluvium (including boulders, cobbles, gravels, and coarse to fine sandy soils) within the stream course. Stream morphology includes portions with narrow, incised, fast-moving streams with plunge pools; wider, slow-moving streams.

Other rare taxa seen at THIS site on THIS date: (separate form preferred) western pond turtle, coast horned lizard, coastal whiptail, two-striped garter snake, American peregrine falcon, and yellow warbler.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: open space in the Angeles National Forest

Visible disturbances:

Threats: potential landslides

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Familiarity with species, visually and aurally

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
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Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 07/24/2018

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Source Code _____ Quad Code _____
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California Native Species Field Survey Form

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Scientific Name: *Gila orcutti*

Common Name: arroyo chub

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 30-60 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

30 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Habitat along Big Tujunga Creek, downstream of Big Tujunga Dam. Six locations with groups of 5-10 arroyo chubs, totaling 30-60 arroyo chubs.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2,252-2,370 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐

Source of Coordinates (GPS, topo. map & type): GPS

GPS Make & Model Garmin eTrek Vista

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐

Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates: Group 1: 389366 E, 3793956 N; group 2: 389425 E, 3794002 N; group 3: 389922 E, 3794408 N; group 4: 390051 E, 3794498 N; group 5: 390071 E, 3794837 N; group 6: 390455 E, 3795212 N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Downstream habitat consists of relatively dense and continuous willow riparian forest dominated by arroyo willow (Salix lasiolepsis) and red willow (Salix laevigata), with an overstory of white alder and Fremont cottonwood (Populus fremontii ssp, fremontii).

Other rare taxa seen at THIS site on THIS date: western pond turtle
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: open space in the Angeles National Forest

Visible disturbances:

Threats: potential landslides

Comments: Six locations with groups of 5-10 arroyo chubs, totaling 30-60 individuals.

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Familiarity with species, visually

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/18/2018

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California Native Species Field Survey Form

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Scientific Name: *Emys marmorata*

Common Name: western pond turtle

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 4 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

4 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

***Location Description* (please attach map *AND/OR* fill out your choice of coordinates, below)**

Habitat along Big Tujunga Creek extending from Reservoir upstream to Fall Creek and downstream of Big Tujunga Dam to 0.62 mile downstream of the Big Tujunga Canyon Road bridge.

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2252-2370 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: WPTU1: 392579 E, 3796588 N (May 18, 2018); WPTU2: 390579 E, 3795325 N (July 24, 2018); WPTU3: 390341 E, 3795096 N (May 23, 2018), WPTU4: 390061 E, 3794834 N (July 24, 2018)

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Upstream habitat consists primarily of riparian vegetation along Big Tujunga Creek that is dominated by willows (Salix spp.) with scattered white alder (Alnus rhombifolia). Downstream habitat consists of relatively dense and continuous willow riparian forest dominated by arroyo willow (Salix lasiolepsis) and red willow (Salix laevigata), with an overstory of white alder and Fremont cottonwood (Populus fremontii ssp, fremontii).

Other rare taxa seen at THIS site on THIS date: (separate form preferred) arroyo chub, arroyo toad, coast horned lizard, coastal whiptail, two-striped garter snake, American peregrine falcon, and yellow warbler.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: open space in the Angeles National Forest

Visible disturbances:

Threats: potential landslides

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Familiarity with species, visually

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 07/25/2018

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California Native Species Field Survey Form

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Scientific Name: *Phrynosoma blainvillii*

Common Name: coast horned lizard

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Habitat along Big Tujunga Creek extending from Reservoir upstream to Fall Creek and downstream of Big Tujunga Dam to 0.62 mile downstream of the Big Tujunga Canyon Road bridge

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2,252-2,370 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐

Source of Coordinates (GPS, topo. map & type): GPS

GPS Make & Model Garmin eTrek Vista

DATUM: **NAD27** ☐ **NAD83** ☑ **WGS84** ☐

Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates: 1: 392101 E, 3796146 N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Observed on an open sandy area with adjacent riparian habitat along Big Tujunga Creek that is dominated by willows (Salix spp.) with scattered white alder (Alnus rhombifolia). The understory vegetation includes, but is not limited to, mule fat (Baccharis salicifolia), cocklebur (Xanthium strumarium), and broad-leaved cattail (Typha latifolia).

Other rare taxa seen at THIS site on THIS date: (separate form preferred) arroyo toad, western pond turtle, coastal whiptail, two-striped garter snake, American peregrine falcon, and yellow warbler.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: open space in the Angeles National Forest

Visible disturbances:

Threats: potential landslides

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Familiarity with species, visually

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/11/2018

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Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

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California Native Species Field Survey Form

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Scientific Name: *Aspidoscelis tigris stejneri*

Common Name: coastal whiptail

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 8 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

7 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description *(please attach map AND/OR fill out your choice of coordinates, below)*

Habitat along Big Tujunga Creek extending from Reservoir upstream to Fall Creek and downstream of Big Tujunga Dam to 0.62 mile downstream of the Big Tujunga Canyon Road bridge

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2,25,2-2370 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: 1: 392775 E, 3796610 N; 2: 392748 E, 3796627 N; 3: 392712 E, 3796619 N; 4: 392593 E, 3796584 N; 5: 392539 E, 3796480 N; 6: 392334 E, 3796239 N; 7: 392187 E, 3796168 N; and 8: 392141 E, 3796159 N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Observed mainly in open sandy areas with adjacent coastal sage scrub and/or chaparral habitat or riparian habitat along Big Tujunga Creek that is dominated by willows (Salix spp.) with scattered white alder (Alnus rhombifolia).

Other rare taxa seen at THIS site on THIS date: (separate form preferred) arroyo toad, western pond turtle, coast horned lizard, two-striped garter snake, American peregrine falcon, and yellow warbler.

Site Information

Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: open space in the Angeles National Forest

Visible disturbances:

Threats: potential landslides

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Familiarity with species, visually

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
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Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 07/25/2018

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Elm Code _____ Occ. No. _____
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California Native Species Field Survey Form

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Scientific Name: *Thamnophis hammondii*

Common Name: two-striped garter snake

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 6 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

6 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Habitat along Big Tujunga Creek extending from Reservoir upstream to Fall Creek and downstream of Big Tujunga Dam to 0.62 mile downstream of the Big Tujunga Canyon Road bridge

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2,252-2,370 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: **NAD27** ☐ **NAD83** ☑ **WGS84** ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates: 1: 391700 E, 3796204 N; 2: 392367 E, 3796288 N; 3: 392571 E, 3796576 N, 4: 392662 E, 3796619 N; 5: 392684 E, 3796626 N; 6: 392861 E, 3796613 N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Habitat consists primarily of riparian vegetation along Big Tujunga Creek that is dominated by willows (Salix spp.) with scattered white alder (Alnus rhombifolia). The understory vegetation includes, but is not limited to, mule fat (Baccharis salicifolia), cocklebur (Xanthium strumarium), and broad-leaved cattail (Typha latifolia). A few western sycamore (Platanus racemosa) and Fremont cottonwood (Populus fremontii ssp. fremontii) are also present. Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels.

Other rare taxa seen at THIS site on THIS date: (separate form preferred) arroyo toad, western pond turtle, coast horned lizard, coastal whiptail, American peregrine falcon, and yellow warbler.

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: open space in the Angeles National Forest

Visible disturbances:

Threats: potential landslides

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Familiarity with species, visually

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

APPENDIX B-4

SIERRA MADRE YELLOW-LEGGED FROG SURVEY LETTER REPORT

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January 4, 2012

Ms. Erin M. McCarthy
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011

VIA EMAIL
erin_mccarthy@fws.gov

Subject: Results of Focused Presence/Absence Surveys for Sierra Madre Yellow-legged Frog for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles County, California

Dear Ms. McCarthy:

This Letter Report presents the results of focused diurnal surveys to determine the presence or absence of the Sierra Madre yellow-legged frog (*Rana muscosa*) upstream of the Big Tujunga Reservoir for the Big Tujunga Reservoir Sediment Removal Project. A qualified Biologist with the necessary experience and a California Department of Fish and Game (CDFG) scientific collecting permit conducted the surveys.

Survey Area

The survey area for the Big Tujunga Dam and Reservoir Sediment Removal Project is located in Big Tujunga Canyon on the southern edge of the San Gabriel Mountains, within the Angeles National Forest (ANF), Los Angeles County (Exhibit 1). The Sierra Madre yellow-legged frog survey area included suitable and accessible habitat along Big Tujunga Creek extending approximately 3,300 feet (one kilometer) upstream of Big Tujunga Reservoir and portions of three tributary creeks, including approximately 800 feet (0.24 kilometers) of Josephine Creek, 3,300 feet (one kilometer) of Fox Creek, and 1,300 feet (0.40 kilometers) of White Oak Creek (Exhibit 2). The remaining portions of Josephine and White Oak creeks were not surveyed due to the presence of an impassable physical obstacle (such as a waterfall) or lack of suitable upstream habitat. Representative photographs of the survey area are provided in Attachment A.

The survey area is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute topographic quadrangle at Township 3 North, Range 12 West, within Sections 31 and 32. Topography in the survey area consists of sheer cliffs and steep slopes to the canyon bottom, with elevations ranging from approximately 2,150 to 3,400 feet above mean sea level (msl). The survey area and surrounding vicinity consists of natural open space within the Angeles National Forest.

Big Tujunga Creek

Big Tujunga Creek flows in a westerly direction, and several tributaries from the north and south join it upstream of Big Tujunga Reservoir, including Josephine Creek to the south, and Fox Creek and White Oak Creek to the north. Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels. Erosion has deposited alluvium (including boulders, cobbles, gravels, and coarse to fine sandy soils) within the stream course. Topography is irregular, and stream grade

and flow velocity range across a moderate spectrum. Stream morphology includes portions with narrow, incised, fast-moving streams with plunge pools; wider, slow-moving streams; and a relatively broad alluvial wash with multiple meanders where the creek flows into the reservoir. Within the survey area, Big Tujunga Creek is a perennially flowing stream.

Upstream of the reservoir, vegetation along Big Tujunga Creek consists primarily of southern riparian scrub species. Big Tujunga Canyon burned during the 2009 Station Fire; thus, the riparian canopy is sparse through much of the creek. The average vegetation heights are approximately five to seven feet. Vegetation within Big Tujunga Creek consists mainly of willow riparian scrub dominated by arroyo willow (*Salix lasiolepis*) and red willow (*Salix laevigata*); however, in some areas it is co-dominated by white alder (*Alnus rhombifolia*) and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*). Other common species present include mule fat (*Baccharis salicifolia*), stinging nettle (*Urtica dioica*), and mugwort (*Artemisia douglasiana*). In upland areas, coast live oaks (*Quercus agrifolia*) and western sycamores (*Platanus racemosa*) are also present.

In alluvial terraces and slopes above the main stream course, alluvial scrub is present, dominated by scale-broom (*Lepidospartum squamatum*); other common species include thick-leaf yerba santa (*Eriodictyon crassifolium*), California buckwheat (*Eriogonum fasciculatum*), Our Lord's candle (*Yucca whipplei*), black sage (*Salvia mellifera*), deerweed (*Acmispon glaber* [*Lotus scoparius*]), and laurel sumac (*Malosma laurina*). Many of the burned trees and shrubs are resprouting from the base. Poodledog bush (*Turricula parryi*), a fire-following species, is widespread throughout the survey area.

Josephine Creek

Josephine Creek flows from the south into Big Tujunga Creek at its confluence with Big Tujunga Reservoir. Stream morphology during surveys is best characterized as a shallow, narrow creek, less than 2 feet (0.6 meter) deep and 10 feet (3.0 meters) wide, and a moderate stream grade within a steep sided canyon approximately 200 feet (61 meters) wide. Approximately 800 feet (0.24 kilometer) upstream of the confluence with Big Tujunga Creek, Josephine Creek flows into the canyon over an approximately 140 foot (43 meter) vertical waterfall. Substrate within the canyon consists of boulders, cobble, gravel, and coarse sand.

Vegetation within Josephine Creek consists mainly of southern sycamore alder riparian woodland, dominated by white alder and western sycamore. In some areas it is co-dominated by black willow (*Salix goddingii*) with a few coast live oak scattered throughout. This vegetation type burned during the 2009 Station Fire and the understory has grown thick with stinging nettle, mugwort, caterpillar phacelia (*Phacelia cicutaria*), scarlet monkeyflower (*Mimulus cardinalis*), California blackberry (*Rubus ursinus*), and poodledog bush. Trees that survived the fire are resprouting.

Fox Creek

Fox Creek flows from the north into Big Tujunga Reservoir approximately half a mile (0.8 kilometer) west of Josephine Creek. Stream morphology during surveys is best characterized as a shallow, narrow creek, less than 3 feet (0.9 meter) deep and 15 feet (4.5 meter) wide, and a moderate stream grade within a steep-sided canyon less than 100 feet (30 meters) wide. Approximately 1,200 feet (0.37 kilometer) upstream of the confluence with Big Tujunga Creek, Fox Creek flows into the canyon over an approximately 70 foot (21 meter) vertical waterfall. Above the waterfall, the canyon becomes narrower with granite slides and sandy pools up to 6 feet (1.8 meter) deep. Substrate within the canyon consists of boulders, cobble, gravel, and coarse to very fine-grained sand.

Vegetation within Fox Creek consists of relatively sparse southern sycamore alder riparian woodland, dominated by white alder and western sycamore. In some areas it is co-dominated by black willow and Fremont cottonwood with coast live oak scattered throughout the upper terraces. Portions of this vegetation type burned during the 2009 Station Fire. The understory consists of patches of caterpillar phacelia, scarlet monkeyflower, California blackberry, and poodledog bush.

White Oak Creek

White Oak Creek flows from the north into Big Tujunga Reservoir approximately 0.5-mile west of the confluence of Fox Creek and Big Tujunga Creek. Stream morphology during surveys is best characterized as a shallow, narrow creek, less than 2 feet (0.6 meter) deep and 5 feet (1.5 meter) wide, and a moderate stream grade within a near vertical walled canyon less than 100 feet (30 meters) wide. The creek has eroded a steep sided channel through sedimentary deposits primarily composed of coarse to fine grained sand and silt. Approximately 1,300 feet (0.4 kilometers) upstream of the confluence with Big Tujunga Creek, White Oak Creek flows into the canyon over an approximately 120 foot (37 meter) vertical waterfall. Above the waterfall, the canyon becomes narrower with a very steep stream gradient.

Vegetation within White Oak Creek consists of sparse willow riparian scrub dominated by black willow with scattered Fremont cottonwood. The alluvial deposits are primarily devoid of vegetation and appear deep, likely having been deposited following the 2009 Station Fire.

Background Information

The Sierra Madre yellow-legged frog was federally listed as an Endangered species by the U.S. Fish and Wildlife Service (USFWS) on July 2, 2002, and is considered a CDFG Species of Special Concern. This species has been extirpated from more than 90 percent of its historic range (Knapp et al. 2007). At the time of listing, the Sierra Madre and the Sierra Nevada (*R. sierrae*) yellow-legged frogs were considered distinct population segments of *R. muscosa*. Genetic, morphological, and acoustical studies (Vredenburg et al. 2007) have determined that they are genetically distinct and the Sierra Nevada yellow-legged frog (*R. sierra*) is now recognized as a new species. The northern distribution of the Sierra Madre yellow-legged frog occurs on the western slopes of the Sierra Nevada Mountains from Fresno County south to Kern County, with Mather Pass representing the northern border of the species range (Vredenburg et al. 2007). The Sierra Nevada yellow-legged frog occurs north of Mather Pass on the eastern slopes of the Sierra Nevada Mountains. The southern distribution of the Sierra Madre yellow-legged frog consists of several small, isolated populations in the San Gabriel, San Bernardino, and San Jacinto Mountains, the largest of which does not exceed 100 individuals. Only the Sierra Madre yellow-legged frog is known to occur in the project region.

The Sierra Madre yellow-legged frog ranges in size from 1.5 to 3.25 inches (3.8 to 8.3 centimeters) snout to vent length (Jennings and Hayes 1994a). Females average slightly larger than males (Stebbins 2003). The belly and ventral (bottom) surface of the hind limbs are yellow to orange, with this pigmentation on the abdomen occasionally extending to the forelimbs (Stebbins 2003). Dorsal (top) coloration in adults is variable, exhibiting a mix of brown and yellow, but it can also be gray, red, or green-brown, and usually patterned with dark spots (Jennings and Hayes 1994a). Dorsolateral (horizontal along the body) folds are apparent but not as pronounced as the red-legged frog. Tadpoles can reach lengths of 2.8 inches (7 centimeters) and are generally mottled brown in dorsal coloration with a golden tint and faintly yellow ventral coloration (Stebbins 2003).

Within the southern range of the Sierra Madre yellow-legged frog in the San Gabriel, San Bernardino, and San Jacinto Mountains, this species is found in narrow, rock-walled rivers, perennial creeks, permanent plunge pools within intermittent creeks, and pools in montane riparian and/or chaparral habitat from 1,200 to 7,500 feet (365 to 2286 meters) msl (Jennings and Hayes 1994a). Breeding pools must maintain water during the entire tadpole growth phase which can last up to four years. Substrates within the aquatic habitat consist of varying proportions of silt, sand, gravel, cobble, rock, and boulders. Boulders and open gravel banks projecting above the water level are required for sunning. Aquatic refugia, including pools with overhanging banks, fallen logs, or rocks, are required to escape predation.

Sierra Madre yellow-legged frogs are primarily diurnal and maintain a small home range, likely less than 33 feet (10 meters) in the longest dimension (CDFG 2008). They are also highly aquatic, not venturing more than a few feet (one meter) from water (CDFG 2008). Adults feed primarily on aquatic and terrestrial invertebrates, favoring terrestrial insects, but have also been observed feeding on tadpoles (Mullally 1953; Heller 1960). Yellow-legged frog tadpoles graze on algae and diatoms along rocky bottoms in shallows.

During the breeding season, typically from March to May, males will defend a territory and make advertising vocalizations to females from shallow areas along the creek margins. Calls are made above and below the water's surface. This species lacks vocal sacs and vocalizations are therefore weak and difficult to detect. Small egg masses of 15 to 350 eggs are deposited underwater where they attach to rocks, gravel, vegetation, or under banks (Livezey and Wright 1945). Eggs hatch approximately three weeks later (Zweifel 1955). Length of the larval stage has not been studied for the southern populations of the Sierra Madre yellow-legged frog; however, it has been determined to be dependent upon elevation in Sierra Nevada yellow-legged frog. Larval stage length for Sierra Nevada yellow-legged frog was found to range from 4 years for the highest elevation populations to one year for the lowest elevation populations (Storer 1925; Zweifel 1955). Larval stage lengths for Sierra Madre yellow-legged frog would be expected to conform to lower elevation Sierra Nevada yellow-legged frog populations. Females reach sexual maturity at 1.8 inches (4.6 centimeters) with males maturing at a slightly smaller size (Zweifel 1955). There is little reliable data on age at sexual maturity but it is considered to be at least three years after metamorphosis (Zweifel 1955).

On September 13, 2005, the USFWS proposed a rule designating approximately 8,770 acres (3550 hectares) of land as critical habitat for the Southern California Distinct Vertebrate Population Segment of the Mountain Yellow-Legged Frog (*Rana muscosa*) in Los Angeles, San Bernardino, and Riverside counties, California (USFWS 2005). A final rule was published on September 14, 2006 for approximately 8,283 acres (3352 hectares) (USFWS 2006). The nearest Critical Habitat is Unit 1D, Devil's Canyon, approximately 12 miles (19 kilometers) east of the project area within the San Gabriel River Watershed. The survey area is located in the Los Angeles River Watershed.

The Sierra Madre yellow-legged frog occurred historically in the Big Tujunga Wash immediately upstream of Foothill Boulevard; and in Big Tujunga Creek, Mill Creek, and several tributary drainages above Big Tujunga Dam (CDFG 2011). There have been no documented observations of the population between Foothill Boulevard and Big Tujunga Dam since 1939 and it is considered extirpated (CDFG 2011; Jennings and Hayes 1994b). The closest known population for this species is located at Devil's Canyon approximately 12 miles (19 kilometers) east.

The San Diego Zoo's Institute for Conservation Research, in conjunction with the CDFG, USFWS, U.S. Forest Service (USFS) and USGS, has developed a Mountain Yellow-legged Frog Recovery Program which involves captive breeding and translocation for the remaining frogs from the San Bernardino Mountains (San Diego Zoo 2009). In August of 2006, 75 tadpoles were collected from a drying stream bed in the San Jacinto Mountains and were used to establish the captive breeding program. In 2010, tadpole offspring from the captive breeding program were released back into the San Jacinto Mountains at sites where the species was observed historically.

Survey Methodology

Prior to conducting the focused surveys, a search of the California Natural Diversity Database (CNDDB) (CDFG 2011) and other relevant available documents (Jennings and Hayes 1994; Campbell et al. 1996) was conducted to determine if and to what extent the Sierra Madre yellow-legged frog occurs in the project vicinity.

An initial site assessment was conducted by BonTerra Consulting Senior Herpetologist Sam Stewart on March 17, 2011, to determine the extent of potentially suitable habitat for the Sierra Madre yellow-legged frog. The site assessment determined that Big Tujunga Creek upstream from the reservoir and three tributary drainages (i.e., Josephine Creek, Fox Creek, and White Oak Creek) provide potentially suitable habitat for the species.

Surveys were proposed in suitable habitat up to 0.6 mile (1 kilometer) from the project study area, which includes Big Tujunga Reservoir and a 200 foot (60 meter) buffer. Surveys in Big Tujunga Creek were conducted from the reservoir to the Fall Creek Campground/USFS Road 3N27 approximately 0.6 mile (one kilometer) upstream. Surveys in Fox Canyon were conducted from Big Tujunga Creek to approximately 0.6 mile (1 kilometer upstream). The Josephine Creek survey area was reduced to 800 feet (244 meters) from the confluence with Big Tujunga Creek due to the presence of an impassable 140 foot (43 meter) vertical waterfall and marginal conditions for the species (i.e., relatively broad canyon and lack of suitable pools for larval development). The White Oak Creek survey area was reduced to 1,200 feet (365 meters) from the confluence with Big Tujunga Creek due to the presence of an impassable 120 foot (37 meter) vertical waterfall and lack of suitable upstream habitat (i.e., high stream gradient).

Mr. Stewart was the principal investigator accompanied by BonTerra Consulting Biologist Jason Mintzer. A total of four diurnal surveys were conducted on July 28; August 2, 15, and 17, 2011. The timing of the surveys was not suitable to observe breeding but adults and larvae would have been detectable. Although there is no USFWS-approved survey protocol for the Sierra Madre yellow-legged frog, surveys were consistent with a draft survey protocol developed by the USGS (Backlin et al. 2003).

Diurnal surveys were conducted between 9:00 AM and dusk, and focused on the detection of frogs by visual identification and checking potentially suitable breeding habitat for tadpoles. Mr. Stewart and Mr. Mintzer scanned pools for larvae, juveniles, and adults in potentially suitable breeding territories along the stream, and for foraging individuals in the adjacent riparian areas. Surveys were conducted during appropriate environmental conditions conducive to the activity patterns of the Sierra Madre yellow-legged frog. Generally, these conditions consist of temperatures in excess of 50 degrees Fahrenheit (10 degrees Celsius) with low winds (less than 10 miles [16 kilometers] per hour). Survey dates, times, and weather data are shown in Table 1.

TABLE 1
SUMMARY OF SIERRA MADRE YELLOW LEGGED FROG
SURVEY CONDITIONS

Survey	Surveying Biologists	Survey Date	Wind (miles/hour)		Temperature (°F)		Relative Humidity (%)		Cloud Cover
			Start	End	Start	End	Start	End	
1	S. Stewart, J. Mintzer	7/28/2011	4-6	0-2	77	78	45	44	Clear
2	S. Stewart, J. Mintzer	8/2/2011	3-5	2-4	88	89	20	17	10%
3	S. Stewart, J. Mintzer	8/15/2011	0-2	5-7	82	84	21	34	Clear
4	S. Stewart, J. Mintzer	8/17/2011	0-2	2-4	83	88	22	20	10%

Special status species detected during surveys were documented in field notes and the following data collected whenever possible: (1) time of initial observation; (2) meteorological conditions at time of initial observation (including temperature, relative humidity, wind speed, and barometric pressure); (3) geographic positioning system (GPS) coordinates; (4) and photographs.

Survey Results

No Sierra Madre yellow-legged frogs were observed during focused surveys. Native amphibian species observed during surveys include western toad (*Anaxyrus boreas*), California treefrog (*Pseudacris cadaverina*), and Baja California treefrog (*Pseudacris hypochondriac*). A list of all wildlife species observed within the survey area is included in Attachment B.

Several non-target special status species were observed during surveys (Table 2). These include the following California Species of Special Concern: yellow warbler (*Dendroica petechia*),loggerhead shrike (*Lanius ludovicianus*), and two-striped garter snake (*Thamnophis hammondii*). The coastal whiptail (*Aspidoscelis tigris stejnegeri*), a CDFG Special Animal, and peregrine falcon (*Falco peregrines*), a California Fully Protected Species, were also detected. CNDDB forms for these species are found in Attachment C. Detailed information on the special status bird sightings was not collected because amphibians were the focus of the survey effort. Therefore, CNDDB forms for special status bird species are not included in Attachment C.

TABLE 2
SPECIAL STATUS SPECIES OBSERVED DURING SURVEYS

Scientific Name	Common Name	Status			Location
		USFWS	USFS	CDFG	
Reptiles					
Aspidoscelis tigris stejnegeri	coastal whiptail	-	-	SA	All segments
Thamnophis hammondii	two-striped garter snake	-	FSS	SSC	Big Tujunga Creek, Fox Creek
Birds					
Dendroica petechia	yellow warbler	-	-	SSC	Big Tujunga Creek
Falco peregrines	peregrine falcon	-	FSS	CFP SCD	Big Tujunga Creek
Lanius ludovicianus	loggerhead shrike	-	-	SSC	Fox Creek

Federal Designations (USFS)
FSS Forest Service Sensitive Species

State Designations (CDFG)
CFP California Fully Protected
SA Special Animal
SCD California (State) Candidate for Delisting
SSC Species of Special Concern

BonTerra Consulting appreciates the opportunity to assist with this project. Please contact David Hughes or Sam Stewart at (626) 351-2000 with any questions or comments.

Sincerely,

BONTERRA CONSULTING

David T. Hughes
Senior Project Manager

for Samuel C. Stewart, IV
Senior Herpetologist

Enclosures: Exhibits 1 and 2
Attachment A – Site Photographs
Attachment B –Wildlife Compendium
Attachment C – CNDDB Forms

cc: Ryan Butler, Los Angeles County Department of Public Works
Philip Siongco, Los Angeles County Department of Public Works

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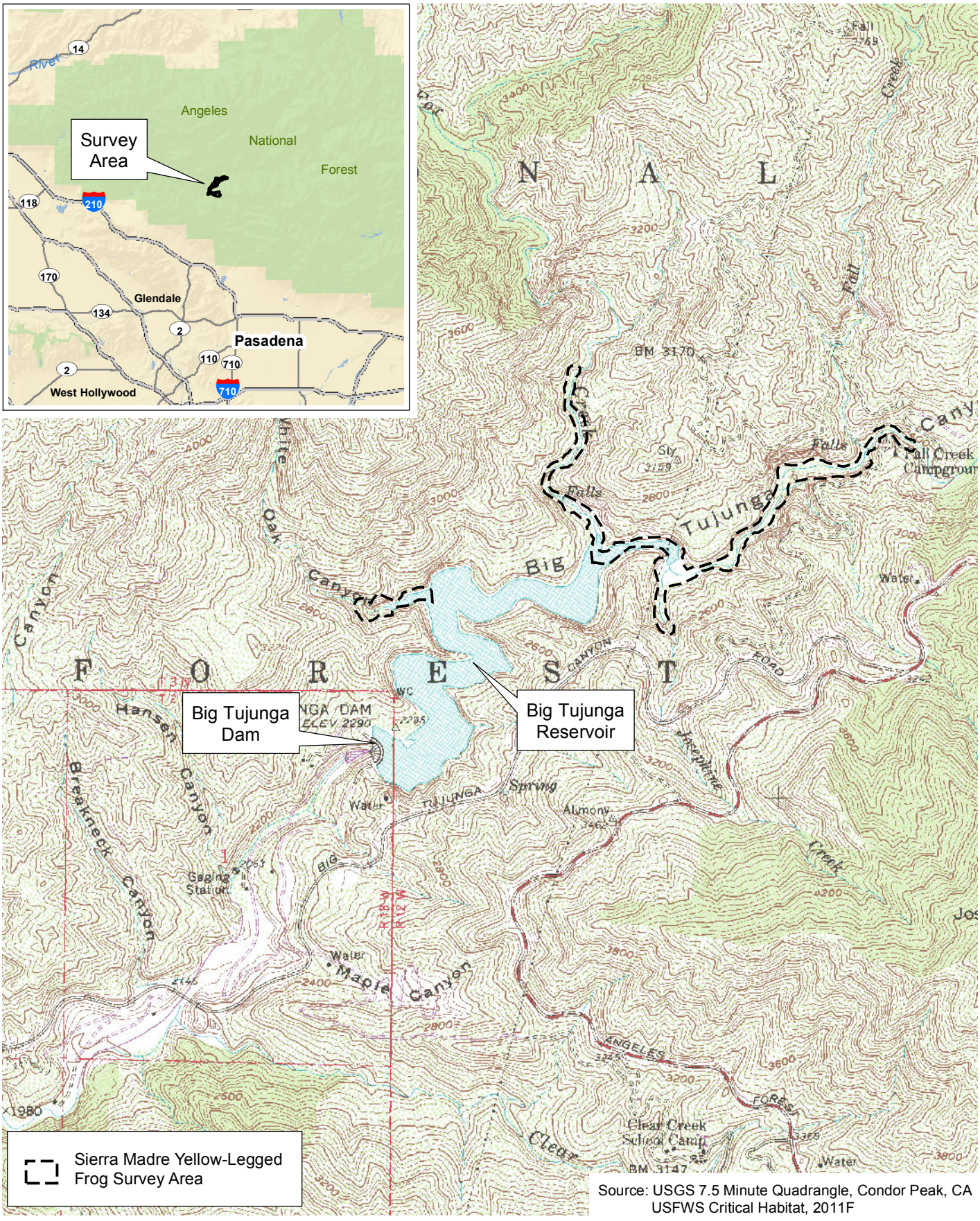

Source: USGS 7.5 Minute Quadrangle, Condor Peak, CA
USFWS Critical Habitat, 2011F

Survey Area Location

Exhibit 1

Sierra Madre Yellow-Legged Frog Survey for the Big Tujunga Reservoir Sediment Removal Project

N
W E
S

2,000 1,000 0 2,000
Feet

BonTerra CONSULTING

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Sierra Madre Yellow-Legged Frog Survey Area

Species Observed

Two-striped Garter Snake

Loggerhead Shrike

Other Features

White Oak Creek Waterfall

Fox Creek Waterfall

Josephine Creek Waterfall

Fox Creek

Big Tujunga Creek

White Oak Creek

Josephine Creek

Big Tujunga Canyon Rd

Big Tujunga Canyon Rd

Angeles Forest Hwy

2

2

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Sierra Madre Yellow-Legged Frog Survey Area

Exhibit 2

Sierra Madre Yellow-Legged Frog Survey for the Big Tujunga Reservoir Sediment Removal Project

N W E S

700 350 0 700

Feet

BonTerra CONSULTING

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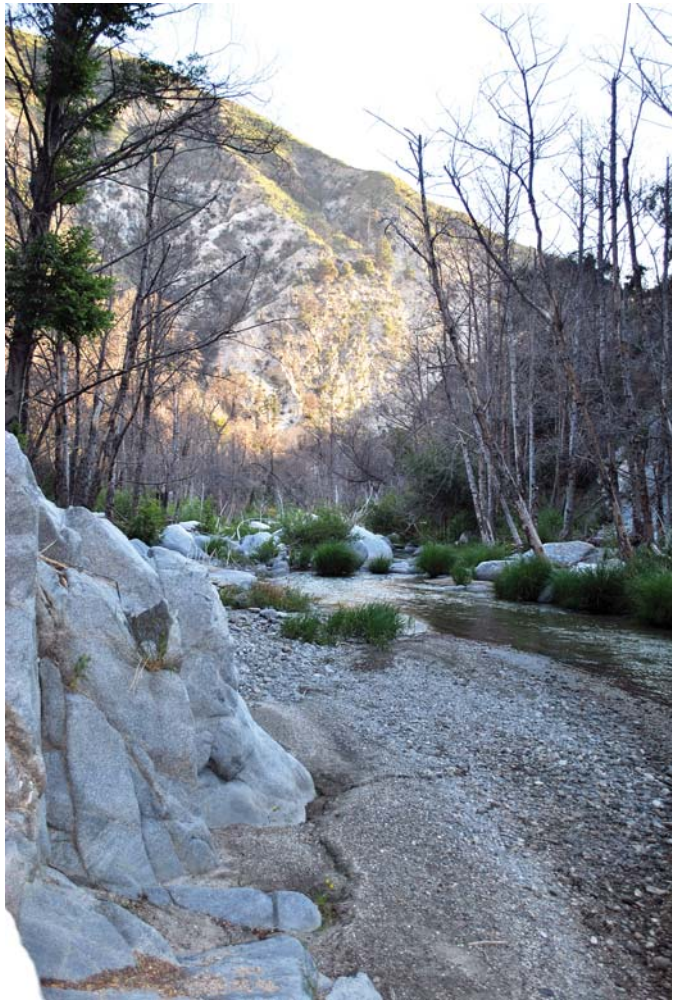
ATTACHMENT A

PHOTOGRAPHS



Eastern end of Big Tujunga Creek survey area facing downstream.



Fox Creek Waterfall.

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Survey Area Photographs

Attachment A-1

Sierra Madre Yellow-Legged Frog Survey for the Big Tujunga Reservoir Sediment Removal Project

BonTerra CONSULTING



Fox Canyon granite slides and pools above the waterfall.



White Oak Canyon facing downstream toward Big Tujunga Reservoir.

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Survey Area Photographs

Attachment A-2

Sierra Madre Yellow-Legged Frog Survey for the Big Tujunga Reservoir Sediment Removal Project

BonTerra CONSULTING



Josephine Creek Waterfall.



Representative habitat within Fox Canyon.

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Survey Area Photographs

Attachment A-3

Sierra Madre Yellow-Legged Frog Survey for the Big Tujunga Reservoir Sediment Removal Project

BonTerra CONSULTING

ATTACHMENT B

WILDLIFE COMPENDIUM

WILDLIFE COMPENDIUM

Species
Amphibians
BUFONIDAE - TRUE TOADS
Anaxyrus boreas [*Bufo boreas*] western toad
HYLIDAE - TREEFROGS
Pseudacris [Hyla] cadaverina California treefrog
Pseudacris hypochondriaca [*Hyla regilla*] Baja California treefrog
Reptiles
PHRYNOSOMATIDAE - ZEBRA-TAILED, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, & HORNED LIZARDS
Sceloporus occidentalis western fence lizard
Uta stansburiana side-blotched lizard
SCINCIDAE - SKINKS
Plestidon [*Eumeces*] *skiltonianus* western skink
TEIIDAE - WHIPTAIL LIZARDS
Aspidoscelis [Cnemidophorus] tigris stejnegeri coastal whiptail
ANGUIDAE - ALLIGATOR LIZARDS
Elgaria multicarinata southern alligator lizard
COLUBRIDAE - COLUBRID SNAKES
Thamnophis hammondii two-striped garter snake
Birds
ANATIDAE - WATERFOWL
Anas platyrhynchos mallard
PHALACROCORACIDAE - CORMORANTS
Phalacrocorax auritus double-crested cormorant
ARDEIDAE - HERONS, BITTERNS, & ALLIES
Ardea herodias great blue heron
Nycticorax nycticorax black-crowned night-heron
ACCIPITRIDAE - HAWKS, KITES, EAGLES, & ALLIES
Buteo jamaicensis red-tailed hawk
FALCONIDAE - FALCONS
Falco sparverius American kestrel
Falco peregrinus peregrine falcon

WILDLIFE COMPENDIUM (Continued)

Species
COLUMBIDAE - PIGEONS & DOVES
Streptopelia chinensis * spotted dove
Zenaida macroura mourning dove
CAPRIMULGIDAE - GOATSUCKERS
Phalaenoptilus nuttallii common poorwill
APODIDAE - SWIFTS
Aeronautes saxatalis white-throated swift
TROCHILIDAE - HUMMINGBIRDS
Archilochus alexandri black-chinned hummingbird
Calypte costae Costa's hummingbird
Selasphorus sasin Allen's hummingbird
PICIDAE - WOODPECKERS
Picoides nuttallii Nuttall's woodpecker
Colaptes auratus northern flicker
TYRANNIDAE - TYRANT FLYCATCHERS
Contopus sordidulus western wood-pewee
Empidonax hammondii Hammond's flycatcher
Empidonax difficilis Pacific-slope flycatcher
Sayornis nigricans black phoebe
Myiarchus cinerascens ash-throated flycatcher
VIREONIDAE - VIREOS
Vireo cassinii Cassin’s vireo
CORVIDAE - CROWS & JAYS
Aphelocoma californica western scrub-jay
Corvus brachyrhynchos American crow
Corvus corax common raven
Cyanocitta stelleri Steller's jay

WILDLIFE COMPENDIUM (Continued)

Species
HIRUNDINIDAE - SWALLOWS
Tachycineta thalassina violet-green swallow
Stelgidopteryx serripennis northern rough-winged swallow
Petrochelidon pyrrhonota cliff swallow
Baeolophus inornatus oak titmouse
TROGLODYTIDAE - WRENS
Salpinctes obsoletus rock wren
Catherpes mexicanus canyon wren
Thryomanes bewickii Bewick's wren
CINCLIDAE - DIPPERS
Cinclus mexicanus American dipper
PTILOGONATIDAE - SILKY-FLYCATCHERS
Phainopepla nitens phainopepla
PARULIDAE - WARBLERS
Oreothlypis [*Vermivora*] *celata* orange-crowned warbler
Dendroica petechia yellow warbler
Dendroica coronata yellow-rumped warbler
Dendroica nigrescens black-throated gray warbler
Wilsonia pusilla Wilson's warbler
EMBERIZIDAE - SPARROWS & JUNCOS
Pipilo maculatus spotted towhee
Melozone [*Pipilo*] *crissalis* California towhee
Amphispiza belli sage sparrow
Melospiza melodia song sparrow
Junco hyemalis dark-eyed junco
CARDINALIDAE - CARDINALS & ALLIES
Pheucticus melanocephalus black-headed grosbeak
Passerina amoena lazuli bunting

WILDLIFE COMPENDIUM (Continued)

Species
ICTERIDAE - BLACKBIRDS
Molothrus ater brown-headed cowbird
Icterus bullockii Bullock's oriole
FRINGILLIDAE - FINCHES
Carpodacus mexicanus house finch
Spinus [Carduelis] psaltria lesser goldfinch
Spinus [Carduelis] lawrencei Lawrence's goldfinch
Spinus [Carduelis] tristis American goldfinch
Mammals
MURIDAE - MICE, RATS, & VOLES
Peromyscus maniculatus deer mouse
CANIDAE - WOLVES & FOXES
Urocyon cinereoargenteus gray fox
PROCYONIDAE - RACCOONS
Procyon lotor common raccoon
MUSTELIDAE - WEASELS, SKUNKS & OTTERS
Mephitis mephitis striped skunk
CERVIDAE - DEER
Odocoileus hemionus mule deer
* introduced species

ATTACHMENT C

CNDDB FORM

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/15/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Thamnophis hammondii*

Common Name: two-striped garter snake

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☑ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Sam Stewart
Address: 225 S. Lake Ave., Suite 1000
Pasadena, CA. 91101
E-mail Address: sstewart@bonterraconsulting.com
Phone: (626) 351-2000

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: US Forest Service
Quad Name: Condor Peak Elevation: 2,253ft.
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐
Source of Coordinates (GPS, topo. map & type): GPS
GPS Make & Model Garmin Etrex Vista H
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐
Horizontal Accuracy 10 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐
Coordinates: 11S 392434, 3796307

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Adult two-striped garter snake observed foraging on south bank of Big Tujunga Creek above reservoir on sandy terrace. Willow and alder riparian woodland with mule fat on banks.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: No development in vicinity. Angeles National Forest.

Visible disturbances: None.

Threats:

Comments:

Determination: *(check one or more, and fill in blanks)*
- ☑ Keyed (cite reference): Powell et al. 1998
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: familiarity with species

Photographs: *(check one or more)* Slide Print Digital
- Plant / animal ☐ ☐ ☑
- Habitat ☐ ☐ ☑
- Diagnostic feature ☐ ☐ ☑

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/17/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Thamnophis hammondii*

Common Name: two-striped garter snake

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☑ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Sam Stewart
Address: 225 S. Lake Ave., Suite 1000
Pasadena, CA. 91101
E-mail Address: sstewart@bonterraconsulting.com
Phone: (626) 351-2000

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown
	1			

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: US Forest Service
Quad Name: Condor Peak Elevation: 3,100 ft.
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐
Source of Coordinates (GPS, topo. map & type): GPS
GPS Make & Model Garmin Etrex Vista H
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐
Horizontal Accuracy 10 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 11S 391613, 3797077

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Adult two-striped garter snake observed foraging on east bank of Fox Creek on sandy terrace. Willow and alder riparian woodland with mule fat on banks.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: No development in vicinity. Angeles National Forest.

Visible disturbances: None.

Threats:

Comments:

Determination: *(check one or more, and fill in blanks)*
- ☑ Keyed (cite reference): Powell et al. 1998
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: familiarity with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

December 5, 2016

Stacey Love
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

VIA EMAIL AND MAIL
Stacey_Love@fws.gov

Subject: Results of Focused Presence/Absence Surveys for Sierra Madre Yellow-Legged Frog for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles, California

Dear Ms. Love:

This Letter Report presents the results of focused diurnal surveys to determine the presence or absence of the Sierra Madre yellow-legged frog (*Rana muscosa*) for the Big Tujunga Reservoir Sediment Removal Project (hereinafter referred to as the "proposed project") located in Los Angeles County, California (Exhibit 1). A qualified Biologist with the necessary experience and a California Department of Fish and Wildlife (CDFW) scientific collecting permit conducted the surveys.

PROJECT DESCRIPTION AND LOCATION

The proposed project involves the dewatering of the Big Tujunga Reservoir and the removal of sediment to the nearby Maple Canyon Sediment Placement Site. The proposed project is located on the southern edge of the San Gabriel Mountains in the Angeles National Forest and is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute topographic quadrangle (Exhibit 1).

The survey area for the Sierra Madre yellow-legged frog included all riparian habitat along Big Tujunga Creek extending 0.62 mile (1 kilometer) upstream of the sediment removal area (including portions of three tributary creeks) and from Big Tujunga Dam to 0.62 mile (1 kilometer) downstream of the proposed project (i.e., 0.62 mile downstream of the Big Tujunga Road Bridge over Big Tujunga Wash) (Exhibit 2). The portions of the 3 tributary creeks surveyed upstream of Big Tujunga Reservoir included approximately 800 feet (0.24 kilometer) of Josephine Creek, 3,300 feet (1.01 kilometer) of Fox Creek, and 1,300 feet (0.40 kilometer) of White Oak Creek (Exhibit 2). The remaining portions of Josephine and White Oak Creeks were not surveyed due to the presence of an impassable physical obstacle for the Sierra Madre yellow-legged frog (such as a waterfall) or lack of suitable upstream habitat. Because of the length of the two sections and the difficulty in accessing the upper section to be surveyed, the sections upstream and downstream of the dam were surveyed on separate days. The survey area and surrounding vicinity consist of open space in the Angeles National Forest.

3 Hutton Centre Drive
Suite 200
Santa Ana, CA 92707

Tel 714.751.7373
www.Psomas.com

Big Tujunga Creek

Big Tujunga Creek flows in a westerly direction, and several tributaries from the north and south join it upstream of Big Tujunga Reservoir, including Josephine Creek to the south and Fox Creek and White Oak Creek to the north. Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained in bedrock channels. Erosion has deposited alluvium (including boulders, cobbles, gravels, and coarse to fine sandy soils) in the stream course. The topography is irregular, and stream grade and flow velocity range across a moderate spectrum. Stream morphology includes portions with narrow, incised, fast-moving streams with plunge pools; wider, slow-moving streams; and a relatively broad alluvial wash with multiple meanders where the creek flows into the reservoir. Within the survey area, Big Tujunga Creek is a perennially flowing stream.

Upstream of the reservoir, habitat in the survey area's upper section consists primarily of riparian vegetation along Big Tujunga Creek that is dominated by a young, emergent growth of willows (*Salix* spp.) with scattered mature willows and white alder (*Alnus rhombifolia*). The understory vegetation includes, but is not limited to, mule fat (*Baccharis salicifolia*), cocklebur (*Xanthium strumarium*), and broad-leaved cattail (*Typha latifolia*). A few western sycamore (*Platanus racemosa*) and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) are also present. Substrate throughout the creek in this area consists of boulders, cobble, gravel, and coarse sand.

Downstream of the Big Tujunga Dam, riparian habitat in the survey area's lower section is characterized by relatively dense and continuous willow riparian forest dominated by arroyo willow (*Salix lasiolepsis*) and red willow (*Salix laevigata*), with an overstory of white alder and Fremont cottonwood. Common understory species include mule fat, hoary nettle (*Urtica dioica* ssp. *holosericea*), and mugwort (*Artemisia douglasiana*). Most of the substrate throughout the creek in this area was covered in silt that appears to have filled in suitable pools and covered the cobble and sand substrates that provide higher quality habitat for the Sierra Madre yellow-legged frog. Representative site photos are included in Attachment A.

Josephine Creek

Josephine Creek flows from the south into Big Tujunga Creek at its confluence with Big Tujunga Reservoir. Stream morphology during surveys is best characterized as a shallow, narrow creek, less than 2 feet (0.6 meter) deep and 10 feet (3.0 meters) wide and a moderate stream grade in a steep-sided canyon approximately 200 feet (61 meters) wide. Approximately 800 feet (244 meters) upstream of the confluence with Big Tujunga Creek, Josephine Creek flows into the canyon over an approximately 140 foot (43 meter) vertical waterfall.

Vegetation in Josephine Creek consists mainly of southern sycamore alder riparian woodland, dominated by white alder and western sycamore. In some areas it is codominated by black willow (*Salix goddingii*) with a few coast live oak (*Quercus agrifolia*) scattered throughout. The understory vegetation includes, but is not limited to, hoary nettle, mugwort, caterpillar phacelia (*Phacelia cicutaria*), and scarlet monkeyflower (*Mimulus cardinalis*). Substrate in the canyon consists of boulders, cobble, gravel, and coarse sand.

Fox Creek

Fox Creek flows from the north into Big Tujunga Reservoir approximately 0.5 mile (0.8 kilometer) west of Josephine Creek. Stream morphology during surveys is best characterized as a shallow, narrow creek, less than 3 feet (0.9 meter) deep and 15 feet (4.5 meters) wide and a moderate stream grade in a steep-sided canyon less than 100 feet (30 meters) wide. Approximately 1,200 feet (366 meters) upstream of the confluence with Big Tujunga Creek, Fox Creek flows into the canyon over an approximately 70-foot (21

meter) vertical waterfall. Above the waterfall, the canyon becomes narrower with granite slides and sandy pools up to 6 feet (1.8 meter) deep.

Vegetation in Fox Creek consists of relatively sparse southern sycamore alder riparian woodland, dominated by white alder and western sycamore. In some areas it is codominated by black willow and Fremont cottonwood with coast live oak scattered throughout the upper terraces. The understory consists of patches of mugwort, caterpillar phacelia, and scarlet monkeyflower. Substrate in the canyon consists of boulders, cobble, gravel, and coarse to very fine-grained sand.

White Oak Creek

White Oak Creek flows from the north into Big Tujunga Reservoir approximately 0.5 mile west of the confluence of Fox Creek and Big Tujunga Creek. Stream morphology during surveys is best characterized as a shallow, narrow creek, less than 2 feet (0.6 meter) deep and 5 feet (1.5 meters) wide and a moderate stream grade in a near vertical-walled canyon less than 100 feet (30 meters) wide. The creek has eroded a steep-sided channel through sedimentary deposits primarily composed of coarse to fine-grained sand and silt. Approximately 1,300 feet (396 meters) upstream of the confluence with Big Tujunga Creek, White Oak Creek flows into the canyon over an approximately 120-foot (37 meter) vertical waterfall.

Vegetation in White Oak Creek consists of sparse willow riparian scrub dominated by black willow with scattered Fremont cottonwood. Substrate in the canyon consists of boulders, cobble, gravel, and coarse to very fine-grained sand.

SPECIES BACKGROUND

The Sierra Madre yellow-legged frog was federally listed as an Endangered species by the U.S. Fish and Wildlife Service (USFWS) on July 2, 2002. This species has been extirpated from more than 90 percent of its historic range (Knapp et al. 2007). At the time of listing, the Sierra Madre and the Sierra Nevada (*Rana sierrae*) yellow-legged frogs were considered distinct population segments of *Rana muscosa*. Genetic, morphological, and acoustical studies (Vredenburg et al. 2007) have determined that they are genetically distinct and the Sierra Nevada yellow-legged frog (*Rana sierra*) is now recognized as a new species. The northern distribution of the Sierra Madre yellow-legged frog occurs on the western slopes of the Sierra Nevada Mountains from Fresno County south to Kern County, with Mather Pass representing the northern border of the species' range (Vredenburg et al. 2007). The Sierra Nevada yellow-legged frog occurs north of Mather Pass on the eastern slopes of the Sierra Nevada Mountains. The southern distribution of the Sierra Madre yellow-legged frog consists of several small, isolated populations in the San Gabriel, San Bernardino, and San Jacinto Mountains, the largest of which does not exceed 100 individuals. Only the Sierra Madre yellow-legged frog is known to occur in the project region.

The Sierra Madre yellow-legged frog ranges in size from 1.50 to 3.25 inches (3.8 to 8.3 centimeters) snout to vent length (Jennings and Hayes 1994a). Females average slightly larger than males (Stebbins 2003). The belly and ventral (bottom) surface of the hind limbs are yellow to orange, with this pigmentation on the abdomen occasionally extending to the forelimbs (Stebbins 2003). Dorsal (top) coloration in adults is variable, exhibiting a mix of brown and yellow, but it can also be gray, red, or green-brown and usually patterned with dark spots (Jennings and Hayes 1994a). Dorsolateral (horizontal along the body) folds are apparent but not as pronounced as the red-legged frog. Tadpoles can reach lengths of 2.8 inches (7 centimeters) and are generally mottled brown in dorsal coloration with a golden tint and faintly yellow ventral coloration (Stebbins 2003).

Within the southern range of the Sierra Madre yellow-legged frog in the San Gabriel, San Bernardino, and San Jacinto Mountains, this species is found in narrow, rock-walled canyons with perennial rivers or creeks, permanent plunge pools in intermittent creeks, and pools in montane riparian and/or chaparral habitat from 1,200 to 7,500 feet (365 to 2,286 meters) above mean sea level (msl) (Jennings and Hayes

1994a). Breeding pools must maintain water during the entire tadpole growth phase, which can last up to four years. Substrates in the aquatic habitat consist of varying proportions of silt, sand, gravel, cobble, rock, and boulders. Boulders and open gravel banks projecting above the water level are required for sunning. Aquatic refugia, including pools with overhanging banks, fallen logs, or rocks, are required to escape predation.

Sierra Madre yellow-legged frogs are primarily diurnal and maintain a small home range, likely less than 33 feet (10 meters) in the longest dimension (CDFG 2008). They are also highly aquatic, not venturing more than a few feet (one meter) from water (CDFG 2008). Adults feed primarily on aquatic and terrestrial invertebrates, favoring terrestrial insects, but have also been observed feeding on tadpoles (Heller 1960). Yellow-legged frog tadpoles graze on algae and diatoms along rocky bottoms in shallows.

During the breeding season, typically from March to May, males will defend a territory and make advertising vocalizations to females from shallow areas along the creek margins. Calls are made above and below the water's surface. This species lacks vocal sacs and vocalizations are therefore weak and difficult to detect. Small egg masses of 15 to 350 eggs are deposited underwater where they attach to rocks, gravel, vegetation, or under banks (Livezey and Wright 1945). Eggs hatch approximately three weeks later (Zweifel 1955). The length of the larval stage has not been studied for the southern populations of the Sierra Madre yellow-legged frog; however, it has been determined to be dependent upon elevation. Larval stage length for Sierra Nevada yellow-legged frog was found to range from four years for the highest elevation populations to one year for the lowest elevation populations (Storer 1925; Zweifel 1955). Larval stage lengths for Sierra Madre yellow-legged frog would be expected to conform to lower elevation Sierra Nevada yellow-legged frog populations. Females reach sexual maturity at 1.8 inches (4.6 centimeters), with males maturing at a slightly smaller size (Zweifel 1955). There is little reliable data on age at sexual maturity, but it is considered to be at least three years after metamorphosis (Zweifel 1955).

On September 13, 2005, the USFWS proposed a rule designating approximately 8,770 acres (3,550 hectares) of land as critical habitat for the Southern California distinct vertebrate population segment of the mountain yellow-legged frog (*Rana muscosa*) in Los Angeles, San Bernardino, and Riverside Counties, California (USFWS 2005). A final rule was published on September 14, 2006, for approximately 8,283 acres (3,352 hectares) (USFWS 2006). The nearest Critical Habitat is Unit 1D, Devil's Canyon, approximately 12 miles (19 kilometers) east of the project area in the San Gabriel River Watershed. The survey area is located in the Los Angeles River Watershed.

The Sierra Madre yellow-legged frog occurred historically in the Big Tujunga Wash immediately upstream of Foothill Boulevard and in Big Tujunga Creek, Mill Creek, and several tributary drainages above Big Tujunga Dam (CDFG 2011). There have been no documented observations of the population between Foothill Boulevard and Big Tujunga Dam since 1939, and it is considered extirpated from Big Tujunga Creek (CDFG 2011; Jennings and Hayes 1994b). The closest known population for this species is located at Little Rock Creek, Devil's Canyon, approximately 12 miles (19 kilometers) east.

The San Diego Zoo's Institute for Conservation Research, in conjunction with the CDFW, USFWS, U.S. Forest Service (USFS), and USGS, has developed a Mountain Yellow-legged Frog Recovery Program which involves captive breeding and translocation for the remaining frogs from the San Bernardino Mountains (San Diego Zoo 2009). In August 2006, 75 tadpoles were collected from a drying stream bed in the San Jacinto Mountains and were used to establish the captive breeding program. In 2010, tadpole offspring from the captive breeding program were released back into the San Jacinto Mountains at sites where the species was observed historically.

SURVEY METHODS

An initial site assessment was conducted by BonTerra Consulting Senior Herpetologist Sam Stewart on March 17, 2011, to determine the extent of potentially suitable habitat for the Sierra Madre yellow-legged frog. The site assessment determined that Big Tujunga Creek, upstream from the reservoir, and three tributary drainages (i.e., Josephine Creek, Fox Creek, and White Oak Creek) provide potentially suitable habitat for the species. Even though habitat downstream of the dam is considered only marginally suitable due to the density of the riparian forest and high levels of silt that covered the normal substrates of boulders, cobble, and gravel normally associated with the frog.

A total of four surveys were conducted to search for Sierra Madre yellow-legged frogs between June and October 2016 both upstream and downstream of the Reservoir. The surveys included diurnal searches to search for the presence of life phases of Sierra Madre yellow-legged frog, including eggs, tadpoles, adults, and juveniles. The surveys in June and July are focused on the detection of adult frogs, while the surveys in September and October focus on the detection of juvenile frogs because they are usually active along the margins of the creek and readily identifiable at this time. If any Sierra Madre yellow-legged frogs were found, the individual or population would have been documented (including dorsal photographs and snout-vent length measurements), recorded with a Global Positioning System (GPS) unit, and mapped on an aerial photograph. Data would also have been collected on general habitat characteristics and the weather conditions at the time of the observation (temperature, relative humidity, wind speed, and barometric pressure). Survey conditions and results were documented in field notes.

Consulting Biologist Brian Leatherman and Psomas Biologists Jonathan Aguayo, Sarah Thomas, and Jonas Winbolt conducted the focused surveys in all potentially suitable habitat for Sierra Madre yellow-legged frog in the survey area, including both the upper and lower sections (Tables 1 and 2). Mr. Leatherman was the Principal Investigator and was present during all surveys and was accompanied by Psomas Biologists during each survey.

Diurnal surveys were conducted between 9:00 AM and 2:00 PM and focused on the detection of adult and juvenile frogs by visual identification. Survey Biologists scanned pools for eggs, larvae, juveniles, and adults in potentially suitable breeding territories along the stream and for foraging individuals in the adjacent riparian areas. Surveyors moved in an upstream direction during the surveys. Surveys were conducted during appropriate environmental conditions conducive to the activity patterns of the Sierra Madre yellow-legged frog. Generally, these conditions consist of temperatures in excess of 50 degrees Fahrenheit (10 degrees Celsius) with low winds (less than 10 miles [16 kilometers] per hour). Survey dates, times, and weather data are shown in Tables 1 and 2.

White Oak Creek was surveyed on June 14, 2016 but was completely dry between the reservoir and the waterfall. Therefore, no subsequent surveys were conducted in that tributary. Josephine Creek was surveyed on July 8, 2016 but was completely dry between the reservoir and the waterfall. Therefore, no subsequent surveys were conducted in that tributary except to verify that there was still no surface water present. Fox Creek and Big Tujunga Creek had water nearly along the entire survey reaches during the first survey but large sections were dry during the subsequent three surveys.

TABLE 1
SUMMARY OF SURVEY DATA AND CONDITIONS FOR SIERRA MADRE YELLOW-LEGGED FROG SURVEYS FOR UPPER SECTION SURVEY AREA

Survey	Surveying Biologists	Survey Date	Start/End Time	Wind (miles/hour)		Temperature (°F)		Cloud Cover
				Start	End	Start	End	
1	B. Leatherman J. Aguayo	6/14/2016	10:00AM–2:00PM	2–4	7–10	70s	80s	Clear
1	B. Leatherman J. Aguayo	7/8/2016	9:30AM–12:10PM	4–7	4–7	70	81	Clear
2	B. Leatherman J. Aguayo	7/20/2016	10:15AM–1:30PM	2–4	4–7	78	92	Clear
3	B. Leatherman S. Thomas	9/30/2016	9:15AM–2:00PM	0–1	4–7	70s	88	Clear
4	B. Leatherman S. Thomas	10/4/2016	9:15AM–1:45PM	2–4	2–4	63	80	Clear

°F: degrees Fahrenheit.

TABLE 2
SUMMARY OF SURVEY DATA AND CONDITIONS FOR SIERRA MADRE YELLOW-LEGGED FROG SURVEYS FOR LOWER SECTION SURVEY AREA

Survey	Surveying Biologists	Survey Date	Start/End Time	Wind (miles/hour)		Temperature (°F)		Cloud Cover
				Start	End	Start	End	
1	B. Leatherman J. Aguayo	7/19/2016	M9:30A–1:30PM	2–4	4–7	71	88	Clear
2	B. Leatherman J. Aguayo	8/10/2016	9:15AM–12:35PM	2–4	4–7	66	82	Clear
3	B. Leatherman J. Aguayo	9/14/2016	9:30AM–12:45PM	2–4	4–7	64	75	Clear
4	B. Leatherman J. Winbolt	9/26/2016	9:15AM–12:30PM	4–7	4–7	88	99	Clear

°F: degrees Fahrenheit.

SURVEY RESULTS

No adult or juvenile Sierra Madre yellow-legged frogs were detected during these surveys, and no egg masses or tadpoles that could have been Sierra Madre yellow-legged frog were observed during the surveys. In addition, none were incidentally observed during the focused surveys for arroyo toad (six diurnal and nocturnal surveys conducted between April and June) conducted this spring downstream of the Dam (BonTerra Psomas 2016). This is consistent with previous focused surveys for Sierra Madre yellow-legged frog conducted over the upper and lower survey area in 2012 for the project (BonTerra Consulting 2012).

Amphibian species detected during the surveys included western toad (*Anaxyrus boreas*), California treefrog (*Pseudacris cadaverina*), Baja California treefrog (*Pseudacris hypochondriaca*), and bullfrog (*Rana catesbeiana*). A complete list of all wildlife species detected during the surveys is provided in Attachment B.

OTHER OBSERVATIONS

Three California Species of Special Concern were observed during the surveys: western pond turtle (*Emys marmorata*), coastal whiptail (*Aspidoscelis tigris stejneri*), and two-striped garter snake (*Thamnophis hammondii*). Observations of the western pond turtle, coastal whiptail, and two-striped garter snake have been reported to the California Natural Diversity Database in the Arroyo Toad Survey Report for the proposed project and will be submitted to the CDFW with that report.

BonTerra Psomas appreciates the opportunity to assist on this project. If you have any comments or questions, please call Amber Heredia at (714) 751-7373.

Sincerely,
BonTerra Psomas

Amber O. Heredia
Senior Project Manager

Jonathan Aguayo
Biologist

Enclosures: Exhibits 1–2
Attachment A – Site Photographs
Attachment B – Wildlife Compendium

cc: Alex Ho, alho@dpw.lacounty.gov

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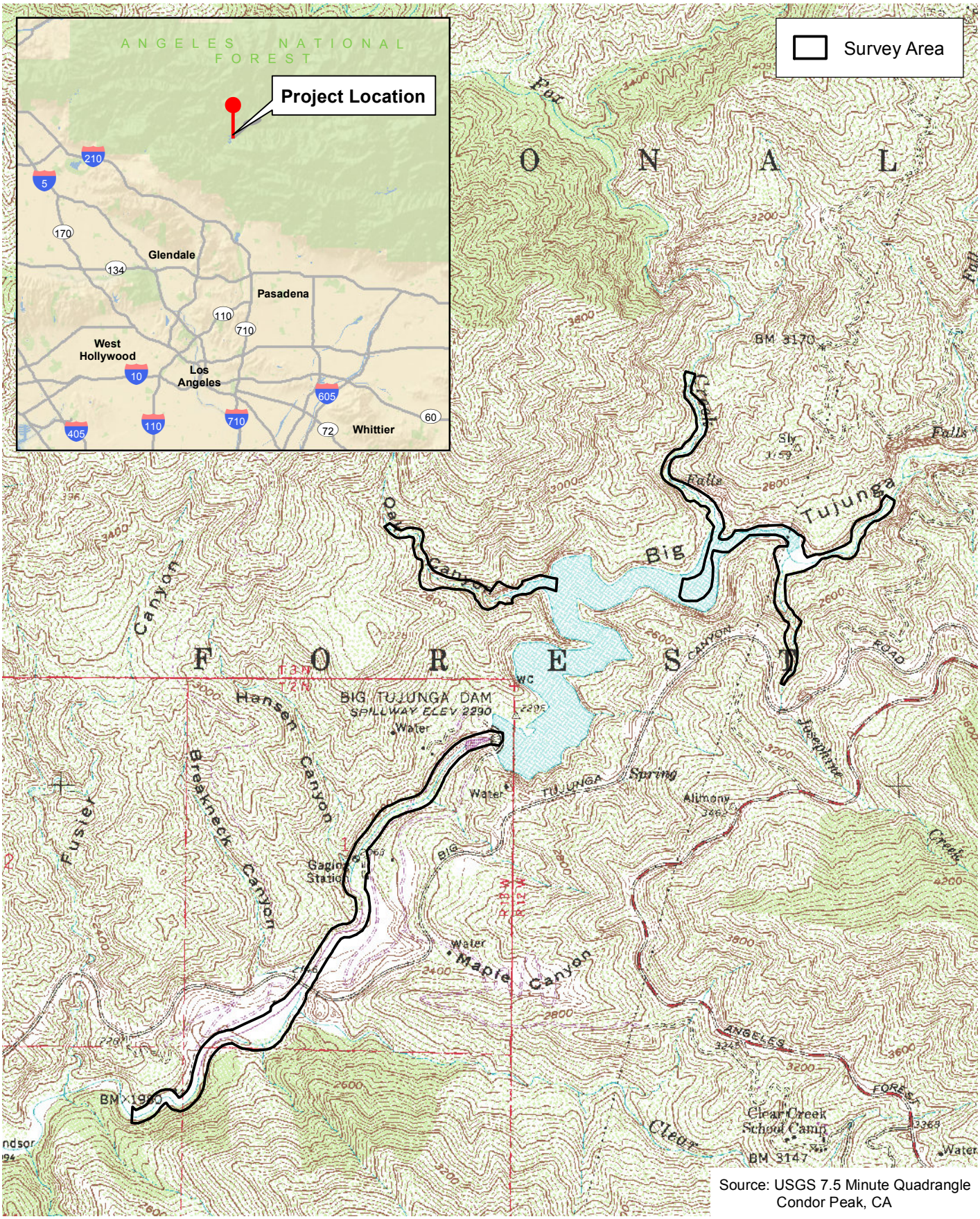

Source: USGS 7.5 Minute Quadrangle
Condor Peak, CA

Regional Location and Local Vicinity

Exhibit 1

Big Tujunga Reservoir Sediment Removal Project

N
W E
S

2,000 1,000 0 2,000
Feet

BonTerra PSOMAS

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Aerial Source: LAR-IAC 2014

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Survey Area

Exhibit 2

Big Tujunga Reservoir Sediment Removal Project

N
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1,700 850 0 1,700

Feet

BonTerra PSOMAS

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ATTACHMENT A

SITE PHOTOGRAPHS



Representative view of riparian habitat in the upper section of the survey area upstream of Big Tujunga Reservoir.



Representative view of riparian habitat in the lower section of the survey area downstream of Big Tujunga Dam.

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Site Photographs

Attachment A-1

Big Tujunga Reservoir Sediment Removal Project

BonTerra PSOMAS

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View of riparian habitat along Big Tujunga Creek located in the southern portion of the survey area.



View of a pool along Big Tujunga Creek located in the southern portion of the survey area.

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Site Photographs

Attachment A-2

Big Tujunga Reservoir Sediment Removal Project

BonTerra PSOMAS

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ATTACHMENT B

WILDLIFE COMPENDIUM

WILDLIFE COMPENDIUM

Scientific Name	Common Name
AMPHIBIANS	
BUFONIDAE – TRUE TOAD FAMILY	
Anaxyrus boreas	western toad
RANIDAE – TRUE FROG FAMILY	
*Lithobates catesbeianus**	American bullfrog
HYLIDAE – TREEFROG FAMILY	
Pseudacris cadaverina	California treefrog
Pseudacris hypochondriaca	Baja California treefrog
TURTLES	
EMYDIDAE – BOX AND BASKING TURTLE FAMILY	
Emys marmorata	western pond turtle
LIZARDS	
PHRYNOSOMATIDAE – SPINY LIZARD FAMILY	
Sceloporus occidentalis	western fence lizard
Uta stansburiana	common side-blotched lizard
TEIIDAE – WHIPTAIL LIZARD FAMILY	
Aspidoscelis tigris stejnegeri	coastal whiptail
SNAKES	
NATRICIDAE – HARMLESS LIVE-BEARING SNAKE FAMILY	
Thamnophis hammondii	two-striped garter snake
BIRDS	
ANATIDAE – SWAN, GOOSE, AND DUCK FAMILY	
Anas platyrhynchos	mallard
ODONTOPHORIDAE – NEW WORLD QUAIL FAMILY	
Oreortyx pictus	mountain quail
Callipepla californica	California quail
ACCIPITRIDAE – HAWK FAMILY	
Buteo jamaicensis	red-tailed hawk
COLUMBIDAE – PIGEON AND DOVE FAMILY	
Patagioenas fasciata	band-tailed pigeon
Zenaida macroura	mourning dove
APODIDAE – SWIFT FAMILY	
Aeronautes saxatalis	white-throated swift
TROCHILIDAE – HUMMINGBIRD FAMILY	
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird
PICIDAE – WOODPECKER FAMILY	
Melanerpes formicivorus	acorn woodpecker
Picoides nuttallii	Nuttall's woodpecker
Picoides villosus	hairy woodpecker
Colaptes auratus	northern flicker
TYRANNIDAE – TYRANT FLYCATCHER FAMILY	
Contopus sordidulus	western wood-pewee
Sayornis nigricans	black phoebe
Myiarchus cinerascens	ash-throated flycatcher

WILDLIFE COMPENDIUM

Scientific Name	Common Name
VIREONIDAE – VIREO FAMILY	
Vireo huttoni	Hutton's vireo
CORVIDAE – JAY AND CROW FAMILY	
Aphelocoma californica	California scrub-jay
Corvus corax	common raven
HIRUNDINIDAE – SWALLOW FAMILY	
Tachycineta thalassina	violet-green swallow
Stelgidopteryx serripennis	northern rough-winged swallow
Petrochelidon pyrrhonota	cliff swallow
PARIDAE – TITMOUSE FAMILY	
Baeolophus inornatus	oak titmouse
AEGITHALIDAE – BUSHTIT FAMILY	
Psaltriparus minimus	bushtit
TROGLODYTIDAE – WREN FAMILY	
Salpinctes obsoletus	rock wren
Catherpes mexicanus	canyon wren
Troglodytes aedon	house wren
Thryomanes bewickii	Bewick's wren
TURDIDAE – THRUSH FAMILY	
Turdus migratorius	American robin
PTILOGONATIDAE – SILKY-FLYCATCHER FAMILY	
Phainopepla nitens	phainopepla
PARULIDAE – WOOD-WARBLER FAMILY	
Geothlypis trichas	common yellowthroat
Setophaga petechia	yellow warbler
EMBERIZIDAE – SPARROW FAMILY	
Pipilo maculatus	spotted towhee
Melozone crissalis	California towhee
Melospiza melodia	song sparrow
CARDINALIDAE – CARDINALS, GROSBEAKS, AND ALLIES FAMILY	
Piranga ludoviciana	western tanager
Pheucticus melanocephalus	black-headed grosbeak
Passerina amoena	lazuli bunting
ICTERIDAE – BLACKBIRD, COWBIRD, AND ORIOLE FAMILY	
Agelaius phoeniceus	red-winged blackbird
Icterus bullockii	Bullock’s oriole
FRINGILLIDAE – FINCH FAMILY	
Haemorhous mexicanus	house finch
Spinus psaltria	lesser goldfinch
MAMMALS	
SCIURIDAE – SQUIRREL FAMILY	
Sciurus griseus	western gray squirrel
Otospermophilus beecheyi	California ground squirrel

WILDLIFE COMPENDIUM

Scientific Name	Common Name
CANIDAE – CANID FAMILY	
Canis latrans	coyote
Urocyon cinereoargenteus	common gray fox (scat)
CERVIDAE – CERVID FAMILY	
Odocoileus hemionus	southern mule deer
* Non-native species	

APPENDIX B-5

SPECIAL STATUS FISH SPECIES SURVEY LETTER REPORT

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October 5, 2011

Ms. Erin M. McCarthy
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
6010 Hidden Valley Road, Suite 101

VIA EMAIL
erin_mccarthy@fws.gov

Subject: Results of Focused Presence/Absence Special Status Fish Species Surveys at the Big Tujunga Dam and Reservoir Sediment Removal Project, Los Angeles County, California

Dear Ms. McCarthy:

This Letter Report presents the results of presence/absence surveys for special status fish species, including Santa Ana sucker (*Catostomus santaanae*), Santa Ana speckled dace (*Rhinichthys osculus* ssp. 3), and arroyo chub (*Gila orcutti*) for the Big Tujunga Dam and Reservoir Sediment Removal Project.

Survey Area

Big Tujunga Canyon is located on the southern edge of the San Gabriel Mountains, within the Angeles National Forest, and is located on the U.S. Geological Survey (USGS) Condor Peak 7.5-minute topographic quadrangle (Exhibit 1). The survey area for the special status fish surveys included Big Tujunga Creek extending approximately two river miles upstream of Big Tujunga Reservoir, the Reservoir, and a small section of the creek below the dam including the plunge pool. Topography in the survey area consists of sheer cliffs and steep slopes to the canyon bottom, with elevations ranging from approximately 2,150 to 3,400 feet above mean sea level (msl). The survey area and surrounding vicinity consist of open space within the Angeles National Forest

Big Tujunga Creek consists of two forks, both beginning in the San Gabriel Mountains above the Big Tujunga Dam. The upper portion of Big Tujunga Creek flows from east to west, and several tributaries from the north and south join it as it flows toward Big Tujunga Reservoir. Below the reservoir, the creek is called Big Tujunga Wash. The special status fish survey area is made up of three distinct sections: (1) Big Tujunga Creek upstream of Big Tujunga Reservoir to approximately Fall Creek Campground (approximately two river miles); (2) the edges around Big Tujunga Reservoir; and (3) an area downstream of Big Tujunga Dam, including the plunge pool and adjacent portion of Big Tujunga Wash downstream to the first maintenance road crossing (Exhibit 1).

Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels. Erosion has deposited alluvium (including boulders, cobbles, gravel, and coarse to fine sandy soils) within the stream course. Topography is irregular and stream grade, width, and flow velocity vary but are generally moderate. The creek channel morphology within the survey area includes portions with narrow, incised, fast-moving water; portions with wider,

slow-moving water; deep pools; and a relatively broad alluvial wash with multiple meanders. In the survey area, Big Tujunga Creek is perennial. Representative photographs of the survey area are provided in Appendix A.

The water elevation in Big Tujunga Reservoir at the time of the surveys was approximately 2,228.5 to 2,229.0 feet above msl. At the time of the surveys, the depth of the reservoir at the dam face was approximately 60 feet (Chimienti 2011). The body of the reservoir itself consists of open water with some floating mats of vegetation (emergent vegetation rooted in the woody debris floating on the surface). These floating mats move around the reservoir with the wind, and often accumulate along the edges of the reservoir. The emergent vegetation is composed primarily of cattails (*Typha* sp.) and arroyo willow (*Salix lasiolepis*).

Upstream of the reservoir, vegetation along Big Tujunga Creek consists primarily of southern riparian scrub species. Big Tujunga Canyon burned during the 2009 Station Fire; thus, the riparian canopy is sparse through much of the creek. The average vegetation heights are approximately five to seven feet. Dominant species in this portion of the survey area include arroyo willow, red willow (*Salix laevigata*), white alder (*Alnus rhombifolia*) and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), with mule fat (*Baccharis salicifolia*), rough sedge (*Carex senta*), wild oat (*Avena* sp.), and white sweet clover (*Melilotus alba*) in the understory.

Below the dam, the plunge pool is mostly unvegetated. Downstream of the plunge pool, Big Tujunga Wash consists mainly of willow riparian forest dominated by arroyo willow, red willow, white alder, and Fremont cottonwood. Other common species present include mule fat, hoary nettle (*Urtica dioica* ssp. *holosericea*), and mugwort (*Artemisia douglasiana*).

Species Descriptions

Santa Ana Sucker (*Catostomus santaanae*)

Santa Ana sucker is a federally listed Threatened species, and a California Species of Special Concern. Santa Ana sucker is endemic to the Los Angeles basin. Its historic range consisted of the Los Angeles, San Gabriel, and Santa Ana River systems; only these populations within its historic range are federally protected. The most recent California Natural Diversity Database (CNDDB) record of Santa Ana sucker in the vicinity of the survey area reported a location approximately 7.5 miles downstream of the dam in Big Tujunga Wash in 2007 (CDFG 2011). Santa Ana sucker was observed in the survey area along Big Tujunga Wash between the Big Tujunga Dam and Delta Flats in 2009 (SMEA 2010).

On January 4, 2005, the U.S. Fish and Wildlife Service (USFWS) published a final rule designating 8,305 acres of critical habitat for the Santa Ana sucker (USFWS 2005). Two areas were designated in Los Angeles County, one along the San Gabriel River (Unit 2) and the other along Big Tujunga Creek (Unit 3). This designation did not include habitat for the species in Orange, Riverside, or San Bernardino Counties. Following lawsuits, the USFWS proposed a revised critical habitat on December 9, 2009, adding habitat along the Santa Ana River in Orange, Riverside, and San Bernardino Counties to critical habitat for the species (USFWS 2009). This increased the critical habitat designation to 9,331 acres. On December 14, 2010, the USFWS published the final rule formalizing the revised critical habitat (USFWS 2010). A portion of the survey area, the area downstream of Big Tujunga Reservoir, is within the 2010 revised critical habitat for Santa Ana sucker (Exhibit 2).

Santa Ana sucker is found in small, shallow streams with flows that run from slow to swift. They are most abundant where water is clear and unpolluted, although they can withstand seasonal turbidity. Santa Ana sucker is often associated with bottom materials of boulders, gravel, and cobble where there are growths of filamentous algae; they are also occasionally found on sand or mud substrates. Although Santa Ana sucker have generalized stream habitat requirements, they are intolerant of polluted or highly modified streams (Moyle et al. 1995). The majority of their diet consists of algae and detritus that they scrape from rock surfaces, as well as occasional aquatic insect larvae.

Adult Santa Ana sucker rarely exceed a standard length of eight inches (measured from snout tip to anterior of the caudal fin [tail fin]). They exhibit a broad mouth with notches at the junction of the upper and lower lips, and the median notch on the lower lip is less well defined. Their body coloration is silver on the ventral (belly/underside) surface and darker with irregular blotches on the dorsal (back/top) surface. Their scale pattern has longitudinal lateral striping along the length of their body. The interradial membrane (membrane between the spines) of the caudal fin is pigmented, and the anal and pelvic fins normally lack pigment (Moyle et al. 1995).

Santa Ana suckers are relatively short-lived; they become reproductively mature by the first year and spawn during the first and second years. Most suckers do not survive past the second year, although a few live three to four years. There is no sexual dimorphism (distinguishable appearances between males and females), although reproductive males develop breeding tubercles (small bumps) over most of the body (Moyle et al. 1995).

Santa Ana sucker spawning occurs from April until early July, but peaks in late May and early June. Santa Ana suckers spawn over gravel beds in flowing water where the female deposits the eggs in fine gravel substrate. The eggs hatch within 36 hours at 55.5 degrees Fahrenheit (°F), and the fry (fish hatchlings) congregate in shallow, slow-moving waters along the stream margins in water depths ranging from 1 to 5.5 inches, often over very soft sand or mud substrates. Edgewater habitat is probably used by fry because (1) it typically contains fewer predatory fish and (2) shallow water is warmer and probably allows the suckers to grow more quickly (USFWS 2010).

The Santa Ana sucker is currently threatened by water diversions, alteration of stream channels, changes in the watershed that result in erosion and debris flows, pollution and predation by non-native fishes. The primary cause for the extirpation of the Santa Ana sucker from lowland reaches of the Los Angeles, San Gabriel, and Santa Ana Rivers is most likely due to increased urbanization (USFWS 2000).

Arroyo Chub (*Gila orcutti*)

Arroyo chub is a California Species of Special Concern. It is a small freshwater fish native to the watersheds of the Los Angeles, San Gabriel, San Luis Rey, Santa Ana, and Santa Margarita Rivers and those of the Malibu and San Juan Creeks. Arroyo chub have also been successfully introduced into the Santa Ynez, Santa Maria, Cuyama, and Mojave River systems and other smaller coastal streams (Moyle 2002). The arroyo chub is now common at only three of its native locations: Santa Margarita and De Luz Creeks in San Diego County; Trabuco and San Juan Creeks in Orange County; and Malibu Creek in Los Angeles County (Swift et al. 1993). The most recent CNDDB record of arroyo chub in the vicinity of the survey area reported a location approximately 10 miles southwest of Big Tujunga Reservoir along Big Tujunga Wash and Haines Canyon Creek, approximately 0.62–1.1 miles downstream of the Interstate (I) 210 freeway (CDFG 2011). Arroyo chub was observed in the survey area along Big Tujunga Wash between the Big Tujunga Dam and Delta Flats in 2009 (SMEA 2010).

Arroyo chub are small fish that can reach standard lengths of 4.72 inches, although typical adult lengths are 2.76–3.94 inches (Moyle 2002). Males are distinguished from females by their larger fins and, when breeding, by the prominent patch of tubercles on the upper surface of the pectoral fins (forelimbs). Arroyo chub have chunky bodies, fairly large eyes, and small mouths. Their body color is silver or grey to olive-green dorsally, white ventrally, and they usually have a dull grey lateral band (Moyle et al. 1995).

Arroyo chub are found in coastal freshwater streams and rivers with sustained flows and emergent vegetation. They prefer the slowest moving sections where the substrates consist primarily of sand or mud, but they can also be found in fairly fast-moving (31.5 inches/second or more) sections of stream over coarse substrates (Moyle 2002). Arroyo chub also prefer water with depths greater than 15.75 inches (Moyle 2002). This species is adapted to survive in widely fluctuating water temperatures (50°F to 75°F) and fluctuating dissolved oxygen levels common in coastal streams. Arroyo chub form schools and feed heavily on algae and other plants as well as small crustaceans and aquatic insect larvae (Moyle 2002).

Arroyo chub rarely live beyond four years and begin to reproduce at one year of age (McGinnis 2006). Arroyo chub breed more or less continuously from February through August, although most spawning occurs in June and July. The majority of spawning occurs in pools or in quiet edge waters with temperatures of 57.2°F–71.6° F (Moyle 2002). Eggs adhere to the substrate or plants and hatch in approximately four days. After hatching, the fry spend the next 3–4 months in quiet water in the water column and usually occur among vegetation or other flooded cover (Moyle 2002).

Arroyo chub are threatened by the introduction of non-native fish and show a decline in the watershed when non-native species become abundant. The introduction of largemouth bass (*Micropterus salmoides*) and green sunfish (*Lepomis cyanellus*) pose a threat to arroyo chub and could be responsible for their extirpation from many areas (Moyle et al. 1995). Arroyo chub are also threatened by water diversions, urbanization of watersheds, and pollution.

Santa Ana Speckled Dace (*Rhinichthys osculus* ssp. 3)

Santa Ana speckled dace is a California Species of Special Concern. The Santa Ana speckled dace has not been formally described as a subspecies, which is why it is not federally listed. Many believe that Santa Ana speckled dace deserves subspecies status because they have morphological differences that distinguish them from other California dace: they have finer scales, a better developed frenum (a flap of skin attaching the snout to upper lip), a longer head, and smaller eggs (Moyle et al. 1995).

Santa Ana speckled dace was historically distributed throughout the upland portions of the Santa Ana, San Gabriel, and Los Angeles River systems, but it currently has a limited distribution in the headwaters of the Santa Ana and San Gabriel Rivers (Moyle et al. 1995). The most recent CNDDB record of Santa Ana speckled dace in the vicinity of the survey area was reported from a location approximately 10 miles southwest of Big Tujunga Reservoir along Big Tujunga Wash and Haines Canyon Creek, 0.62–1.1 miles downstream of the I-210 freeway (CDFG 2011).

Santa Ana speckled dace is a small, freshwater fish that rarely exceeds three inches in length. Physical characteristics of the Santa Ana speckled dace include one barbel (whisker-like) at the end of each jaw and a frenum on the upper lip. The back and sides of the fish are dusky yellow or olive, and are covered with dark speckles and splotches. During breeding, the base of the

fins in both sexes and the snouts and lips of males often turn red. Also, males usually develop tubercles on their pectoral fins and head (Moyle 2002).

Santa Ana speckled dace require perennial streams with summer water temperatures of 62°F–68°F (Moyle et al. 1995). They prefer riffle habitats in clean, rocky-bottomed streams and rivers, but are also found near the shores of lakes (Moyle et al. 1995). This species exhibits predatory avoidance behaviors such as nocturnal feeding and hiding among the bottom rocks during daylight hours. Except for the breeding season, this species does not form large groups, but instead forages in small groups that can easily blend into the bottom rocks to avoid predation. They forage on a large variety of small, ground-dwelling invertebrates, zooplankton, filamentous algae, and other plant material (McGinnis 2006).

Santa Ana speckled dace typically have a life span of three years, but can live up to six years or more. They become sexually mature in their second year, and spawning occurs throughout the summer months. Speckled dace lay and fertilize their eggs on the stream bottom in rocks and gravel. The eggs hatch in six days, and similar to most other minnows, the young seek out calm inshore areas where zooplankton is available to feed upon (Moyle 2002; McGinnis 2006).

Santa Ana speckled dace are threatened by the introduction of non-native fish and show a decline in the watershed when non-native species become abundant. The introduction of largemouth bass and green sunfish pose a threat to Santa Ana speckled dace and could be responsible for their extirpation from many areas (Moyle et al. 1995). Santa Ana speckled dace are also threatened by water diversions, urbanization of watersheds, and pollution.

Survey Methodology

Surveys were conducted by ECORP Consulting Biologists Todd Chapman (TE-110094-2) and Brian Zitt (TE-27460A-0) with BonTerra Consulting Biologists Jennifer Pareti and Dr. Carl Demetropoulos. Prior to the surveys, Todd Chapman consulted John O'Brien from the California Department of Fish and Game (CDFG) for approval to conduct the surveys for special status fish species in the survey area. Survey methods included electrofishing and seining depending on the location within the survey area (Exhibit 3).

Electrofishing was conducted using a backpack electrofisher (Smith Root Model LR-20B). Adhering to the sampling guidelines provided by USFWS, pulse frequency was 30 hertz (hz); the pulse width did not exceed 5 milliseconds; the duty cycle was 15 percent; and the voltage output was 200 volts (V). Electrofishing was conducted in Big Tujunga Creek upstream of the reservoir on August 15, 2011, and also in Big Tujunga Wash immediately downstream of the dam on August 17, 2011. While electrofishing, care was taken to avoid algal mats and dense vegetation in the creek to avoid impacts on refugia for young fish. Captured fishes were immediately transferred into a container of clean aerated water taken from the wash and were visually identified. Native fishes were released unharmed at the point of capture. Non-native fishes were not returned to Big Tujunga Creek/Wash. Electrofishing was immediately stopped once the presence of the three native special status fish species was confirmed within the survey area.

Four large seine hauls were conducted along the edges of the reservoir, and one seine haul was conducted in the plunge pool immediately below the dam. Seining was conducted using a 100-foot by 10-foot deep nylon knotless delta weave bagged seine with ¼-inch mesh. Seining along the edges of the reservoir was accomplished using a small motorized boat to deploy the seine net, which was then hauled onto the shore. Captured fishes were immediately transferred into a container of clean aerated water taken from the reservoir and were visually identified.

Captured non-native fishes and invertebrates were not returned to Big Tujunga Reservoir or Big Tujunga Wash.

All fish observed during the survey were recorded in field notes. A list of all wildlife species observed during the surveys is included in Appendix B.

Survey Results

Survey date, time, and weather data for the special status fish surveys are shown in Table 1. During the August 15, 2011 survey, which covered the two miles of Big Tujunga Creek upstream of the reservoir, no fish were found. During the August 17, 2011 survey, which covered the reservoir and the area downstream of the reservoir, all three native special status fishes were observed or captured just downstream of the dam in Big Tujunga Wash (Table 2). One large adult Santa Ana sucker was captured and 20 others were visually observed in Big Tujunga Wash. A total of 96 arroyo chub were captured and over 150 others were visually observed during the seining and electrofishing efforts below the dam in Big Tujunga Wash. One Santa Ana speckled dace was also captured during electrofishing downstream of the dam. No special status fish species were found in the reservoir.

Two special status reptile species were observed during the surveys. Two two-striped garter snakes (*Thamnophis hammondii*) and one coastal western whiptail (*Aspidoscelis tigris stejnegeri*) were observed on August 15, 2011. CNDDB forms for these observations will be submitted to CDFG and are included in Appendix C.

Non-native aquatic species observed during these surveys included red-swamp crayfish (*Procambarus clarkii*), green sunfish (*Lepomis cyanellus*), black bullhead (*Ameiurus melas*), and American bullfrog (*Lithobates catesbeianus*). The crayfish, green sunfish, and black bullhead captured during the surveys were removed from the reservoir and Big Tujunga Wash because non-native species are known predators of the special status native fish species.

TABLE 1
FISH SURVEY CONDITIONS DATA

Survey Date	Surveyor Name(s)	Time	Atmospheric Conditions				Water Conditions				
			Percent Cloud Cover (%)	Air Temperature (°F)	Wind Speed (mph)	Weather Conditions	Water Temperature (°F)	Salinity	Oxidation Reduction Potential (ORP)	Nephelometric Turbidity Unit (NTU)	Total Dissolved Solids (TDS)
August 15, 2011	T. Chapman B. Zitt J. Pareti	8:15 AM–4:00 PM	15	73	0–5	sunny	68.3	0.2 ppt	76 mV	500	0.277
August 17, 2011	T. Chapman B. Zitt J. Pareti C. Demetropoulos	8:15 AM–2:00 PM	25	77	0–3	partly cloudy	67.9	0.2 ppt	170 mV	0	0.259

°F: degrees Fahrenheit; mph: miles per hour; ppt: parts per thousand; mV: millivolts; ORP: measure of the cleanliness of the water and its ability to break down contaminants; NTU: measurement of the lack of clarity of water; TDS: total dissolved solids.

TABLE 2
SURVEY RESULTS

Survey Date	Location	Method	Species Captured (Number of Individuals)					Species Visually Observed (Number of Individuals)			
			Arroyo chub	Santa Ana speckled dace	Santa Ana sucker	Black bullhead	Red swamp crayfish	Santa Ana sucker	Arroyo chub	Red swamp crayfish	Green sunfish
August 15, 2011	Upstream of reservoir	Electrofishing	0	0	0	0	0	0	0	0	0
August 17, 2011	Reservoir	Seine 1	0	0	0	30	0	0	0	0	0
August 17, 2011	Reservoir	Seine 2	0	0	0	0	0	0	0	0	0
August 17, 2011	Reservoir	Seine 3	0	0	0	1	0	0	0	0	0
August 17, 2011	Reservoir	Seine 4	0	0	0	0	0	0	0	0	0
August 17, 2011	Plunge Pool beneath dam	Seine 5	46	0	0	1	0	0	50	0	0
August 17, 2011	Downstream of reservoir	Electrofishing	50	1	1	0	1	20	100+	30	1
		Total	**96**	**1**	**1**	**32**	**1**	**20**	**150+**	**30**	**1**

BonTerra Consulting has appreciated the opportunity to assist with this project. Please contact David Hughes at (626) 351-2000 or Jennifer Pareti at (714) 444-9199 if you have questions or comments.

Sincerely,

BONTERRA CONSULTING

David T. Hughes
Senior Project Manager

Jennifer S. Pareti
Biologist

"I certify that the information in this survey report and enclosed exhibits fully and accurately represents my work."

Todd Chapman
Senior Ichthyologist, ECORP Consulting, Inc.
(TE-110094-2)

Brian Zitt
Senior Ichthyologist, ECORP Consulting, Inc.
(TE-27460A-0)

Enclosures: Exhibits 1, 2, and 3
Appendix A – Site Photographs
Appendix B – Wildlife Compendium
Appendix C – CNDDB Forms

cc: Kavita Mahulikar
Ryan Butler

REFERENCES

California Department of Fish and Game (CDFG). 2011. California Natural Diversity Database. Records of Occurrence for the USGS Condor Peak 7.5-minute quadrangle. Sacramento, CA: CDFG, Natural Heritage Division.

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———. 2005 (January 4). Endangered and Threatened Wildlife and Plants; Final Rule to Designate Critical Habitat for the Santa Ana Sucker (*Catostomus santaanae*); Final Rule. *Federal Register* 70(2): 426–458. Washington, D.C.: USFWS.

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Source: USGS 7.5 Minute Quadrangle
Condor Peak, CA

D:\Projects\CoLADPW\J162\MXD\ex_lv_usgs_fish_V002.mxd

Project Location

Exhibit 1

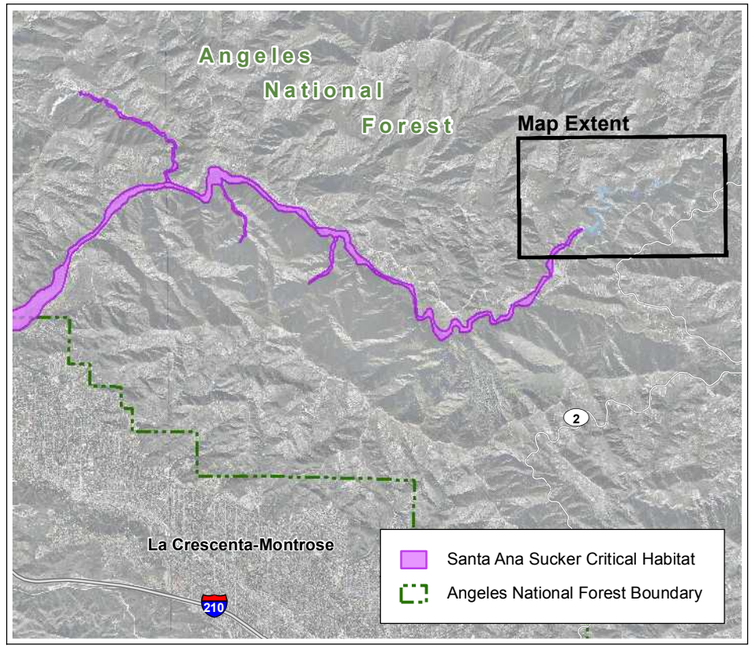
Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project

N W E S

2,000 1,000 0 2,000 Feet

BonTerra CONSULTING

(Rev: 9-08-2011 JCD) PAS\Projects\CoLADPW\J162\Graphics\Bio\Fish\Ex1_LV_usgs.pdf



D:\Projects\CoLADPW\J162\MXD\Ex_critical_habitat_V002.mxd

Critical Habitat

Exhibit 2

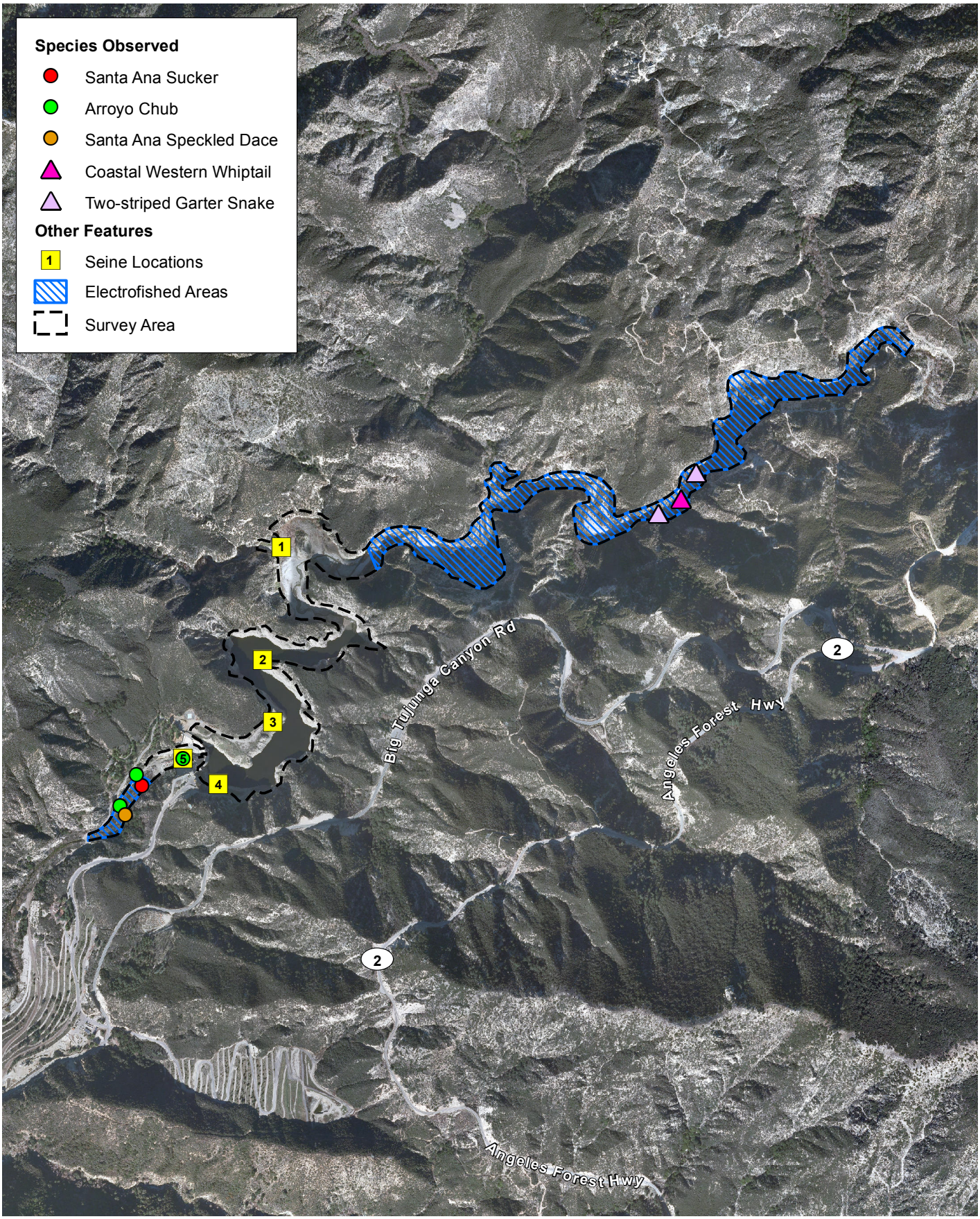
Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project

N
W E
S

800 400 0 800
Feet

Bonterra CONSULTING

(Rev: 9-19-2011 JCD) Projects\CoLADPW\J162\Graphics\Bio\Fish\Ex2_Critical_Habitat.pdf



D:\Projects\CoLADPW\J162\MXD\Ex_FishSurvey_V002.mxd

Survey Results

Exhibit 3

Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project

N
W E
S

1,500 750 0 1,500

Feet

BonTerra CONSULTING

(Rev: 9-21-2011 JCD) R:\PAS\Projects\CoLADPW\J162\Graphics\Bio\Fish\Ex3_SurveyResults.pdf

APPENDIX A

SITE PHOTOGRAPHS



Facing north. Big Tujunga Reservoir.



Facing south. Floating vegetation within Big Tujunga Reservoir.

D:\Projects\CoLADPW\J162\Graphics\AppA_1.ai



Facing upstream. Northeast portion of Big Tujunga Reservoir.



Facing upstream. Directly upstream of Big Tujunga Reservoir.

D:\Projects\CoLADPW\J162\Graphics\AppA_2.ai



Facing upstream. Big Tujunga Creek.



Facing upstream. Big Tujunga Creek.

D:\Projects\CoLADPW\J162\Graphics\AppA_3.ai



Facing upstream. Northern portion of the survey area in Big Tujunga Creek.



Releasing seine at location #1 in northern portion of Big Tujunga Reservoir.

D:\Projects\CoLADPW\J162\Graphics\AppA_4.ai



Arroyo chub (top) and Santa Ana sucker (bottom) caught downstream of Big Tujunga Dam.



Santa Ana speckled dace caught downstream of Big Tujunga Dam.

D:\Projects\CoLADPW\J162\Graphics\AppA_5.ai

APPENDIX B

WILDLIFE COMPENDIUM

APPENDIX B
WILDLIFE COMPENDIUM

BIG TUJUNGA WILDLIFE COMPENDIUM
SPECIES
Fish
CYPRINIDAE – MINNOWS
Gila orcutti arroyo chub
Rhinichthys osculus ssp. 3 Santa Ana speckled dace
CATOSTOMIDAE – SUCKERS
Catostomus santaanae Santa Ana sucker
ICTALURIDAE – CATFISH
*Ameiurus melas** black bullhead
CENTRARCHIDAE – SUNFISH
*Lepomis cyanellus** green sunfish
Amphibians
HYLIDAE – TREEFROGS
Pseudacris [Hyla] cadaverina California treefrog
RANIDAE – TRUE FROGS
*Lithobates [Rana] catesbeianus [catesbeiana]** American bullfrog
Reptiles
PHRYNOSOMATIDAE – ZEBRA-TAILED, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNED LIZARDS
Sceloporus occidentalis western fence lizard
TEIIDAE – WHIPTAIL LIZARDS
Aspidoscelis [Cnemidophorus] tigris stejnegeri coastal western whiptail
COLUBRIDAE – COLUBRID SNAKES
Thamnophis hammondii two-striped garter snake
Birds
PHALACROCORACIDAE – CORMORANTS
Phalacrocorax auritus double-crested cormorant
ARDEIDAE – HERONS
Ardea Herodias great blue heron
ACCIPITRIDAE – HAWKS
Buteo jamaicensis red-tailed hawk

APPENDIX B
WILDLIFE COMPENDIUM

BIG TUJUNGA WILDLIFE COMPENDIUM
SPECIES
TROGLODYTIDAE – WRENS
Catherpes mexicanus canyon wren
Invertebrates
CAMBARIDAE – CAMBARID CRAYFISH
*Procambarus clarkia** red swamp crayfish
* introduced species

APPENDIX C

CNDDB FORMS

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/17/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Gila orcutti*

Common Name: Arroyo chub

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 200 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Todd Chapman, Ecorp
Address: 1801 Park Court Place, Bldg B, Suite 103
Santa Ana, CA 92701
E-mail Address: tchapman@ecorpconsulting.com
Phone: (714) 648-0630

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

50 # adults | 150 # juveniles | _____ # larvae | _____ # egg masses | _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: Los Angeles County Department of Public Works
Quad Name: Condor Peak Elevation: 2091 ft
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Etrex
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy +/- 10 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 3795304
390613

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Along the creek, vegetation consists mainly of willow riparian forest dominated by arroyo willow, red willow, white alder and Fremont cottonwood. Other common species present included mule fat, hoary nettle (Urtica dioica ssp. holosericea), and mugwort (Artemisia douglasiana).

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: open space

Visible disturbances: recently burnt (2009 Station Fire)

Threats: non-native aquatic species present

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/17/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Rhinichthys osculus*

Common Name: Santa Ana speckled dace

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Todd Chapman, Ecorp
Address: 1801 Park Court Place, Bldg B, Suite 103
Santa Ana, CA 92701
E-mail Address: tchapman@ecorpconsulting.com
Phone: (714) 648-0630

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: Los Angeles County Department of Public Works
Quad Name: Condor Peak Elevation: 2091 ft
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Etrex
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy +/- 10 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 3795077
390363

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Along the creek, vegetation consists mainly of willow riparian forest dominated by arroyo willow, red willow, white alder and Fremont cottonwood. Other common species present included mule fat, hoary nettle (Urtica dioica ssp. holosericea), and mugwort (Artemisia douglasiana).

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: open space

Visible disturbances: recently burned (2009 Station Fire)

Threats: non-native aquatic species present

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/17/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Catostomus santaanae*

Common Name: Santa Ana sucker

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 21 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Todd Chapman, Ecorp
Address: 1801 Park Court Place, Bldg B, Suite 103
Santa Ana, CA 92701
E-mail Address: tchapman@ecorpconsulting.com
Phone: (714) 648-0630

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

21 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: Los Angeles County Department of Public Works
Quad Name: Condor Peak Elevation: 2091 ft
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Etrex
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy +/- 10 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐
Coordinates: 3795077
390363

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Along the creek, vegetation consists mainly of willow riparian forest dominated by arroyo willow, red willow, white alder and Fremont cottonwood. Other common species present included mule fat, hoary nettle (Urtica dioica ssp. holosericea), and mugwort (Artemisia douglasiana).

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: open space

Visible disturbances: recently burned (2009 Station Fire)

Threats: non-native aquatic species present

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/15/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Thamnophis hammondii*

Common Name: two-striped garter snake

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 2 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Todd Chapman, Ecorp
Address: 1801 Park Court Place, Bldg B, Suite 103
Santa Ana, CA 92701
E-mail Address: tchapman@ecorpconsulting.com
Phone: (714) 648-0630

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

2 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: Los Angeles County Department of Public Works
Quad Name: Condor Peak Elevation: 2257 ft
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Etrex
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy +/- 10 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 3796179 / 392281
3796318 / 392411

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Big Tujunga Canyon burned in the 2009 Station Fire; the riparian canopy is sparse through much of the creek and average vegetation heights are approximately five to seven feet. Dominant species in this portion of the survey area include arroyo willow (Salix lasiolepis), red willow (Salix laevigata), white alder (Alnus rhombifolia) and Fremont cottonwood (Populus fremontii ssp. fremontii) with mule fat (Baccharis salicifolia), rough sedge (Carex senta), wild oat (Avena sp.), and white sweet clover (Melilotus alba).

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: open space

Visible disturbances: recently burned (2009 Station Fire)

Threats:

Comments: 2 adults found at separate locations in the creek

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☑ Compared with photo / drawing in: Stebbins
☐ By another person (name): _____
☑ Other: experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/15/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Aspidoscelis tigris stejnegeri*

Common Name: coastal western whiptail

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Todd Chapman, Ecorp
Address: 1801 Park Court Place, Bldg B, Suite 103
Santa Ana, CA 92701
E-mail Address: tchapman@ecorpconsulting.com
Phone: (714) 648-0630

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: Los Angeles County Department of Public Works
Quad Name: Condor Peak Elevation: 2257 ft
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Etrex
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy +/- 10 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 3796179 / 392281

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Big Tujunga Canyon burned in the 2009 Station Fire; the riparian canopy is sparse through much of the creek and average vegetation heights are approximately five to seven feet. Dominant species in this portion of the survey area include arroyo willow (Salix lasiolepis), red willow (Salix laevigata), white alder (Alnus rhombifolia) and Fremont cottonwood (Populus fremontii ssp. fremontii) with mule fat (Baccharis salicifolia), rough sedge (Carex senta), wild oat (Avena sp.), and white sweet clover (Melilotus alba).

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: open space

Visible disturbances: recently burned (2009 Station Fire)

Threats:

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☑ Compared with photo / drawing in: Stebbins
☐ By another person (name): _____
☑ Other: experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

APPENDIX B-6

WESTERN POND TURTLE SURVEY LETTER REPORT

BonTerra CONSULTING
225 South Lake Avenue, Suite 1000 Pasadena, CA 91101
T: (626) 351-2000 F: (626) 351-2030 | www.BonTerraConsulting.com

January 4, 2012

Mr. Philip Siongco
Water Resources Division
Department of Public Works
County of Los Angeles
900 South Fremont Avenue
Alhambra, California 91802-1460

VIA EMAIL AND U.S. MAIL
PSIONGCO@dpw.lacounty.gov

Subject: Results of Focused Presence/Absence Surveys for Western Pond Turtle for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles County, California

Dear Mr. Siongco:

This Letter Report presents the results of focused surveys to determine the presence or absence of the western pond turtle (*Emys marmorata*) in the Big Tujunga Reservoir and Big Tujunga Creek. The focused surveys were conducted in support of project approvals for the Big Tujunga Reservoir Sediment Removal Project. A qualified Biologist with the necessary experience and a California Department of Fish and Game (CDFG) scientific collecting permit conducted the surveys.

Survey Area

The survey area for the Big Tujunga Reservoir Sediment Removal Project includes Big Tujunga Reservoir, immediately upstream of the Big Tujunga Dam, in the Angeles National Forest and Big Tujunga Creek, approximately one mile upstream of the reservoir in Los Angeles County, California (Exhibit 1). The survey area is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute quadrangle at Township 3 North, Range 12 West, within Sections 29, 31, and 32 (Exhibit 1). Elevations within the survey area range from approximately 2,150 to 3,400 feet above mean sea level. The survey area and surrounding vicinity consist of natural open space within the Angeles National Forest.

Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels. Erosion has deposited alluvium (including boulders, cobbles, gravel, and coarse to fine sandy soils) within the stream course. Topography is irregular and stream grade, width, and flow velocity vary but are generally moderate. The creek channel morphology within the survey area includes portions with narrow, incised, fast-moving water; portions with wider, slow-moving water; deep pools; and relatively broad alluvial wash with multiple meanders. In the survey area, Big Tujunga Creek is perennial.

Upstream of the reservoir, vegetation along Big Tujunga Creek consists mainly of willow riparian scrub dominated by arroyo willow (*Salix lasiolepis*) and red willow (*Salix laevigata*); however, in some areas it is co-dominated by white alder (*Alnus rhombifolia*) and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*). Other common species include mule fat (*Baccharis salicifolia*), stinging nettle (*Urtica dioica ssp. holosericea*),

and mugwort (*Artemisia douglasiana*). In upland areas, coast live oaks (*Quercus agrifolia*) and western sycamores (*Platanus racemosa*) are also present. Big Tujunga Canyon burned during the 2009 Station Fire; thus, the riparian canopy is sparse through much of the creek in this area.

In alluvial terraces and slopes above the main stream course, alluvial scrub is present, dominated by scale-broom (*Lepidospartum squamatum*); other common species include thick-leaf yerba santa (*Eriodictyon crassifolium*), California buckwheat (*Eriogonum fasciculatum*), our Lord's candle (*Yucca whipplei*), black sage (*Salvia mellifera*), deerweed (*Acmispon glaber* [*Lotus scoparius*]), and laurel sumac (*Malosma laurina*). Many of the burned trees and shrubs are resprouting from the base. Poodledog bush (*Turricula parryi*), a fire-following species, is widespread throughout the survey area.

Species Background

The western pond turtle is a CDFG Species of Special Concern and a U.S. Forest Service sensitive species in the Angeles National Forest (CDFG 2011a). The western pond turtle is the only remaining native species of freshwater turtle in California. The current range of the western pond turtle in Southern California extends south from the San Francisco Bay area (excluding Inyo, Mono and Imperial Counties), with a broad range of intergradations from the American River south through the San Joaquin Valley (Bury and Germano 2008). Isolated, extant populations are found in the interior draining Mojave River of California at least as far into the Mojave Desert as Afton Canyon and in the Amargosa River in the vicinity of Lake Elizabeth in northern Los Angeles County (Holland 1994). The closest records of the western pond turtle relative to the survey area include two occurrences downstream of the study area in Big Tujunga Wash (approximately two miles and eight miles downstream) (CDFG 2011b, BonTerra Consulting 2010) and one occurrence approximately six miles upstream at the confluence of Upper Big Tujunga Creek and Lynx Gulch (ICF and BonTerra Consulting 2011).

The western pond turtle has a low carapace (upper shell), 3.5 to 8.5 inches in length, and may be brown, olive or blackish in color, usually with black or brown spots or lines that radiate out from the center of the carapace shields (Stebbins 2003). The limbs of this species have prominent scales that contain black lines or flecks, and the head may also contain black spots or markings (Stebbins 2003). Males tend to have a lighter throat without black markings with a shell that is flatter and more of a solid color than females (Stebbins 2003).

The western pond turtle lays a clutch of 3 to 14 eggs from April to August (Stebbins 2003). Nest sites are usually found in upland habitats beyond the floodplain, typically on south-facing slopes of less than a 60-degree angle (Jennings and Hayes 1994). In Southern California, most hatchlings emerge in the early fall, while some may overwinter in the nest (Holland 1994). Adults in Southern California may be active year round; however, during the coldest months (i.e., between October and April), this species will often seek upland refugia and enter a period of brumation (i.e., reptilian inactivity and decreased metabolic rate in response to seasonal temperature changes [similar to hibernation]), particularly in more temperate, high elevation areas of the species' range (Holland and Goodman 1996). Winter refugia are often found in the same upland habitats as nesting sites.

Agricultural development, flood-control projects, water diversion, and urbanization have resulted in elimination of over 90 percent of the wetland habitats within the historic range of the western pond turtle throughout California (USFWS 1992). These anthropogenic threats have also fragmented the remaining suitable habitat and isolated remaining populations, resulting in a lack of genetic variability.

Invasion of exotic pest species into habitats occupied by western pond turtles is another threat to the continued survival of the species. Invasive, non-native plant species such as tamarisk (*Tamarix ramosissima*) and giant reed (*Arundo donax*) have become established throughout Southern California, reducing plant diversity, altering stream morphology, and eliminating suitable basking sites (Lovich et al. 1994). The invasive bullfrog (*Rana catesbeiana*) is native to eastern North America but is widely established in California. Bullfrogs are voracious predators that will eat any live animal they can swallow, and bullfrog predation of hatchling and young western pond turtles has been recorded (Holland 1994). The intensity of bullfrog predation is severe enough to eliminate recruitment in some western pond turtle populations in Southern California (Overtree and Collings 1997). As a result of the threats listed above, the western pond turtle is believed to be in decline throughout 75 to 80 percent of its range (Stebbins 2003).

Survey Methodology

The survey methodology was based on pond turtle survey and census recommendations made by Holland (1991) and survey protocols developed by Reese and Welsh (1988) and Goodman (1999). Surveys incorporated both visual encounter and live trapping. BonTerra Consulting Senior Herpetologist Samuel Stewart (CDFG Scientific Collecting Permit SC-004421) conducted the surveys from August 2–5, 2011 and from August 8–10, 2011. Mr. Stewart is familiar with the western pond turtle and has the appropriate CDFG authorization to trap and handle the species.

Mr. Stewart conducted live trapping, which consisted of placing live-catch turtle traps at six trapping stations throughout the reservoir. All traps were fitted with tags listing the CDFG Scientific Collecting Permit number under which live trapping was being conducted. Trap station locations were recorded with a Garmin Etrex Vista H Geographic Positioning System (GPS) unit. Trap station locations are presented on Exhibit 2.

The first trapping session consisted of 3 trapping periods lasting approximately 24 hours each (traps were set on August 2, 3, and 4 and checked 24 hours later). The second trapping session consisted of 2 trapping periods lasting approximately 24 hours each (traps were set on August 8 and 9 and checked 24 hours later). Traps were planted and were checked and/or relocated using a kayak. Mr. Stewart conducted visual encounter surveys for turtles during setting and checking of traps and while walking along Big Tujunga Creek upstream of the reservoir to the eastern survey area limit.

Live-catch floating net mesh box traps were used for the survey effort. Net mesh box traps consist of a 24-inch by 18-inch by 8-inch framed box with $^{5}/_{16}$-inch mesh and two 1-way funnel entrances. Floats were placed inside the trap to allow submergence of one trap entrance and flotation of approximately four inches of trap enclosure. Six net mesh box traps were firmly secured to booms, emergent trees, or other immovable objects in the reservoir using nylon rope and baited with fresh fish trimmings. Thread herring and mackerel were placed in the traps as bait. Turtles attracted by the scent of the bait would enter the submerged entrance and surface within the enclosure to breathe.

Survey Results

One western pond turtle was detected in Big Tujunga Reservoir during trapping. It was a single juvenile male western pond turtle (carapace length of 5 inches), that was recovered from Trap Station 3 on August 4, 2011. GPS location, photographic evidence, and carapace measurements were recorded prior to immediate release at the point of capture. No other western pond turtles were detected within the reservoir or within Big Tujunga Creek upstream of the reservoir.

One adult red-eared slider (*Trachemys scripta elegans*), an introduced pond turtle species in the family Emydidae, was recovered from Trap Station 4 during the August 4 trapping session. The red-eared slider was removed from the reservoir and taken into captivity. Additionally, 190 black bullhead (*Ameiurus melas*), an introduced species of catfish, were recovered from multiple trap stations during the trapping sessions and were removed from the reservoir.

A summary of trapping results is provided in Table 1. Photographs of the survey area and notable species observed during surveys are provided in Attachment A. A list of all wildlife species observed during surveys is included in Attachment B. A California Native Diversity Database form for the western pond turtle observed will be submitted to the CDFG and is included in Attachment C.

TABLE 1
SUMMARY OF TRAPPING RESULTS

Start				End					
Trap Set Date	Time	Air Temp (°F)	Wind Speed mph	Trap Check Date	Time	Air Temp (°F)	Wind Speed mph	Trap Results	Trap Location[1]
8/2/2011	10:50AM–4:10PM	84	0–2	8/3/2011	11:00AM–5:05 PM	93	2–8	Trap 1 – Empty	390874, 3795292
								Trap 2 – Empty	390876, 3795338
								Trap 3 – Empty	390802, 3795762
								Trap 4 – Empty	391155, 3796077
								Trap 5 – Empty	390993, 3795615
								Trap 6 – Empty	390876, 3795250
8/3/2011	11:00AM–5:05PM	93	2–8	8/4/2011	1:15PM–7:05 PM	90	2–5	Trap 1 – 1 bullhead	390876, 3795250
								Trap 2 – Empty	391073, 3796181
								Trap 3 – 8 bullhead, 1 western pond turtle	391048, 3796189
								Trap 4 – 44 bullhead, 1 red-eared slider	391094, 3796050
								Trap 5 – Empty	391137, 3796029
								Trap 6 – Empty	391137, 3796064
8/4/2011	1:15AM–7:05 PM	90	2–5	8/5/2011	10:46 AM–2:52 PM	88	0–2	Trap 1 – Empty	390876, 3795250
								Trap 2 – Empty	391073, 3796181
								Trap 3 – 36 bullhead	391048, 3796189
								Trap 4 – 1 juvenile bullhead	391094, 3796050
								Trap 5 – None	391137, 3796029
								Trap 6 – None	391137, 3796064
8/8/2011	10:20 AM–2:15 PM	85	2–5	8/9/2011	11:42 PM–4:44 PM	86	3–8	Trap 1 – 3 bullhead	390876, 3795250
								Trap 2 – None	391073, 3796181
								Trap 3 – None	391048, 3796189
								Trap 4 – 18 bullhead	391094, 3796050
								Trap 5 – 19 bullhead	391137, 3796029
								Trap 6 – 21 bullhead	391137, 3796064

TABLE 1 (Continued)
SUMMARY OF TRAPPING RESULTS

Start				End					
Trap Set Date	Time	Air Temp (°F)	Wind Speed mph	Trap Check Date	Time	Air Temp (°F)	Wind Speed mph	Trap Results	Trap Location[1]
8/9/2011	11:42 PM–4:44 PM	86	3–8	8/10/2011	1:20 PM–6:40 PM	81	1–3	Trap 1 – 10 bullhead	390876, 3795250
								Trap 2 – 18 bullhead	391073, 3796181
								Trap 3 – 5 bullhead	391048, 3796189
								Trap 4 – None	391094, 3796050
								Trap 5 – 4 bullhead	391137, 3796029
								Trap 6 – 1 juvenile bullhead	391137, 3796064

°F: degrees Fahrenheit; mph: miles per hour
[1] GPS points presented in Universal Transverse Mercator (UTM) Coordinates, North American Datum 83, Zone 11S

BonTerra Consulting appreciates the opportunity to assist with this project. Please contact David Hughes or Sam Stewart at (626) 351-2000 with any questions or comments.

Sincerely,

BONTERRA CONSULTING

David T. Hughes
Senior Project Manager

for Samuel C. Stewart IV
Senior Herpetologist

Attachments: Exhibit 1 – Survey Area Location
Exhibit 2 – Survey Results
A – Photographic Documentation
B – Wildlife Compendium
C – CNDDB Form

cc: Ryan Butler, Los Angeles County Department of Public Works

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Source: USGS 7.5 Minute Quadrangle, Condor Peak, CA
USFWS Critical Habitat, 2011F

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Survey Area Location

Exhibit 1

Western Pond Turtle Focused Survey for the Big Tujunga Reservoir Sediment Removal Project

N
W E
S

2,000 1,000 0 2,000
Feet

BonTerra CONSULTING

(Rev: 1-04-2012 JCD) PAS\Projects\CoLADPW\J162\Graphics\Bio\WPondTurtlet\Ex1_LV_USGS.pdf



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Survey Results

Exhibit 2

Western Pond Turtle Focused Survey for the Big Tujunga Reservoir Sediment Removal Project

N W E S

700 350 0 700 Feet

BonTerra CONSULTING

(Rev: 1-04-2012 JCD) PAS\Projects\CoLADPW\J162\Graphics\Bio\WPondTurtle\Ex2_SurveyResults.pdf

ATTACHMENT A

PHOTOGRAPHIC DOCUMENTATION



Big Tujunga Reservoir photographed from the dam.



Big Tujunga Creek facing upstream from the confluence with Big Tujunga Reservoir.

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Western pond turtle recovered from Trap Station 3 (August 4, 2011).



Black bullhead schooling in Big Tujunga Reservoir.

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ATTACHMENT B

WILDLIFE COMPENDIUM

WILDLIFE SPECIES OBSERVED DURING TURTLE TRAPPING

Species
Fish
ICTALURIDAE – CATFISH
*Ameiurus melas**   black bullhead
Reptiles
EMYDIDAE – WATER & BOX TURTLES
Emys marmorata   western pond turtle
*Trachemys scripta elegans**   red-eared slider
PHRYNOSOMATIDAE – ZEBRA-TAILED, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, & HORNED LIZARDS
Sceloporus occidentalis   western fence lizard
Uta stansburiana   side-blotched lizard
TEIIDAE – WHIPTAIL LIZARDS
Aspidoscelis [Cnemidophorus] tigris stejnegeri   coastal western whiptail
Birds
ANATIDAE – WATERFOWL
Anas platyrhynchos   mallard
PHALACROCORACIDAE – CORMORANTS
Phalacrocorax auritus   double-crested cormorant
ARDEIDAE – HERONS, BITTERNS, & ALLIES
Ardea herodias   great blue heron
ACCIPITRIDAE – HAWKS, KITES, EAGLES, & ALLIES
Buteo jamaicensis   red-tailed hawk
COLUMBIDAE - PIGEONS & DOVES
*Streptopelia chinensis *   spotted dove
TROCHILIDAE - HUMMINGBIRDS
Calypte anna   Anna's hummingbird
PICIDAE - WOODPECKERS
Colaptes auratus   northern flicker
TYRANNIDAE - TYRANT FLYCATCHERS
Sayornis nigricans   black phoebe
LANIIDAE - SHRIKES
Lanius ludovicianus   loggerhead shrike

WILDLIFE SPECIES OBSERVED DURING TURTLE TRAPPING (Continued)

Species
CORVIDAE - CROWS & JAYS
Aphelocoma californica western scrub-jay
Corvus brachyrhynchos American crow
HIRUNDINIDAE - SWALLOWS
Petrochelidon pyrrhonota cliff swallow
TROGLODYTIDAE - WRENS
Salpinctes obsoletus rock wren
Catherpes mexicanus canyon wren
PTILOGONATIDAE - SILKY-FLYCATCHERS
Phainopepla nitens phainopepla
CARDINALIDAE - CARDINALS & ALLIES
Pheucticus melanocephalus black-headed grosbeak
FRINGILLIDAE - FINCHES
Spinus [Carduelis] psaltria lesser goldfinch
* introduced species

ATTACHMENT C

CNDDB FORM

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/04/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Emys marmorata*

Common Name: western pond turtle

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☑ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Sam Stewart
Address: 225 S. Lake Ave. Suite 1000
Pasadena, CA. 91101
E-mail Address: sstewart@bonterraconsulting.com
Phone: (626) 351-2000

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown
	1			

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☑ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Los Angeles Landowner / Mgr.: US Forest Service
Quad Name: Condor Peak Elevation: 2,230ft.
T____ R____ Sec ____, ____ ¼ of ____¼, Meridian: H☐ M☐ S☐
T____ R____ Sec ____, ____ ¼ of ____¼, Meridian: H☐ M☐ S☐
Source of Coordinates (GPS, topo. map & type): GPS
GPS Make & Model Garmin Etrex Vista H
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐
Horizontal Accuracy 10 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 391048, 3796189

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Western pond turtle caught in floating nylon funnel-trap set in Big Tujunga Reservoir. Juvenile turtle with carapace length of 13 cm. No other individuals observed during focused surveys at this location, within the reservoir, or for at least 1 km upstream during 5 trapping sessions. Scattered emergent alder present in shallows.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: No development in vicinity. Angeles National Forest.

Visible disturbances: None.

Threats: Introduced fish, amphibian, and turtle species, including black bullhead, American bullfrog (as indicated by dam operator), & red-eared slider.

Comments: Red-eared slider taken into captivity.

Determination: *(check one or more, and fill in blanks)*
☑ Keyed (cite reference): Stebbins 2003
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: familiarity with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

December 14, 2018

Alex Ho
Stormwater Engineering Division
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

VIA EMAIL
AlHo@dpw.lacounty.gov

Subject: Results of 2018 Visual Survey and Trapping Program for Western Pond Turtle for the Big Tujunga Reservoir Restoration Project, Los Angeles, California

Dear Mr. Ho:

This Letter Report presents the results of the 2018 visual survey and trapping program to determine the presence or absence of the western pond turtle (*Emys marmorata*) for the Big Tujunga Reservoir Restoration Project (hereinafter referred to as the "proposed project") located in Los Angeles County, California (Exhibit 1). A qualified Biologist with the necessary experience and a California Department of Fish and Wildlife (CDFW) Scientific Collecting Permit conducted the surveys.

PROJECT DESCRIPTION AND LOCATION

The proposed project involves the dewatering of the Big Tujunga Reservoir and the removal of sediment to the nearby Maple Canyon Sediment Placement Site. The proposed project is located on the southern edge of the San Gabriel Mountains in the Angeles National Forest and is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute topographic quadrangle (Exhibit 1).

The survey area included all suitable habitat along Big Tujunga Creek, including Big Tujunga Reservoir, from Big Tujunga Reservoir upstream to Fall Creek (i.e., 0.62 mile upstream of the sediment removal area), and from Big Tujunga Dam downstream to approximately 500 feet downstream of the Big Tujunga Canyon Road bridge (Exhibit 2). The survey area and surrounding vicinity consist of open space in the Angeles National Forest.

Big Tujunga Creek travels roughly west, and several tributaries from the north and south join it as it flows through Big Tujunga Canyon. Big Tujunga Canyon is characterized by very steep slopes, shallow soils, and watercourses contained within bedrock channels. Erosion has deposited alluvium (including boulders, cobbles, gravel, and coarse to fine sandy soils) within the stream course. Topography is irregular, and stream grade and flow velocity range across a moderate spectrum.

Upstream of Big Tujunga Reservoir, riparian habitat in the survey area's upper section is characterized by southern willow scrub dominated by willows (*Salix* spp.) with scattered white alder (*Alnus rhombifolia*) trees. The understory vegetation includes, but is not limited to, mule fat (*Baccharis salicifolia*), cocklebur (*Xanthium strumarium*), and broad-leaved cattail (*Typha latifolia*). A few western sycamore (*Platanus racemosa*) and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) trees are also present. Stream morphology in the upper section varies with some areas that are narrow, incised, and fast-moving; areas of

3 Hutton Centre Drive
Suite 200
Santa Ana, CA 92707

Tel 714.751.7373
Fax 714.545.8883
www.Psomas.com

small pools; and areas of broad alluvial wash. From April through early June, water flowed throughout the upper section; during the later surveys, the stream was intermittent with a mix of dry segments and pools.

Downstream of Big Tujunga Dam, riparian habitat in the survey area's lower section is characterized by relatively dense and continuous willow riparian forest dominated by Fremont cottonwood, white alder, arroyo willow (*Salix lasiolepsis*), and red willow (*S. laevigata*). Common understory species include mule fat, hoary nettle (*Urtica dioica* ssp. *holosericea*), and mugwort (*Artemisia douglasiana*). At the initiation of the surveys in April, stream morphology in the lower section was intermittent with a mix of dry segments and pools. From May through the end of the survey period, stream morphology in the lower section consisted of a slow-moving stream with large pools.

Representative site photographs are included in Attachment A.

SPECIES BACKGROUND

The western pond turtle is a California Species of Special Concern and a U.S. Forest Service Sensitive Species. In 2012, the Center for Biological Diversity petitioned the USFWS to list 53 amphibian and reptile species; the western pond turtle was one of the species. In 2015, the USFWS published a finding that the listing of this species may be warranted and requested that information on this species be submitted to the USFWS for review (USFWS 2015). Currently, the species status is "under review" (USFWS 2018).

This species was known as the western pond turtle or Pacific pond turtle (*Clemmys marmorata*) for over a century. The taxonomy of this species has been revised several times in recent years based on various genetic studies. This species has been moved between the genus *Emys* and the genus *Actinemys*. Some nomenclature recognizes two subspecies (a northern and southern subspecies), while others do not. Nomenclature in this report follows the current CDFW List of Special Animals, which does not recognize subspecies and places the species in the genus *Emys* (Spinks and Shaffer 2005, 2009). It should be noted that a subsequent publication by these same researchers in 2014 indicated that splitting the species into subspecies may, in fact, be warranted (Spinks et al. 2014)

The western pond turtle is a relatively flat, dark turtle of moderate size, with a carapace (shell) length that rarely exceeds 10 inches (Spinks et al. 2003). They are cryptically colored brown, olive-brown, or dark brown (USGS 2006). The carapace is usually brown or blackish in color with a series of darker spots, lines or dashes that radiate out from the center of each shield (Stebbins and McGinnis 2012). Their head and body have a mottled appearance (USGS 2006). Males tend to have thicker tails, while females have thinner tails. Males tend to have concave plastrons (shells), while females tend to have flat or slightly convex plastrons; the carapaces of females are also taller to allow room for eggs. The cloacal opening (opening for digestive, urinary, and reproductive tracts) is also further back in males than in females (USGS 2006). They typically reach sexual maturity when they are approximately 4 inches and four to six years of age (USGS 2006).

The western pond turtle is the only native turtle species in coastal California. It is found in ponds, lakes, marshes, reservoirs, seasonal standing or slow-moving streams, canals, sloughs, vernal pools, and occasionally in brackish water (Germano and Bury 2001). Sufficient cover (e.g., vegetation, undercut banks) and basking sites are important components of suitable habitat (Spinks et al. 2003). Suitable basking sites include partially submerged logs, rocks, floating vegetation, and open mud banks (CDFW 2000). Adults are often observed basking on logs or other objects protruding out of the water or floating in the warmer surface water. They have both good hearing and eyesight and are easily disturbed; they are often heard splashing into the water to take cover before they are seen (USGS 2006). Western pond turtle

is omnivorous; aquatic invertebrates are the mainstay of the adult diet; but carrion, small fish, frogs, and some plants are also consumed (USGS 2006).

This species breeds from April to May (Jennings and Hayes 1994), but the timing is highly variable depending on location and seasonal conditions. Females move from the water to adjacent upland habitats to lay eggs, usually sometime in late May to early July, although movement could occur as early as April or as late as August (Ernst et al. 1994). Nest site selection favors unshaded slopes that may be at least in part south-facing, likely to ensure that substrate temperatures will be high enough to incubate the eggs (Rathbun et al. 2002). The western pond turtle can nest in a variety of soil conditions, but the soil must be at least 4 inches deep and have relatively high internal humidity (CDFW 2000). Clutch size varies from 1 to 13 eggs, positively correlated with body size; they can sometimes double-clutch (have more than one nest per year) (Goodman 1997a, 1997b; Lovich and Meyer 2002; Holland 1991, 1994; Hays et al. 1999; Pires 2001). In southern California, most hatchlings emerge in the early fall, while some may over-winter in the nest (Holland 1994).

Adults in Southern California may remain active in the water year-round if conditions are suitable (enough water, warm temperatures) (USGS 2006). However, during the coldest months (October to April), this species will often seek upland refugia (i.e., shelter with appropriate temperature and moisture conditions) and enter a period of aestivation. Aestivation is a period of inactivity and decreased metabolic rate in response to seasonal temperature changes (similar to hibernation); it occurs more frequently in more temperate, high-elevation areas of the species' range (Holland and Goodman 1996). Terrestrial refugia are typically covered with dense leaf litter produced by a thick overstory of woody vegetation, such as in dense riparian thickets of willows (Rathbun et al. 2002). Turtles may choose sites where they can bask in direct sunlight or may bury themselves deep into leaf litter and duff (Rathbun et al. 2002). Winter refugia are often found in the same upland habitats as nesting sites. Western pond turtles can also hibernate underwater in bottom mud (CDFW 2000).

Habitat destruction for urban (primarily flood control) and agricultural development has resulted in population declines throughout the western pond turtle's range (Spinks et al. 2003). Over 90 percent of the wetland habitats within the historic range of the western pond turtle throughout California have been lost (USFWS 1992). Additionally, invasion of exotic pest species into habitats occupied by western pond turtles is another threat to the continued survival of the species. Invasive, non-native plant species such as tamarisk (*Tamarix ramosissima*) and giant reed (*Arundo donax*) have become established throughout Southern California, reducing plant diversity, altering stream morphology, and eliminating suitable basking sites (Lovich et al. 1994). The invasive American bullfrog (*Lithobates catesbeianus*) is a voracious predator that will eat any live animal it can swallow, and American bullfrog predation of hatchling and young western pond turtles has been recorded (Holland 1994). The intensity of American bullfrog predation is severe enough to eliminate recruitment in some western pond turtle populations in Southern California (Overtree and Collings 1997).

SURVEY METHODS

Visual Survey

Psomas Senior Biologists Jonathan Aguayo and Lindsay Messett and Biologist Trevor Bristle conducted the visual survey in all potentially suitable habitat for western pond turtle in the survey area, including Big Tujunga Reservoir and both the upper and lower sections. The survey focused on the detection of adult and juvenile turtles by visual identification. Surveys focused on carefully inspected pools, surface water, banks (using binoculars), and suitable basking sites throughout the survey area. During the visual survey, Mr. Aguayo also determined the appropriate placement for turtle traps based on suitable areas within Big Tujunga Reservoir, plunge pool, and suitable pools along the creek. On May 18, 2018,

Mr. Aguayo and Ms. Messett conducted the visual survey for the upper section of the survey area from approximately 4:25 PM to 7:10 PM. The weather conditions during the survey were suitable for turtle activity (e.g., basking) and consisted mostly of clear skies and mild temperatures (i.e., 72–62 degrees Fahrenheit) with calm conditions (i.e., 1–2 mile per hour winds). On July 31, 2018, Mr. Aguayo and Mr. Bristle conducted the visual survey for the lower section of the survey area from approximately 8:00 AM to 12:10 PM. The weather conditions during the survey were suitable for turtle activity and consisted mostly of clear skies and mild temperatures (i.e., 78–98 degrees Fahrenheit) with calm conditions (i.e., 1–3 mile per hour winds). If any western pond turtle were found, the individual or population was documented, recorded with a Global Positioning System (GPS) unit, and mapped on an aerial photograph.

Turtle Trapping

Trapping surveys follow the methodology presented in the Western Pond Turtle Trapping Survey Protocol for the Southcoast Ecoregion (USGS 2006). A five-day/four-night trapping program was conducted during the month of August. Nylon mesh hoop traps and floating basking traps were placed in suitable locations of Big Tujunga Reservoir and Big Tujunga Creek and were baited with cans of sardines to attract turtles. Hoop traps consisted of 2.5-foot hoop diameter by 6 feet long with 2-inch (in) square mesh and a one-way funnel entrance. Floating basking traps were 20-in wide by 28-in long by 13-in deep with two 13-in long wings. Traps were fitted with floats, and both hoop traps and basking traps were properly secured to immovable objects to prevent them from being submerged. Traps were left in place for a maximum of 24 hours before being checked by biologists to retrieve trapped turtles and other aquatic species (e.g. fish, frogs, invertebrates). Western pond turtles retrieved from traps were measured, weighed, notched, and photographed before being released at the point of capture. General weather information (ambient air temperature, sky conditions, and wind speed) and water temperature were recorded at the beginning and end of each trapping session. Two trapping sessions were needed to adequately cover the Big Tujunga Reservoir and survey area's lower section. The survey area's upper section was covered using a visual survey only because the upstream portion of Big Tujunga Creek was not deep enough for placement of traps.

Mr. Aguayo (CDFW Scientific Collecting Permit SC-11733) is familiar with the western pond turtle and has the appropriate CDFW authorization to trap and handle the species. Mr. Aguayo was the Principal Investigator for the visual surveys and trapping sessions and was present during all surveys. All traps were fitted with tags listing Mr. Aguayo's CDFW Scientific Collecting Permit number, under which live trapping was being conducted. Mr. Aguayo and Mr. Bristle conducted the trapping sessions from August 13-17, 2018, for Big Tujunga Reservoir and from August 20-24, 2018, for the survey area's lower section. Eight hoop traps and two basking traps were installed at Big Tujunga Reservoir, and five hoop traps and two basking traps were installed in the lower section of the survey area. Trapping locations were chosen based on whether suitable habitat was observed during visual survey. Traps were placed in suitable areas within the Reservoir, plunge pool, and suitable pools along the creek and numbered in the order in which they were placed. The number of traps set was dependent upon the overall size of the Reservoir and available suitable pools in the lower section of the survey area. Trap locations were recorded with a GPS unit and mapped on an aerial photograph (Table 1, Exhibit 4). Survey dates, times, water temperature, and weather data are shown in Tables 2 and 3.

TABLE 1
TRAP LOCATIONS

Trap Number	Trap Locations (UTM)
Reservoir Trapping Session	
Hoop Trap 1	391127, 3796103
Hoop Trap 2	391110, 3796152
Hoop Trap 3	390973, 3796053
Hoop Trap 4	391287, 3795739
Hoop Trap 5	390838, 3795623
Hoop Trap 6	390931, 3795549
Hoop Trap 7	391053, 3795335
Hoop Trap 8	390951, 3795455
Basking Trap 9	390985, 3795254
Basking Trap 10	391085, 3796041
Downstream of Dam	
Basking Trap 1	390575, 3795344
Hoop Trap 2	390584, 3795296
Hoop Trap 3	390536, 3795267
Basking Trap 4	390073, 3794852
Hoop Trap 5	390069, 3794836
Hoop Trap 6	389920, 3794418
Hoop Trap 7	389742, 3794173
UTM: Universal Transver Mercator coordinates	

TABLE 2
SUMMARY OF SURVEY DATA AND CONDITIONS FOR WESTERN POND TURTLE TRAPPING FOR BIG TUJUNGA RESERVOIR

Survey	Survey Date	Surveying Biologists	Start/End Time	Water Temperature (°F)		Wind (mph)		Temperature (°F)		Cloud Cover (%)
				Start	End	Start	End	Start	End	
1	8/13/2018	Aguayo, Bristle	10:02 AM–2:32 PM	78.4	80.8	1–3	2–4	78	89	0
2	8/14/2018	Aguayo, Bristle	7:50 AM–10:55 AM	77.5	78.6	0–1	2–4	69	86	5
3	8/15/2018	Aguayo, Bristle	7:48 AM–9:57 AM	77.7	78.6	0–1	1–2	68	86	0
4	8/16/2018	Aguayo, Bristle	7:46 AM–9:40 AM	77.5	78.6	0–1	1–2	70	87	0
5	8/17/2018	Aguayo, Bristle	7:46 AM–9:38 AM	78.4	79.3	1–2	2–4	71	87	0
°F: degrees Fahrenheit; mph: miles per hour: %: percent										

TABLE 3
SUMMARY OF SURVEY DATA AND CONDITIONS FOR WESTERN POND TURTLE TRAPPING FOR LOWER SECTION OF THE SURVEY AREA

Survey	Survey Date	Surveying Biologists	Start/End Time	Water Temperature (°F)		Wind (mph)		Temperature (°F)		Cloud Cover (%)
				Start	End	Start	End	Start	End	
1	8/20/2018	Aguayo, Bristle	8:15 AM–11:15 AM	67.1	67.8	0–1	1–2	68	84	0-20
2	8/21/2018	Aguayo, Bristle	7:44 AM–9:40 AM	67.1	67.4	0–1	1–2	67	75	0
3	8/22/2018	Aguayo, Bristle	7:32 AM–10:10 AM	66.9	66.7	0–1	1–3	63	79	0-5
4	8/23/2018	Aguayo, Bristle	7:29 AM–8:59 AM	66.3	65.5	0–1	1–3	65	74	0
5	8/24/2018	Aguayo, Bristle	7:10 AM–9:33 AM	65.6	64.9	0–1	0–1	70	73	10-20

°F: degrees Fahrenheit; mph: miles per hour: %: percent

SURVEY RESULTS

Visual Survey

One western pond turtle was observed during visual survey in the upper section of the survey area on May 18, 2018, and two western pond turtles were observed during the visual survey in the lower section of the survey area on July 31, 2018 (Exhibit 3).

One adult red-eared slider (*Trachemys scripta elegans*), an introduced species, was observed in the survey area's lower section.

Other aquatic wildlife species observed on the survey area during the visual surveys include California treefrog (*Pseudacris cadaverine*), Baja California treefrog (*Pseudacris hypochondriaca*), rainbow trout (*Oncorhynchus mykiss*), and black bullhead (*Ameiurus melas*).

Turtle Trapping

No western pond turtles were caught during the trapping session for Big Tujunga Reservoir. Three western pond turtles were caught on the lower section of the survey area during trapping session (Exhibit 4). One adult male (carapace width: 113.89 millimeters [mm]; carapace height: 45.77 mm; plastron length: 121.60 mm; weight: 345 grams [g]) was caught by Hoop Trap 5 on August 21, 2018. One adult male (carapace width: 118.40 mm; carapace height: 52.0 mm; plastron length: 134.18 mm; weight: 450 g) was caught by Hoop Trap 2 on August 22, 2018. One adult female (carapace width: 122.10 mm; carapace height: 46.50 mm; plastron length: 127.20 mm; weight: 435 g) was caught by Hoop Trap 3 on August 22, 2018. Western pond turtles retrieved from traps were measured, weighed, notched, and photographed before being released at the point of capture. Representative turtle trapping photographs and photographs taken for each individual turtle (face, carapace, and plastron orientation) caught during trapping are included in Attachment B. Survey data sheets are provided in Attachment C. A summary of trapping

results is provided in Tables 4 and 5 below. A California Natural Diversity Database (CNDDB) form for the western pond turtle is included in Attachment D and will be submitted to the CDFW.

TABLE 4
SUMMARY OF TRAPPING RESULTS FOR WESTERN POND TURTLE
TRAPPING FOR BIG TUJUNGA RESERVOIR

Survey	Survey Date	Trap Number	Trap Results
1	8/13/2018	Installation of Hoop Trap 1	N/A
		Installation of Hoop Trap 2	N/A
		Installation of Hoop Trap 3	N/A
		Installation of Hoop Trap 4	N/A
		Installation of Hoop Trap 5	N/A
		Installation of Hoop Trap 6	N/A
		Installation of Hoop Trap 7	N/A
		Installation of Hoop Trap 8	N/A
		Installation of Basking Trap 9	N/A
		Installation of Basking Trap 10	N/A
2	8/14/2018	Hoop Trap 1	No animals captured
		Hoop Trap 2	No animals captured
		Hoop Trap 3	No animals captured
		Hoop Trap 4	No animals captured
		Hoop Trap 5	No animals captured
		Hoop Trap 6	No animals captured
		Hoop Trap 7	No animals captured
		Hoop Trap 8	No animals captured
		Basking Trap 9	No animals captured
		Basking Trap 10	No animals captured
3	8/15/2018	Hoop Trap 1	No animals captured
		Hoop Trap 2	No animals captured
		Hoop Trap 3	No animals captured
		Hoop Trap 4	No animals captured
		Hoop Trap 5	No animals captured
		Hoop Trap 6	No animals captured
		Hoop Trap 7	No animals captured
		Hoop Trap 8	No animals captured
		Basking Trap 9	No animals captured
		Basking Trap 10	No animals captured

TABLE 4
SUMMARY OF TRAPPING RESULTS FOR WESTERN POND TURTLE
TRAPPING FOR BIG TUJUNGA RESERVOIR

Survey	Survey Date	Trap Number	Trap Results
4	8/16/2018	Hoop Trap 1	No animals captured
		Hoop Trap 2	No animals captured
		Hoop Trap 3	No animals captured
		Hoop Trap 4	No animals captured
		Hoop Trap 5	No animals captured
		Hoop Trap 6	No animals captured
		Hoop Trap 7	No animals captured
		Hoop Trap 8	No animals captured
		Basking Trap 9	No animals captured
		Basking Trap 10	No animals captured
5	8/17/2018	Hoop Trap 1	No animals captured
		Hoop Trap 2	No animals captured
		Hoop Trap 3	No animals captured
		Hoop Trap 4	No animals captured
		Hoop Trap 5	No animals captured
		Hoop Trap 6	No animals captured
		Hoop Trap 7	No animals captured
		Hoop Trap 8	No animals captured
		Basking Trap 9	No animals captured
		Basking Trap 10	No animals captured

UTM: Universal Transver Mercator coordinates

TABLE 5
SUMMARY OF TRAPPING RESULTS FOR WESTERN POND TURTLE TRAPPING FOR LOWER SECTION OF THE SURVEY AREA

Survey	Survey Date	Trap Numbers	Trap Results
1	8/20/2018	Installation of Basking Trap 1	N/A
		Installation of Hoop Trap 2	N/A
		Installation of Hoop Trap 3	N/A
		Installation of Basking Trap 4	N/A
		Installation of Hoop Trap 5	N/A
		Installation of Hoop Trap 6	N/A
		Installation of Hoop Trap 7	N/A
2	8/21/2018	Basking Trap 1	No animals captured
		Hoop Trap 2	No animals captured
		Hoop Trap 3	No animals captured
		Basking Trap 4	No animals captured
		Hoop Trap 5	1 adult male WPTU (carapace width: 113.89 mm; carapace height: 45.77 mm; plastron length: 121.60 mm; weight: 345 g)
		Hoop Trap 6	No animals captured
		Hoop Trap 7	No animals captured
3	8/22/2018	Basking Trap 1	No animals captured
		Hoop Trap 2	1 adult male WPTU (carapace width: 118.40 mm; carapace height: 52.0 mm; plastron length: 134.18 mm; weight: 450 g)
		Hoop Trap 3	1 adult female WPTU (carapace width: 122.10 mm; carapace height: 46.50 mm; plastron length: 127.20 mm; weight: 435 g)
		Basking Trap 4	No animals captured
		Hoop Trap 5	No animals captured
		Hoop Trap 6	No animals captured
		Hoop Trap 7	No animals captured
4	8/23/2018	Basking Trap 1	No animals captured
		Hoop Trap 2	No animals captured
		Hoop Trap 3	No animals captured
		Basking Trap 4	No animals captured
		Hoop Trap 5	No animals captured
		Hoop Trap 6	No animals captured
		Hoop Trap 7	No animals captured

TABLE 5
SUMMARY OF TRAPPING RESULTS FOR WESTERN POND TURTLE TRAPPING FOR LOWER SECTION OF THE SURVEY AREA

Survey	Survey Date	Trap Numbers	Trap Results
5	8/24/2018	Basking Trap 1	No animals captured
		Hoop Trap 2	No animals captured
		Hoop Trap 3	No animals captured
		Basking Trap 4	No animals captured
		Hoop Trap 5	No animals captured
		Hoop Trap 6	No animals captured
		Hoop Trap 7	No animals captured
UTM: Universal Transverse Mercator coordinates; WPTU: Western Pond Turtle; mm: millimeters; g: grams			

DISCUSSION

Habitat throughout the survey area is suitable for western pond turtle, and they could occur anywhere in the survey area. Some areas of the survey area provide higher quality habitat than others. In general, Big Tujunga Reservoir provides lower quality of habitat because it lacks emergent vegetation and riparian canopy cover; it also has limited basking habitat and limited upland habitat for nesting due to surrounding steep cliffs. Upstream of Big Tujunga Reservoir, stream morphology in the upper section of the survey area is limited to a few small shallow pools with shallow stream water. In an above average rain year, the upper section would presumably have more suitable basking pools and greater water depth, and therefore would provide higher quality habitat for western pond turtle than the conditions observed this year under low rainfall conditions. The lower section of the survey area has greater range of stream depths, more canopy cover, more basking sites and undercuts than the reservoir and upper section of the survey area; however, only a few low-velocity areas are deep enough to provide optimal habitat for the western pond turtle. The lower portion of the survey area also has only a limited amount of upland habitat suitable for nesting, due to surrounding steep cliffs.

One western pond turtle was observed in the upper portion of Big Tujunga on May 18, 2018. By late June, the creek was observed almost entirely dry. When creeks dry up in summer, turtles would be expected to travel along the creek until they find a deep pool. During dry conditions, turtles could also stay within mats of algae in shallow pools while other turtles may move into upland habitat adjacent to the creek and bury themselves in loose soil where they will overwinter until temperatures warm up enough for them to become active again. Based on the time of the year and available water downstream, it is most likely that the western pond turtle observed in May moved downstream to Big Tujunga Reservoir to find suitable habitat. No western pond turtles were observed and/or trapped at Big Tujunga Reservoir; however, because this species is often difficult to detect/capture, a few individuals may occur in the Reservoir.

Although there is potential for some western pond turtles to have avoided the traps, the observation of three individuals during the visual surveys and during the trapping is likely an indicator of the small population size of turtles within the survey area. During the 2011 Big Tujunga Reservoir trapping, one juvenile male was captured during the trapping effort (BonTerra 2012). During previous years of focused

surveys, biologists have typically incidentally observed one or two western pond turtles per season (BonTerra 2010; BonTerra Psomas 2016; Psomas 2017), which is consistent with the number of turtles observed during the current effort.

Psomas appreciates the opportunity to assist on this project. If you have any comments or questions, please call Amber Heredia at (714) 751-7373.

Sincerely,
PSOMAS

Amber O. Heredia
Senior Project Manager

Jonathan Aguayo
Senior Biologist (SC-11733)

Enclosures: Exhibits 1–4
Attachment A – Site Photographs
Attachment B – Turtle Trapping Photographs
Attachment C – Survey Data Sheets
Attachment D – California Natural Diversity Database Form

cc: Steve Gibson, CDFW

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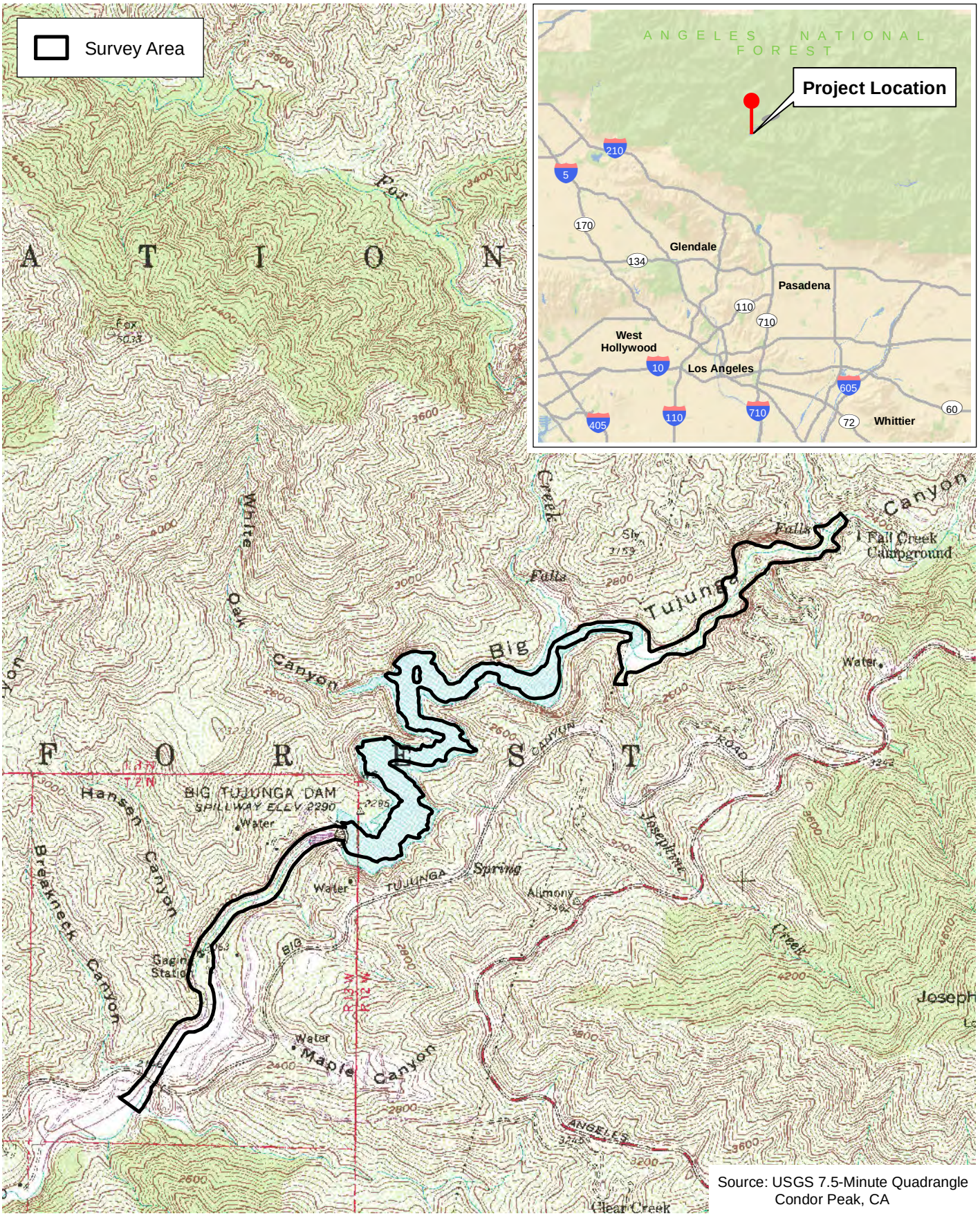

Source: USGS 7.5-Minute Quadrangle
Condor Peak, CA

Regional Location and Local Vicinity

Exhibit 1

Big Tujunga Reservoir Restoration Project

N
W E
S

2,000 1,000 0 2,000
Feet

PSOMAS

(Rev: 12-13-2018 CJS) R:\Projects\DPW\3DPW029312\Graphics\WPT\ex_RL_LV.pdf

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Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J293\MXD\WPT\ex_Survey_Area_20181029.mxd

Survey Area

Exhibit 2

Big Tujunga Reservoir Restoration Project

N W E S

2,000 1,000 0 2,000 Feet

PSOMAS

(Rev: 12-13-2018 CJS) R:\Projects\DPW\3DPW029312\Graphics\WPT\ex_Survey_Area.pdf



Western Pond Turtles Observed During Visual Surveys

Exhibit 3

Big Tujunga Reservoir Restoration Project

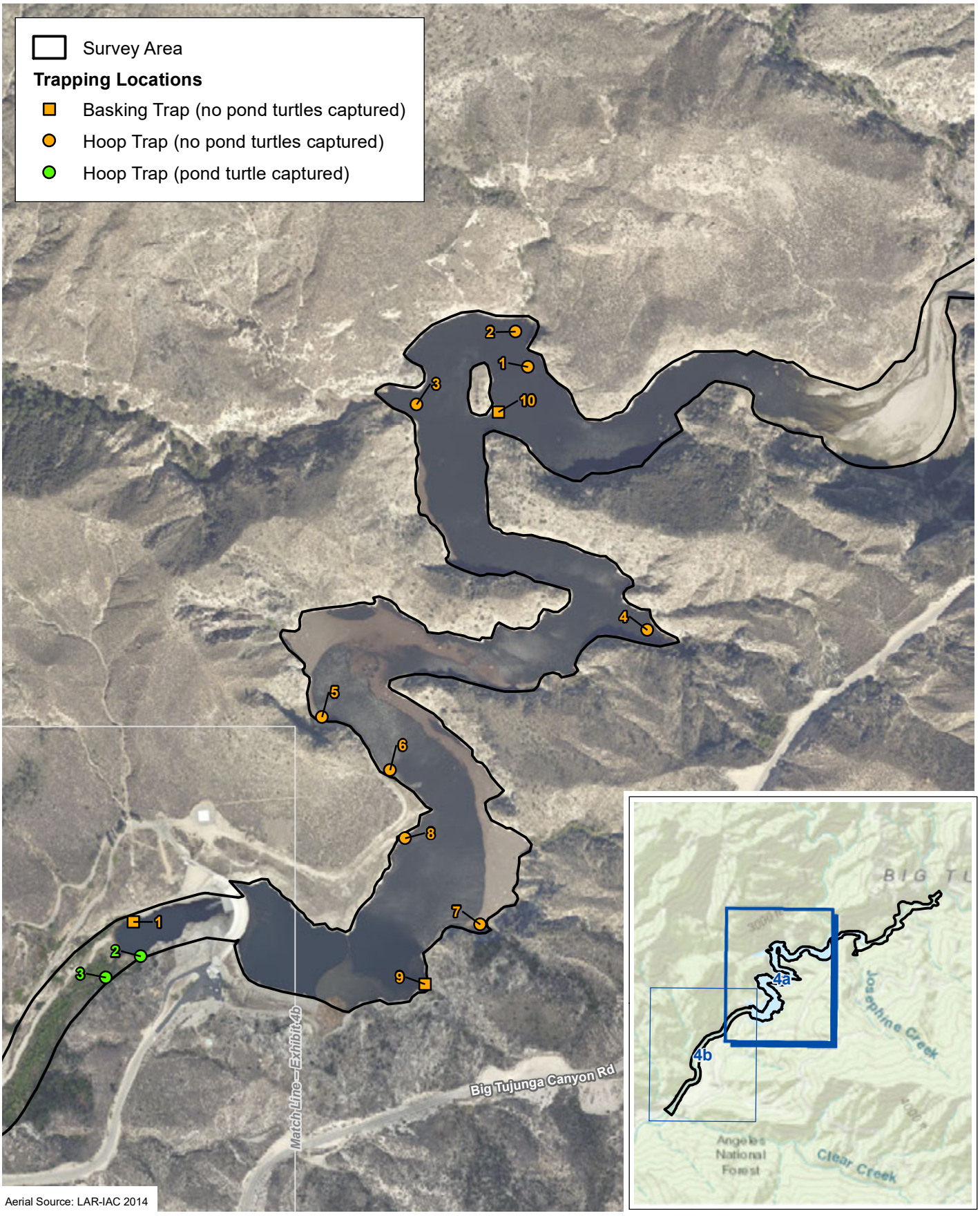
N
W E
S

2,000 1,000 0 2,000 Feet

PSOMAS

(Rev: 12-13-2018 CJS) R:\Projects\DPW\3DPW029312\Graphics\WPT\Ex_survey_results.pdf

D:\Projects\COLADPW\J293\MXD\WPT\Ex_Survey_Results_20181029.mxd



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Turtle Trapping Results — Big Tujunga Reservoir

Exhibit 4a

Big Tujunga Reservoir Restoration Project

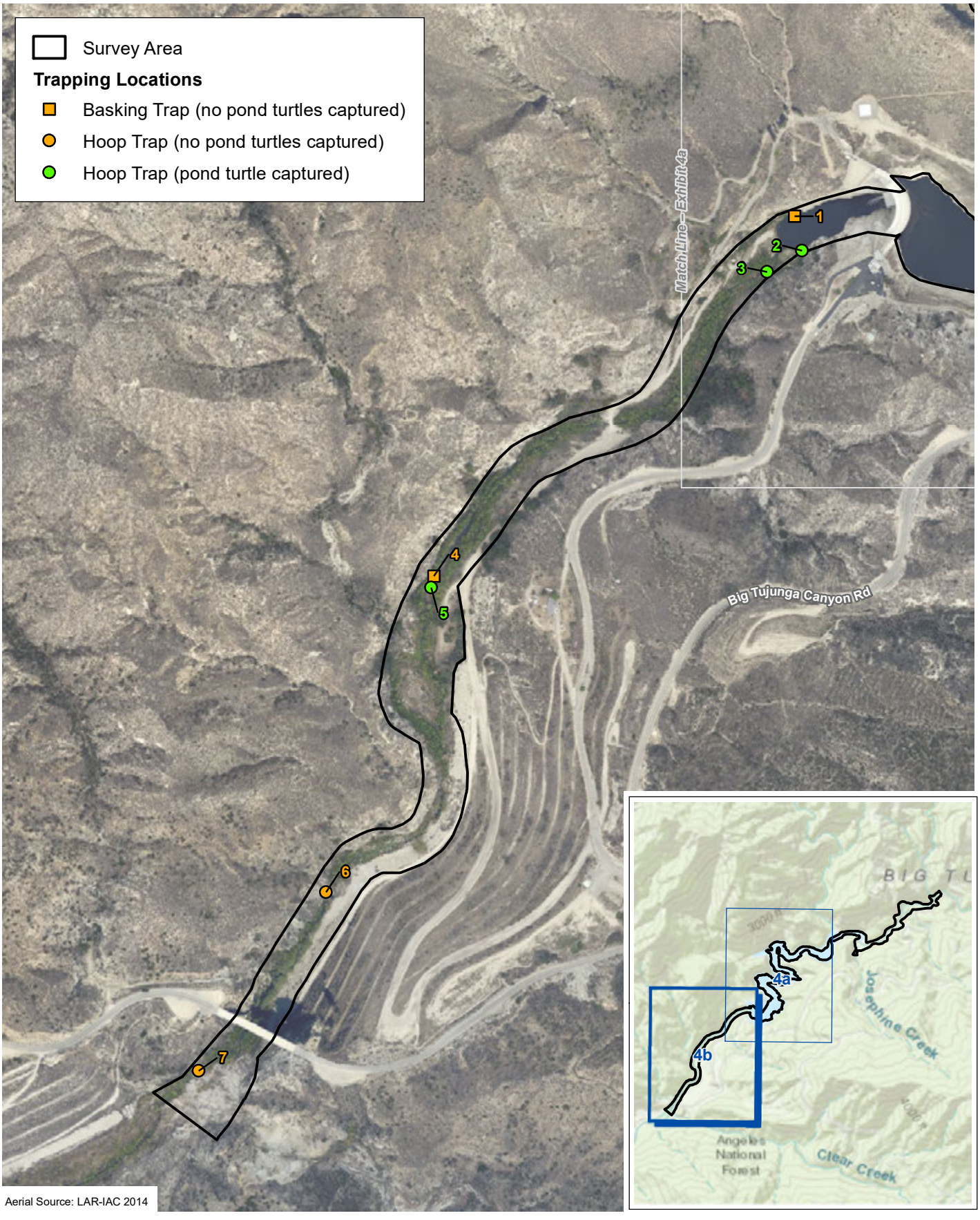
N
W E
S

600 300 0 600

Feet

PSOMAS

(Rev: 12-13-2018 CJS) R:\Projects\DPW\3DPW029312\Graphics\WPT\Ex_Trapping_Results.pdf



D:\Projects\COLADPW\J293\MXD\WPT\Ex_Trapping_Results_20181030.mxd

Turtle Trapping Results — Downstream

Exhibit 4b

Big Tujunga Reservoir Restoration Project

N W E S

600 300 0 600

Feet

PSOMAS

(Rev: 12-13-2018 CJS) R:\Projects\DPW\3DPW029312\Graphics\WPT\Ex_Trapping_Results.pdf

ATTACHMENT A

SITE PHOTOGRAPHS



Representative view of habitat in the upper section of the survey area, upstream of Big Tujunga Reservoir.



Overview of habitat in the lower section of the survey area, downstream of Big Tujunga Dam.

D:\Projects\COLADPWJ293\Graphics\WPT\Ex_photosA_20181029.ai

Site Photographs

Attachment A-1

Big Tujunga Reservoir Restoration Project

PSOMAS

(12/13/18 CJS) R:\Projects\DPW\3DPW029312\Graphics\WPT\



View of an area along Big Tujunga Creek in upper section of the survey area where a western pond turtle was observed on May 18, 2018.



View of an area within plunge pool downstream of Big Tujunga Dam where a western pond turtle was observed on July 31, 2018.

D:\Projects\COLADPWJ293\Graphics\WPT\Ex_photosB_20181029.ai

Site Photographs

Attachment A-2

Big Tujunga Reservoir Restoration Project

PSOMAS

(12/13/18 CJS) R:\Projects\DPW\3DPW029312\Graphics\WPT\

ATTACHMENT B

TURTLE TRAPPING PHOTOGRAPHS



Representative view of installed hoop trap in the Big Tujunga Reservoir.



Representative view of installed basking trap in the Big Tujunga Reservoir.

D:\Projects\COLADPWJ293\Graphics\WPT\Ex_photosC_20181029.ai

Turtle Trapping Photographs

Attachment B-1

Big Tujunga Reservoir Restoration Project

PSOMAS

(12/13/18 CJS) R:\Projects\DPW\3DPW029312\Graphics\WPT\



Representative view of installed hoop trap in the lower section of the survey area.



Representative view of installed basking trap in the lower section of the survey area.

D:\Projects\COLADPWJ293\Graphics\WPT\Ex_photosD_20181029.ai

Turtle Trapping Photographs

Attachment B-2

Big Tujunga Reservoir Restoration Project

PSOMAS

(12/13/18 CJS) R:\Projects\DPW\3DPW029312\Graphics\WPT\



View of the turtle's carapace.



View of the turtle's plastron.



View of turtle's face and head.

View of western pond turtle recovered from Hoop Trap #5 (August 21, 2018) in the lower section of the survey area.

D:\Projects\COLADPWJ293\Graphics\WPT\Ex_photosE_20181029.ai

Western Pond Turtle Photographs

Attachment B-3

Big Tujunga Reservoir Restoration Project

PSOMAS

(12/13/18 CJS) R:\Projects\DPW\3DPW029312\Graphics\WPT\



View of the turtle's carapace.



View of the turtle's plastron.



View of turtle's face and head.

View of western pond turtle recovered from Hoop Trap #2 (August 22, 2018) in the lower section of the survey area.

D:\Projects\COLADPWJ293\Graphics\WPT\Ex_photosF_20181029.ai

Western Pond Turtle Photographs

Attachment B-4

Big Tujunga Reservoir Restoration Project

PSOMAS

(12/13/18 CJS) R:\Projects\DPW\3DPW029312\Graphics\WPT\



View of the turtle's carapace.



View of the turtle's plastron.



View of turtle's face and head.

View of western pond turtle recovered from Hoop Trap #3 (August 22, 2018) in the lower section of the survey area.

D:\Projects\COLADPWJ293\Graphics\WPT\Ex_photosG_20181029.ai

Western Pond Turtle Photographs

Attachment B-5

Big Tujunga Reservoir Restoration Project

PSOMAS

(12/13/18 CJS) R:\Projects\DPW\3DPW029312\Graphics\WPT\

ATTACHMENT C

SURVEY DATA SHEETS

Appendix 2. Paper data form.

Turtle: Trapping Survey Form

Date	8/13/18	Survey Name	BIG TUJUNGA DAM PROJECT			Survey Completed	(Y) N
Project Code		Observer1	JONATHAN A	Obsv1 Task	observer/recorder/processor	Block	
Survey Type	visual/trapping	Observer2	TREVOR B.	Obsv2 Task	observer/recorder/processor	Site	
Start Time	1002	Observer3		Obsv3 Task	observer/recorder/processor	Site Photo	(Y) N
End Time	1432	Observer4		Obsv4 Task	observer/recorder/processor	# photos	

Start Lat		End Lat	
Start Long		End Long	Site
Start Elev		End Elev	Length
Datum		Drainage	

Weather:

Air Temp (°C)	25 - 32
Water Temp (°C)	25.8 - 27.1
Condition	(clear) or few clouds, partly cloudy or variable, cloudy or overcast, fog, mist or drizzle, showers or light rain, heavy rain, sleet or hail, snow, no data
Wind Speed	(<1 calm) 2-3 light air movement, 4-7 light breeze, 8-12 gentle breeze, 13-18 moderate breeze, 19-24 fresh breeze, 25-31 strong breeze, 32-38 near gale, >39 gale and above, no data

All Animals:

	Observ Method	Trap Name (if applicable)	Trap Type (if applicable)	Trap Number (if applicable)	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours
1	audio/hand/trap/vis		HOOP	1	391127, 3796103	1002	N/A	
2	audio/hand/trap/vis		HOOP	2	391118, 3796152			
3	audio/hand/trap/vis		HOOP	3	390973, 3796053			
4	audio/hand/trap/vis		HOOP	4	391287, 3795729			
5	audio/hand/trap/vis		HOOP	5	390838, 3795623			
6	audio/hand/trap/vis		HOOP	6	390931, 3795549			
7	audio/hand/trap/vis		HOOP	7	391053, 3795325			
8	audio/hand/trap/vis		HOOP	8	390951, 3795455			
9	audio/hand/trap/vis		BASKING	9	390985, 3795254			
10	audio/hand/trap/vis		BASKING	10	391085, 3796092	1432		
11	audio/hand/trap/vis							
12	audio/hand/trap/vis							

All Animals (continued):

	Type	Species	Age Category	Disposition				Sex				Length (mm)	Notched		Tissue			Photo	# Photo
1			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
2			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
3			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
4			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
5			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
6			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
7			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
8			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
9			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
10			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
11			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
12			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	

Additional Fields for Pond Turtles:

	Carapace Width (mm)	Carapace Height (mm)	Plastron Length (mm)	Weight (g)	Shell Damag		Type of Shell Damage	Other ID Markings		
1					Y	N		Y	N	
2					Y	N		Y	N	
3					Y	N		Y	N	
4					Y	N		Y	N	
5					Y	N		Y	N	
6					Y	N		Y	N	
7					Y	N		Y	N	
8					Y	N		Y	N	
9					Y	N		Y	N	
10					Y	N		Y	N	
11					Y	N		Y	N	
12					Y	N		Y	N	

Appendix 2. Paper data form (continued).

	Recapture	ID #	Location Within Habitat	Animal Behavior
1	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
2	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
3	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
4	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
5	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
6	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
7	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
8	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
9	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
10	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
11	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
12	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other

Pond Turtle Trap Information:

Trap Name	Trap Type	Trap Number	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours

Temperature Loggers Form:

Logger ID	Lat/Long

Notes: _____

Wind Speed

ID	mph & indicator
0	<1 calm, smoke rises vertically
1	2-3 light air movement
2	4-7 light breeze
3	8-12 gentle breeze
4	13-18 moderate breeze
5	19-24 fresh breeze
6	25-31 strong breeze
7	32-38 near gale
8	>39 gale and above
9	No data

Sky Code

ID	Description
0	Clear or few clouds
1	Partly cloudy or variable
2	Cloudy or overcast
3	Fog
4	Mist or drizzle
5	Showers or light rain
6	Heavy rain
7	Sleet or hail
8	Snow
9	No data

Animal Age Category

A	Adult
J	Juvenile
Mm	Metamorph
L	Larvae
H	Hatchling
Em	Egg/Egg Mass

Disposition

R	Release
D	Dead
E	Escape
C	Collected

General

Y	Yes
N	No
U	Unknown
X	Not Checked

8/14

1 of 2

Appendix 2. Paper data form.

Turtle: Trapping Survey Form

Date	8/14/18	Survey Name	BIG TUJUNGA DAM PROJECT			Survey Completed	(Y) N
Project Code		Observer1	JA	Obsv1 Task	observer/recorder/processor	Block	
Survey Type	visual/(trapping)	Observer2	TB	Obsv2 Task	observer/recorder/processor	Site	
Start Time	0750	Observer3		Obsv3 Task	observer/recorder/processor	Site Photo	(Y) N
End Time	1055	Observer4		Obsv4 Task	observer/recorder/processor	# photos	

Start Lat		End Lat	
Start Long		End Long	Site
Start Elev		End Elev	Length
Datum		Drainage	

Weather:

Air Temp (°C)	20-30
Water Temp (°C)	25.3-25.7
Condition	clear or (few clouds) partly cloudy or variable, cloudy or overcast, fog, mist or drizzle, showers or light rain, heavy rain, sleet or hail, snow, no data
Wind Speed	(<1 calm) 2-3 light air movement, 4-7 light breeze, 8-12 gentle breeze, 13-18 moderate breeze, 19-24 fresh breeze, 25-31 strong breeze, 32-38 near gale, >39 gale and above, no data

All Animals:

	Observ Method	Trap Name (if applicable)	Trap Type (if applicable)	Trap Number (if applicable)	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours
1	audio/hand/trap/vis		HOOP	1	391127, 3796103	N/A	0750	
2	audio/hand/trap/vis		HOOP	2	391110, 3796153			
3	audio/hand/trap/vis		HOOP	3	390973, 3796053			
4	audio/hand/trap/vis		HOOP	4	391287, 3795739			
5	audio/hand/trap/vis		HOOP	5	390838, 3795623			
6	audio/hand/trap/vis		HOOP	6	390931, 3795547			
7	audio/hand/trap/vis		HOOP	7	391052, 3795735			
8	audio/hand/trap/vis		HOOP	8	390951, 3795455			
9	audio/hand/trap/vis		BASKING	9	390985, 3795259			
10	audio/hand/trap/vis		BASKING	10	391085, 3796041		1055	
11	audio/hand/trap/vis							
12	audio/hand/trap/vis							

All Animals (continued):

	Type	Species	Age Category	Disposition				Sex				Length (mm)	Notched		Tissue			Photo	# Photo
1			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
2			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
3			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
4			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
5			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
6			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
7			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
8			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
9			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
10			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
11			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
12			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	

Additional Fields for Pond Turtles:

	Carapace Width (mm)	Carapace Height (mm)	Plastron Length (mm)	Weight (g)	Shell Damag		Type of Shell Damage	Other ID Markings		
1					Y	N		Y	N	
2					Y	N		Y	N	
3					Y	N		Y	N	
4					Y	N		Y	N	
5					Y	N		Y	N	
6					Y	N		Y	N	
7					Y	N		Y	N	
8					Y	N		Y	N	
9					Y	N		Y	N	
10					Y	N		Y	N	
11					Y	N		Y	N	
12					Y	N		Y	N	

8/14

2 of 2

Appendix 2. Paper data form (continued).

	Recapture	ID #	Location Within Habitat	Animal Behavior
1	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
2	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
3	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
4	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
5	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
6	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
7	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
8	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
9	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
10	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
11	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
12	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other

Pond Turtle Trap Information:

Trap Name	Trap Type	Trap Number	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours

Temperature Loggers Form:

Logger ID	Lat/Long

Notes:

Wind Speed

ID	mph & indicator
0	<1 calm, smoke rises vertically
1	2-3 light air movement
2	4-7 light breeze
3	8-12 gentle breeze
4	13-18 moderate breeze
5	19-24 fresh breeze
6	25-31 strong breeze
7	32-38 near gale
8	>39 gale and above
9	No data

Sky Code

ID	Description
0	Clear or few clouds
1	Partly cloudy or variable
2	Cloudy or overcast
3	Fog
4	Mist or drizzle
5	Showers or light rain
6	Heavy rain
7	Sleet or hail
8	Snow
9	No data

Animal Age Category

A	Adult
J	Juvenile
Mm	Metamorph
L	Larvae
H	Hatchling
Em	Egg/Egg Mass

Disposition

R	Release
D	Dead
E	Escape
C	Collected

General

Y	Yes
N	No
U	Unknown
X	Not Checked

8/15

1 of 2

Appendix 2. Paper data form.

Turtle: Trapping Survey Form

Date	8/15/18	Survey Name	BIG TUJUNGA DAM PROJECT			Survey Completed	(Y) N
Project Code		Observer1	JA	Obsv1 Task	observer/recorder/processor	Block	
Survey Type	visual/trapping	Observer2	TB	Obsv2 Task	observer/recorder/processor	Site	
Start Time	0748	Observer3		Obsv3 Task	observer/recorder/processor	Site Photo	(Y) N
End Time	0957	Observer4		Obsv4 Task	observer/recorder/processor	# photos	

Start Lat		End Lat	
Start Long		End Long	Site
Start Elev		End Elev	Length
Datum		Drainage	

Weather:

Air Temp (°C)	20-30
Water Temp (°C)	25.4-25.9
Condition	(clear or few clouds, partly cloudy or variable, cloudy or overcast, fog, mist or drizzle, showers or light rain, heavy rain, sleet or hail, snow, no data
Wind Speed	<1 calm, 2-3 light air movement, 4-7 light breeze, 8-12 gentle breeze, 13-18 moderate breeze, 19-24 fresh breeze, 25-31 strong breeze, 32-38 near gale, >39 gale and above, no data

All Animals:

	Observ Method	Trap Name (if applicable)	Trap Type (if applicable)	Trap Number (if applicable)	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours
1	audio/hand/trap/vis		HOOP	1	SAME AS BEFORE	N/A	0748	
2	audio/hand/trap/vis		HOOP	2				
3	audio/hand/trap/vis		HOOP	3				
4	audio/hand/trap/vis		HOOP	4				
5	audio/hand/trap/vis		HOOP	5				
6	audio/hand/trap/vis		HOOP	6				
7	audio/hand/trap/vis		HOOP	7				
8	audio/hand/trap/vis		HOOP	8				
9	audio/hand/trap/vis		BASKING	9				
10	audio/hand/trap/vis		BASKING	10			0957	
11	audio/hand/trap/vis							
12	audio/hand/trap/vis							

All Animals (continued):

	Type	Species	Age Category	Disposition				Sex				Length (mm)	Notched		Tissue			Photo	# Photo
1			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
2			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
3			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
4			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
5			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
6			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
7			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
8			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
9			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
10			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
11			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
12			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	

Additional Fields for Pond Turtles:

	Carapace Width (mm)	Carapace Height (mm)	Plastron Length (mm)	Weight (g)	Shell Damag		Type of Shell Damage	Other ID Markings		
1					Y	N		Y	N	
2					Y	N		Y	N	
3					Y	N		Y	N	
4					Y	N		Y	N	
5					Y	N		Y	N	
6					Y	N		Y	N	
7					Y	N		Y	N	
8					Y	N		Y	N	
9					Y	N		Y	N	
10					Y	N		Y	N	
11					Y	N		Y	N	
12					Y	N		Y	N	

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Appendix 2. Paper data form (continued).

	Recapture	ID #	Location Within Habitat	Animal Behavior
1	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
2	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
3	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
4	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
5	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
6	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
7	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
8	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
9	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
10	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
11	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
12	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other

Pond Turtle Trap Information:

Trap Name	Trap Type	Trap Number	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours

Temperature Loggers Form:

Logger ID	Lat/Long

Notes:

Wind Speed	
ID	mph & indicator
0	<1 calm, smoke rises vertically
1	2-3 light air movement
2	4-7 light breeze
3	8-12 gentle breeze
4	13-18 moderate breeze
5	19-24 fresh breeze
6	25-31 strong breeze
7	32-38 near gale
8	>39 gale and above
9	No data

Sky Code	
ID	Description
0	Clear or few clouds
1	Partly cloudy or variable
2	Cloudy or overcast
3	Fog
4	Mist or drizzle
5	Showers or light rain
6	Heavy rain
7	Sleet or hail
8	Snow
9	No data

Animal Age Category	
A	Adult
J	Juvenile
Mm	Metamorph
L	Larvae
H	Hatchling
Em	Egg/Egg Mass

Disposition	
R	Release
D	Dead
E	Escape
C	Collected

General	
Y	Yes
N	No
U	Unknown
X	Not Checked

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Appendix 2. Paper data form.

Turtle: Trapping Survey Form

Date	8/16/18	Survey Name	BG TUSUNGA	OBS PROJECT		Survey Completed	(Y) N
Project Code		Observer1	SA	Obsv1 Task	(observer/recorder/processor)	Block	
Survey Type	visual/(trapping)	Observer2	TB	Obsv2 Task	observer/(recorder)/processor	Site	
Start Time	0748	Observer3		Obsv3 Task	observer/recorder/processor	Site Photo	(Y) N
End Time	0940	Observer4		Obsv4 Task	observer/recorder/processor	# photos	

Start Lat		End Lat	
Start Long		End Long	Site
Start Elev		End Elev	Length
Datum		Drainage	

Weather:

Air Temp (°C)	21 - 31
Water Temp (°C)	25.3 - 25.9
Condition	(clear) or few clouds, partly cloudy or variable, cloudy or overcast, fog, mist or drizzle, showers or light rain, heavy rain, sleet or hail, snow, no data
Wind Speed	(≤1 calm), 2-3 light air movement, 4-7 light breeze, 8-12 gentle breeze, 13-18 moderate breeze, 19-24 fresh breeze, 25-31 strong breeze, 32-38 near gale, >39 gale and above, no data

All Animals:

	Observ Method	Trap Name (if applicable)	Trap Type (if applicable)	Trap Number (if applicable)	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours
1	audio/hand/trap/vis		Hoop	1	SAME AS BEFORE	N/A	0748	
2	audio/hand/trap/vis		Hoop	2				
3	audio/hand/trap/vis		Hoop	3				
4	audio/hand/trap/vis		Hoop	4				
5	audio/hand/trap/vis		Hoop	5				
6	audio/hand/trap/vis		Hoop	6				
7	audio/hand/trap/vis		Hoop	7				
8	audio/hand/trap/vis		Hoop	8				
9	audio/hand/trap/vis		BASKING	9				
10	audio/hand/trap/vis		BASKING	10			0940	
11	audio/hand/trap/vis							
12	audio/hand/trap/vis							

All Animals (continued):

	Type	Species	Age Category	Disposition				Sex				Length (mm)	Notched		Tissue			Photo	# Photo
1			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
2			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
3			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
4			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
5			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
6			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
7			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
8			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
9			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
10			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
11			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
12			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	

Additional Fields for Pond Turtles:

	Carapace Width (mm)	Carapace Height (mm)	Plastron Length (mm)	Weight (g)	Shell Damag		Type of Shell Damage	Other ID Markings		
1					Y	N		Y	N	
2					Y	N		Y	N	
3					Y	N		Y	N	
4					Y	N		Y	N	
5					Y	N		Y	N	
6					Y	N		Y	N	
7					Y	N		Y	N	
8					Y	N		Y	N	
9					Y	N		Y	N	
10					Y	N		Y	N	
11					Y	N		Y	N	
12					Y	N		Y	N	

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Appendix 2. Paper data form (continued).

	Recapture	ID #	Location Within Habitat	Animal Behavior
1	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
2	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
3	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
4	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
5	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
6	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
7	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
8	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
9	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
10	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
11	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
12	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other

Pond Turtle Trap Information:

Trap Name	Trap Type	Trap Number	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours

Temperature Loggers Form:

Logger ID	Lat/Long

Notes:

Wind Speed

ID	mph & indicator
0	<1 calm, smoke rises vertically
1	2-3 light air movement
2	4-7 light breeze
3	8-12 gentle breeze
4	13-18 moderate breeze
5	19-24 fresh breeze
6	25-31 strong breeze
7	32-38 near gale
8	>39 gale and above
9	No data

Sky Code

ID	Description
0	Clear or few clouds
1	Partly cloudy or variable
2	Cloudy or overcast
3	Fog
4	Mist or drizzle
5	Showers or light rain
6	Heavy rain
7	Sleet or hail
8	Snow
9	No data

Animal Age Category

A	Adult
J	Juvenile
Mm	Metamorph
L	Larvae
H	Hatchling
Em	Egg/Egg Mass

Disposition

R	Release
D	Dead
E	Escape
C	Collected

General

Y	Yes
N	No
U	Unknown
X	Not Checked

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Appendix 2. Paper data form.

Turtle: Trapping Survey Form

Date	8/17/18	Survey Name	BIG TUJUNGA DAM PROJECT			Survey Completed	(Y) N
Project Code		Observer1	JA	Obsv1 Task	observer/recorder/processor	Block	
Survey Type	visual/(trapping)	Observer2	TB	Obsv2 Task	observer/recorder/processor	Site	
Start Time	0746	Observer3		Obsv3 Task	observer/recorder/processor	Site Photo	(Y) N
End Time	0938	Observer4		Obsv4 Task	observer/recorder/processor	# photos	

Start Lat		End Lat	
Start Long		End Long	Site
Start Elev		End Elev	Length
Datum		Drainage	

Weather:

Air Temp (°C)	22-31
Water Temp (°C)	25.8-26.3
Condition	(clear) or few clouds, partly cloudy or variable, cloudy or overcast, fog, mist or drizzle, showers or light rain, heavy rain, sleet or hail, snow, no data
Wind Speed	<1 calm, (2-3 light air movement, 4-7 light breeze, 8-12 gentle breeze, 13-18 moderate breeze, 19-24 fresh breeze, 25-31 strong breeze, 32-38 near gale, >39 gale and above, no data

All Animals:

	Observ Method	Trap Name (if applicable)	Trap Type (if applicable)	Trap Number (if applicable)	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours
1	audio/hand/trap/vis		HOOP	1	SAME AS BEFORE	NA	0746	
2	audio/hand/trap/vis		HOOP	2				
3	audio/hand/trap/vis		HOOP	3				
4	audio/hand/trap/vis		HOOP	4				
5	audio/hand/trap/vis		HOOP	5				
6	audio/hand/trap/vis		HOOP	6				
7	audio/hand/trap/vis		HOOP	7				
8	audio/hand/trap/vis		HOOP	8				
9	audio/hand/trap/vis		BASKING	9				
10	audio/hand/trap/vis		BASKING	10			0938	
11	audio/hand/trap/vis							
12	audio/hand/trap/vis							

All Animals (continued):

	Type	Species	Age Category	Disposition				Sex				Length (mm)	Notched		Tissue			Photo	# Photo
1			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
2			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
3			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
4			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
5			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
6			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
7			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
8			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
9			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
10			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
11			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
12			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	

Additional Fields for Pond Turtles:

	Carapace Width (mm)	Carapace Height (mm)	Plastron Length (mm)	Weight (g)	Shell Damag		Type of Shell Damage	Other ID Markings		
1					Y	N		Y	N	
2					Y	N		Y	N	
3					Y	N		Y	N	
4					Y	N		Y	N	
5					Y	N		Y	N	
6					Y	N		Y	N	
7					Y	N		Y	N	
8					Y	N		Y	N	
9					Y	N		Y	N	
10					Y	N		Y	N	
11					Y	N		Y	N	
12					Y	N		Y	N	

Appendix 2. Paper data form (continued).

	Recapture		ID #	Location Within Habitat	Animal Behavior
1	Y	N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
2	Y	N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
3	Y	N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
4	Y	N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
5	Y	N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
6	Y	N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
7	Y	N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
8	Y	N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
9	Y	N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
10	Y	N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
11	Y	N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
12	Y	N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other

Pond Turtle Trap Information:

Trap Name	Trap Type	Trap Number	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours

Temperature Loggers Form:

Logger ID	Lat/Long

Notes:

Wind Speed

ID	mph & indicator
0	<1 calm, smoke rises vertically
1	2-3 light air movement
2	4-7 light breeze
3	8-12 gentle breeze
4	13-18 moderate breeze
5	19-24 fresh breeze
6	25-31 strong breeze
7	32-38 near gale
8	>39 gale and above
9	No data

Sky Code

ID	Description
0	Clear or few clouds
1	Partly cloudy or variable
2	Cloudy or overcast
3	Fog
4	Mist or drizzle
5	Showers or light rain
6	Heavy rain
7	Sleet or hail
8	Snow
9	No data

Animal Age Category

A	Adult
J	Juvenile
Mm	Metamorph
L	Larvae
H	Hatchling
Em	Egg/Egg Mass

Disposition

R	Release
D	Dead
E	Escape
C	Collected

General

Y	Yes
N	No
U	Unknown
X	Not Checked

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Appendix 2. Paper data form.

Turtle: Trapping Survey Form

Date	8/20/18	Survey Name	BIG TUJUNGA DAM - DOWNSTREAM			Survey Completed	(Y) N
Project Code		Observer1	JONATHAN A.	Obsv1 Task	observer/recorder/processor	Block	
Survey Type	visual/(trapping)	Observer2	TREVOR B.	Obsv2 Task	observer/recorder/processor	Site	
Start Time	0747	Observer3		Obsv3 Task	observer/recorder/processor	Site Photo	(Y) N
End Time	1115	Observer4		Obsv4 Task	observer/recorder/processor	# photos	

Start Lat		End Lat	
Start Long		End Long	Site
Start Elev		End Elev	Length
Datum		Drainage	

Weather:

Air Temp (°C)	20 - 29
Water Temp (°C)	19.5 - 19.9
Condition	(clear) or few clouds, partly cloudy or variable, cloudy or overcast, fog, mist or drizzle, showers or light rain, heavy rain, sleet or hail, snow, no data
Wind Speed	(<1 calm,) 2-3 light air movement, 4-7 light breeze, 8-12 gentle breeze, 13-18 moderate breeze, 19-24 fresh breeze, 25-31 strong breeze, 32-38 near gale, >39 gale and above, no data

All Animals:

	Observ Method	Trap Name (if applicable)	Trap Type (if applicable)	Trap Number (if applicable)	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours
1	audio/hand/(trap)/vis		BASKING	1	390575, 3795349	0747	NA	
2	audio/hand/(trap)/vis		HOOP	2	390584, 3795296	"	"	
3	audio/hand/(trap)/vis		HOOP	3	390526, 3795267	"	"	
4	audio/hand/(trap)/vis		BASKING	4	390073, 3794852	"	"	
5	audio/hand/(trap)/vis		HOOP	5	390069, 3794826	"	"	
6	audio/hand/(trap)/vis		HOOP	6	389920, 3794918	"	"	
7	audio/hand/(trap)/vis		HOOP	7	389742, 3794173	1115	"	
8	audio/hand/trap/vis							
9	audio/hand/trap/vis							
10	audio/hand/trap/vis							
11	audio/hand/trap/vis							
12	audio/hand/trap/vis							

All Animals (continued):

	Type	Species	Age Category	Disposition				Sex				Length (mm)	Notched		Tissue			Photo	# Photo
1			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
2			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
3			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
4			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
5			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
6			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
7			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
8			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
9			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
10			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
11			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
12			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	

Additional Fields for Pond Turtles:

	Carapace Width (mm)	Carapace Height (mm)	Plastron Length (mm)	Weight (g)	Shell Damag		Type of Shell Damage	Other ID Markings		
1					Y	N		Y	N	
2					Y	N		Y	N	
3					Y	N		Y	N	
4					Y	N		Y	N	
5					Y	N		Y	N	
6					Y	N		Y	N	
7					Y	N		Y	N	
8					Y	N		Y	N	
9					Y	N		Y	N	
10					Y	N		Y	N	
11					Y	N		Y	N	
12					Y	N		Y	N	

Appendix 2. Paper data form (continued).

	Recapture	ID #	Location Within Habitat	Animal Behavior
1	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
2	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
3	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
4	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
5	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
6	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
7	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
8	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
9	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
10	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
11	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
12	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other

Pond Turtle Trap Information:

Trap Name	Trap Type	Trap Number	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours

Temperature Loggers Form:

Logger ID	Lat/Long

Notes:

Wind Speed	
ID	mph & indicator
0	<1 calm, smoke rises vertically
1	2-3 light air movement
2	4-7 light breeze
3	8-12 gentle breeze
4	13-18 moderate breeze
5	19-24 fresh breeze
6	25-31 strong breeze
7	32-38 near gale
8	>39 gale and above
9	No data

Sky Code	
ID	Description
0	Clear or few clouds
1	Partly cloudy or variable
2	Cloudy or overcast
3	Fog
4	Mist or drizzle
5	Showers or light rain
6	Heavy rain
7	Sleet or hail
8	Snow
9	No data

Animal Age Category	
A	Adult
J	Juvenile
Mm	Metamorph
L	Larvae
H	Hatchling
Em	Egg/Egg Mass

Disposition	
R	Release
D	Dead
E	Escape
C	Collected

General	
Y	Yes
N	No
U	Unknown
X	Not Checked

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Appendix 2. Paper data form.

Turtle: Trapping Survey Form

Date	8/21/18	Survey Name	B16 TOWNAP OAK - DOWNSTREAM			Survey Completed	(Y) N
Project Code		Observer1	JA	Obsv1 Task	observer/recorder/processor	Block	
Survey Type	visual/(trapping)	Observer2	TB	Obsv2 Task	observer/recorder/processor	Site	
Start Time	0744	Observer3		Obsv3 Task	observer/recorder/processor	Site Photo	(Y) N
End Time	0940	Observer4		Obsv4 Task	observer/recorder/processor	# photos	

Start Lat		End Lat	
Start Long		End Long	Site
Start Elev		End Elev	Length
Datum		Drainage	

Weather:

Air Temp (°C)	19-24
Water Temp (°C)	19.5-19.7
Condition	(clear) or few clouds, partly cloudy or variable, cloudy or overcast, fog, mist or drizzle, showers or light rain, heavy rain, sleet or hail, snow, no data
Wind Speed	(<1 calm), 2-3 light air movement, 4-7 light breeze, 8-12 gentle breeze, 13-18 moderate breeze, 19-24 fresh breeze, 25-31 strong breeze, 32-38 near gale, >39 gale and above, no data

All Animals:

	Observ Method	Trap Name (if applicable)	Trap Type (if applicable)	Trap Number (if applicable)	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours
1	audio/hand/trap/vis		BASKING	1	SAME AS BEFORE	NA	0744	
2	audio/hand/trap/vis		HOOP	2				
3	audio/hand/trap/vis		HOOP	3				
4	audio/hand/trap/vis		BASKING	4				
5	audio/hand/trap/vis		HOOP	5				
6	audio/hand/trap/vis		HOOP	6				
7	audio/hand/trap/vis		HOOP	7			0940	
8	audio/hand/trap/vis							
9	audio/hand/trap/vis							
10	audio/hand/trap/vis							
11	audio/hand/trap/vis							
12	audio/hand/trap/vis							

All Animals (continued):

	Type	Species	Age Category	Disposition				Sex				Length (mm)	Notched		Tissue			Photo	# Photo
1	T	WPT	(A),J,Mm,L1,L2,H,Em,U	(R)	D	E	C	(M)	F	U	X	121.60	(Y)	N	Y	(N)	U	Y/N	3
2			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
3			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
4			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
5			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
6			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
7			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
8			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
9			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
10			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
11			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
12			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	

Additional Fields for Pond Turtles:

	Carapace Width (mm)	Carapace Height (mm)	Plastron Length (mm)	Weight (g)	Shell Damage		Type of Shell Damage	Other ID Markings		
1	113.89	95.77	121.60	345	Y	(N)		(Y)	N	LIGHT THROAT, CONCAVE PLASTRON
2					Y	N		Y	N	
3					Y	N		Y	N	
4					Y	N		Y	N	
5					Y	N		Y	N	
6					Y	N		Y	N	
7					Y	N		Y	N	
8					Y	N		Y	N	
9					Y	N		Y	N	
10					Y	N		Y	N	
11					Y	N		Y	N	
12					Y	N		Y	N	

Appendix 2. Paper data form (continued).

	Recapture	ID #	Location Within Habitat	Animal Behavior
1	Y (N)	WPT 1	(pool), run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
2	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
3	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
4	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
5	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
6	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
7	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
8	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
9	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
10	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
11	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
12	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other

Pond Turtle Trap Information:

Trap Name	Trap Type	Trap Number	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours
HOOP TRAP 5	HOOP	5	390069, 3799836		0830	

Temperature Loggers Form:

Logger ID	Lat/Long

Notes: NOTCHED ON 1ST CLOCKWISE SCUTE

* LONG NAILS, CONCAVE PLASTRON, LOW DOME CARAPACE, LIGHT THROAT, VENT PAST CARAPACE

↳ INDICATING A MALE

Wind Speed

ID	mph & indicator
0	<1 calm, smoke rises vertically
1	2-3 light air movement
2	4-7 light breeze
3	8-12 gentle breeze
4	13-18 moderate breeze
5	19-24 fresh breeze
6	25-31 strong breeze
7	32-38 near gale
8	>39 gale and above
9	No data

Sky Code

ID	Description
0	Clear or few clouds
1	Partly cloudy or variable
2	Cloudy or overcast
3	Fog
4	Mist or drizzle
5	Showers or light rain
6	Heavy rain
7	Sleet or hail
8	Snow
9	No data

Animal Age Category

A	Adult
J	Juvenile
Mm	Metamorph
L	Larvae
H	Hatchling
Em	Egg/Egg Mass

Disposition

R	Release
D	Dead
E	Escape
C	Collected

General

Y	Yes
N	No
U	Unknown
X	Not Checked

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Appendix 2. Paper data form.

Turtle: Trapping Survey Form

Date	8/22/18	Survey Name	BIG TWIN 6A DAM - DOWNSTREAM			Survey Completed	(Y) N
Project Code		Observer1	JA	Obsv1 Task	observer/recorder/processor	Block	
Survey Type	visual/trapping	Observer2	TO	Obsv2 Task	observer/recorder/processor	Site	
Start Time	0732	Observer3		Obsv3 Task	observer/recorder/processor	Site Photo	(Y) N
End Time	1010	Observer4		Obsv4 Task	observer/recorder/processor	# photos	

Start Lat		End Lat	
Start Long		End Long	Site
Start Elev		End Elev	Length
Datum		Drainage	

Weather:

Air Temp (°C)	17-26
Water Temp (°C)	19.4 - 19.3
Condition	(clear or few clouds, partly cloudy or variable, cloudy or overcast, fog, mist or drizzle, showers or light rain, heavy rain, sleet or hail, snow, no data
Wind Speed	(<1 calm, 2-3 light air movement, 4-7 light breeze, 8-12 gentle breeze, 13-18 moderate breeze, 19-24 fresh breeze, 25-31 strong breeze, 32-38 near gale, >39 gale and above, no data

All Animals:

	Observ Method	Trap Name (if applicable)	Trap Type (if applicable)	Trap Number (if applicable)	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours
1	audio/hand/trap/vis		BASKING	1	SAME AS BEFORE	NA	0732	
2	audio/hand/trap/vis		HOOP	2				
3	audio/hand/trap/vis		HOOP	3				
4	audio/hand/trap/vis		BASKING	4				
5	audio/hand/trap/vis		HOOP	5				
6	audio/hand/trap/vis		HOOP	6				
7	audio/hand/trap/vis		HOOP	7			1010	
8	audio/hand/trap/vis							
9	audio/hand/trap/vis							
10	audio/hand/trap/vis							
11	audio/hand/trap/vis							
12	audio/hand/trap/vis							

All Animals (continued):

	Type	Species	Age Category	Disposition				Sex				Length (mm)	Notched		Tissue			Photo	# Photo
1	T	WPT	(A),J,Mm,L1,L2,H,Em,U	(R)	D	E	C	(M)	F	U	X	134.18	(Y)	N	Y	(N)	U	(Y)/N	3
2	T	WPT	(A),J,Mm,L1,L2,H,Em,U	(R)	D	E	C	M	(F)	U	X	127.20	(Y)	N	Y	(N)	U	(Y)/N	2
3			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
4			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
5			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
6			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
7			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
8			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
9			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
10			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
11			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
12			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	

Additional Fields for Pond Turtles:

	Carapace Width (mm)	Carapace Height (mm)	Plastron Length (mm)	Weight (g)	Shell Damage		Type of Shell Damage	Other ID Markings		
1	118.40	52.0	134.18	450	Y	(N)		(Y)	N	LIGHT THROAT, LOW DOME CARAPACE
2	122.10	46.50	127.20	435	Y	(N)		(Y)	N	MOTTLING THROAT
3					Y	N		Y	N	
4					Y	N		Y	N	
5					Y	N		Y	N	
6					Y	N		Y	N	
7					Y	N		Y	N	
8					Y	N		Y	N	
9					Y	N		Y	N	
10					Y	N		Y	N	
11					Y	N		Y	N	
12					Y	N		Y	N	

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Appendix 2. Paper data form (continued).

	Recapture	ID #	Location Within Habitat	Animal Behavior
1	Y (N)		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
2	Y (N)		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
3	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
4	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
5	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
6	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
7	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
8	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
9	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
10	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
11	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
12	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other

Pond Turtle Trap Information:

Trap Name	Trap Type	Trap Number	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours
HOOP TRAP 2	HOOP	2	390584, 3795296		0800	
HOOP TRAP 3	HOOP	3	390536, 3795267		0900	

Temperature Loggers Form:

Logger ID	Lat/Long

Notes: *NOTCHED ON 2ND CLOCKWISE SCUTE AS #2

#2 LIGHT THROAT, RAISED, ARREAS TOWARDS THE REAR OF THE HEAD, LOW DOME CARAPACE, LONG NAILS, VENT PAST CARAPACE
→ MALE

#3 *NOTCHED 3RD SCUTE
LOT OF MARKINGS/MOTTLING THROAT, SHORT NAILS, HIGH DOME, VENT BEFORE CARAPACE
→ FEMALE

Wind Speed

ID	mph & indicator
0	<1 calm, smoke rises vertically
1	2-3 light air movement
2	4-7 light breeze
3	8-12 gentle breeze
4	13-18 moderate breeze
5	19-24 fresh breeze
6	25-31 strong breeze
7	32-38 near gale
8	>39 gale and above
9	No data

Sky Code

ID	Description
0	Clear or few clouds
1	Partly cloudy or variable
2	Cloudy or overcast
3	Fog
4	Mist or drizzle
5	Showers or light rain
6	Heavy rain
7	Sleet or hail
8	Snow
9	No data

Animal Age Category

A	Adult
J	Juvenile
Mm	Metamorph
L	Larvae
H	Hatchling
Em	Egg/Egg Mass

Disposition

R	Release
D	Dead
E	Escape
C	Collected

General

Y	Yes
N	No
U	Unknown
X	Not Checked

8/23

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Appendix 2. Paper data form.

Turtle: Trapping Survey Form

Date	8/23/18	Survey Name	BIG TUJUNGA DAM - DOWNSTREAM			Survey Completed	(Y) N
Project Code		Observer1	JA	Obsv1 Task	observer/recorder/processor	Block	
Survey Type	visual/(trapping)	Observer2	TB	Obsv2 Task	observer/recorder/processor	Site	
Start Time	0729	Observer3		Obsv3 Task	observer/recorder/processor	Site Photo	(Y) N
End Time	0859	Observer4		Obsv4 Task	observer/recorder/processor	# photos	

Start Lat		End Lat			
Start Long		End Long		Site	
Start Elev		End Elev		Length	
Datum		Drainage			

Weather:

Air Temp (°C)	18-23
Water Temp (°C)	19.1-18.6
Condition	clear or few clouds, partly cloudy or variable, cloudy or overcast, fog, mist or drizzle, showers or light rain, heavy rain, sleet or hail, snow, no data
Wind Speed	<1 calm, 2-3 light air movement, 4-7 light breeze, 8-12 gentle breeze, 13-18 moderate breeze, 19-24 fresh breeze, 25-31 strong breeze, 32-38 near gale, >39 gale and above, no data

All Animals:

	Observ Method	Trap Name (if applicable)	Trap Type (if applicable)	Trap Number (if applicable)	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours
1	audio/hand/trap/vis		BASKING	1	SAME AS BEFORE	N/A	0729	
2	audio/hand/trap/vis		HOOP	2				
3	audio/hand/trap/vis		HOOP	3				
4	audio/hand/trap/vis		BASKING	4				
5	audio/hand/trap/vis		HOOP	5				
6	audio/hand/trap/vis		HOOP	6				
7	audio/hand/trap/vis		HOOP	7			0859	
8	audio/hand/trap/vis							
9	audio/hand/trap/vis							
10	audio/hand/trap/vis							
11	audio/hand/trap/vis							
12	audio/hand/trap/vis							

All Animals (continued):

	Type	Species	Age Category	Disposition				Sex				Length (mm)	Notched		Tissue			Photo	# Photo
1			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
2			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
3			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
4			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
5			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
6			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
7			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
8			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
9			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
10			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
11			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
12			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	

Additional Fields for Pond Turtles:

	Carapace Width (mm)	Carapace Height (mm)	Plastron Length (mm)	Weight (g)	Shell Damag		Type of Shell Damage	Other ID Markings		
1					Y	N		Y	N	
2					Y	N		Y	N	
3					Y	N		Y	N	
4					Y	N		Y	N	
5					Y	N		Y	N	
6					Y	N		Y	N	
7					Y	N		Y	N	
8					Y	N		Y	N	
9					Y	N		Y	N	
10					Y	N		Y	N	
11					Y	N		Y	N	
12					Y	N		Y	N	

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Appendix 2. Paper data form (continued).

	Recapture	ID #	Location Within Habitat	Animal Behavior
1	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
2	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
3	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
4	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
5	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
6	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
7	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
8	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
9	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
10	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
11	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
12	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other

Pond Turtle Trap Information:

Trap Name	Trap Type	Trap Number	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours

Temperature Loggers Form:

Logger ID	Lat/Long

Notes:

Wind Speed	
ID	mph & indicator
0	<1 calm, smoke rises vertically
1	2-3 light air movement
2	4-7 light breeze
3	8-12 gentle breeze
4	13-18 moderate breeze
5	19-24 fresh breeze
6	25-31 strong breeze
7	32-38 near gale
8	>39 gale and above
9	No data

Sky Code	
ID	Description
0	Clear or few clouds
1	Partly cloudy or variable
2	Cloudy or overcast
3	Fog
4	Mist or drizzle
5	Showers or light rain
6	Heavy rain
7	Sleet or hail
8	Snow
9	No data

Animal Age Category	
A	Adult
J	Juvenile
Mm	Metamorph
L	Larvae
H	Hatchling
Em	Egg/Egg Mass

Disposition	
R	Release
D	Dead
E	Escape
C	Collected

General	
Y	Yes
N	No
U	Unknown
X	Not Checked

Appendix 2. Paper data form.

Turtle: Trapping Survey Form

Date	8/24/18	Survey Name	BIG TUJUNGA DAM			Survey Completed	Y	N
Project Code		Observer1	JA	Obsv1 Task	observer/recorder/processor	Block		
Survey Type	visual/trapping	Observer2	TB	Obsv2 Task	observer/recorder/processor	Site		
Start Time	0710	Observer3		Obsv3 Task	observer/recorder/processor	Site Photo	Y	N
End Time	0933	Observer4		Obsv4 Task	observer/recorder/processor	# photos		

Start Lat		End Lat	
Start Long		End Long	Site
Start Elev		End Elev	Length
Datum		Drainage	

Weather:

Air Temp (°C)	21 – 23
Water Temp (°C)	18.7 – 18.3
Condition	clear or few clouds, partly cloudy or variable, cloudy or overcast, fog, mist or drizzle, showers or light rain, heavy rain, sleet or hail, snow, no data
Wind Speed	<1 calm, 2-3 light air movement, 4-7 light breeze, 8-12 gentle breeze, 13-18 moderate breeze, 19-24 fresh breeze, 25-31 strong breeze, 32-38 near gale, >39 gale and above, no data

All Animals:

	Observ Method	Trap Name (if applicable)	Trap Type (if applicable)	Trap Number (if applicable)	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours
1	audio/hand/trap/vis		BASKING	1	390575, 3795344	N/A	0710	
2	audio/hand/trap/vis		HOOP	2	390584, 3795296			
3	audio/hand/trap/vis		HOOP	3	390536, 3795067			
4	audio/hand/trap/vis		BASKING	4	390073, 3794852			
5	audio/hand/trap/vis		HOOP	5	390069, 3794826			
6	audio/hand/trap/vis		HOOP	6	389932, 3794918			
7	audio/hand/trap/vis		HOOP	7	389792, 3794773		0933	
8	audio/hand/trap/vis							
9	audio/hand/trap/vis							
10	audio/hand/trap/vis							
11	audio/hand/trap/vis							
12	audio/hand/trap/vis							

All Animals (continued):

	Type	Species	Age Category	Disposition				Sex				Length (mm)	Notched		Tissue			Photo	# Photo
1			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
2			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
3			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
4			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
5			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
6			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
7			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
8			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
9			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
10			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
11			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	
12			A,J,Mm,L1,L2,H,Em,U	R	D	E	C	M	F	U	X		Y	N	Y	N	U	Y/N	

Additional Fields for Pond Turtles:

	Carapace Width (mm)	Carapace Height (mm)	Plastron Length (mm)	Weight (g)	Shell Damag		Type of Shell Damage	Other ID Markings		
1					Y	N		Y	N	
2					Y	N		Y	N	
3					Y	N		Y	N	
4					Y	N		Y	N	
5					Y	N		Y	N	
6					Y	N		Y	N	
7					Y	N		Y	N	
8					Y	N		Y	N	
9					Y	N		Y	N	
10					Y	N		Y	N	
11					Y	N		Y	N	
12					Y	N		Y	N	

Appendix 2. Paper data form (continued).

	Recapture	ID #	Location Within Habitat	Animal Behavior
1	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
2	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
3	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
4	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
5	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
6	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
7	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
8	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
9	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
10	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
11	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other
12	Y N		pool, run, riffle, bank, upland, splashzone, other	calling, basking, foraging, mating, hiding, other

Pond Turtle Trap Information:

Trap Name	Trap Type	Trap Number	Lat/Long	Date/Time Trap Set	Date/Time Trap Pulled	Elapsed Hours

Temperature Loggers Form:

Logger ID	Lat/Long

Notes:

Wind Speed

ID	mph & indicator
0	<1 calm, smoke rises vertically
1	2-3 light air movement
2	4-7 light breeze
3	8-12 gentle breeze
4	13-18 moderate breeze
5	19-24 fresh breeze
6	25-31 strong breeze
7	32-38 near gale
8	>39 gale and above
9	No data

Sky Code

ID	Description
0	Clear or few clouds
1	Partly cloudy or variable
2	Cloudy or overcast
3	Fog
4	Mist or drizzle
5	Showers or light rain
6	Heavy rain
7	Sleet or hail
8	Snow
9	No data

Animal Age Category

A	Adult
J	Juvenile
Mm	Metamorph
L	Larvae
H	Hatchling
Em	Egg/Egg Mass

Disposition

R	Release
D	Dead
E	Escape
C	Collected

General

Y	Yes
N	No
U	Unknown
X	Not Checked

ATTACHMENT D

CALIFORNIA NATURAL DIVERSITY DATABASE FORM

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/22/2018

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Emys marmorata*

Common Name: western pond turtle

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 3-6 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

3 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Habitat along Big Tujunga Creek including Big Tujunga Reservoir, from Big Tujunga Reservoir upstream to Fall Creek, and from Big Tujunga Dam downstream to approximately 500 feet downstream of the Big Tujunga Canyon Road bridge

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2230-2370 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: **NAD27** ☐ **NAD83** ☑ **WGS84** ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates: Visual: WPT1: 392666, 3796621 (5/18/18); WPT2: 390579, 3795325 (7/31/18); WPT3: 390061, 3794834 (7/31/18)
Trapping: WPT4: 390069, 3794836 (8/21/18); WPT5: 390584, 3795296 (8/22/18); WPT6: 390536, 3795267 (8/22/18)

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Upstream of the reservoir, riparian vegetation along Big Tujunga Creek that is dominated by willows (Salix spp.) with scattered white alder (Alnus rhombifolia) trees. The understory vegetation includes, but is not limited to, mule fat (Baccharis salicifolia), cocklebur (Xanthium strumarium), and broad-leaved cattail (Typha latifolia). Downstream of the dam, relatively dense and continuous willow riparian forest dominated by Fremont cottonwood, white alder, arroyo willow (Salix lasiolepsis), and red willow (S. laevigata). Common understory species include mule fat, hoary nettle (Urtica dioica ssp. holosericea), and mugwort (Artemisia douglasiana). Shallow soils.

Other rare taxa seen at THIS site on THIS date:
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats: potential landslides

Comments: 3 individuals were observed during visual surveys; 3 individuals (2 males and one female) were caught during trapping sessions.

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Familiarity with species, visually

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

APPENDIX B-7

FOCUSED PLANT SURVEY LETTER REPORT

BonTerra CONSULTING
225 South Lake Avenue, Suite 1000 Pasadena, CA 91101
T: (626) 351-2000 F: (626) 351-2030 | www.BonTerraConsulting.com

December 5, 2011

Mr. Philip Siongco
Water Resources Division
Department of Public Works
County of Los Angeles
900 South Fremont Avenue
Alhambra, California 91802-1460

VIA EMAIL AND U.S. MAIL
PSIONGCO@dpw.lacounty.gov

Subject: Results of 2011 Focused Plant Surveys for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles County, California

Dear Mr. Siongco:

This Letter Report presents the findings of 2011 focused plant surveys conducted for the Big Tujunga Reservoir Sediment Removal Project (hereafter referred to as "the Proposed Project") in Los Angeles County, California (Exhibit 1).

Survey Area

Big Tujunga Canyon is located on the southern edge of the San Gabriel Mountains within the Angeles National Forest, and is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute topographic quadrangle at Township 3 North, Range 12 West, Sections 29, 31, and 32 (Exhibit 2). The survey area for special status plants consists of the proposed sediment removal area within the reservoir, the haul route downstream of Big Tujunga Dam, and the proposed fill areas within the existing Maple Canyon Sediment Placement Site (SPS) with a 100-foot buffer around these areas.

Topography in the survey area consists of sheer cliffs and steep slopes to the canyon bottom; elevations range from approximately 2,150 to 3,400 feet above mean sea level (msl). The survey area and surrounding vicinity consist of open space within the Angeles National Forest.

Soils in the survey area consist of Trigo; granitic substratum-Modjeska families association (5 to 60 percent slopes); Rock outcrop-Chilao family-Haploxerolls, warm association (15 to 120 percent slopes); Typic Xerorthents, warm (55 to 90 percent slopes); and Olete-Kilburn-Etsel families complex (50 to 80 percent slopes) (Exhibit 3).

METHODS

Botanical surveys were floristic in nature and conducted following the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009). A literature search was conducted to identify special status plants and habitats known to occur in the vicinity of the survey area. Sources reviewed include the USGS Sunland, Condor Peak, Chilao Flat, Burbank, Pasadena, and Mount Wilson 7.5-minute quadrangles in the California Native Plant Society's (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2011) and the California Department of Fish and Game's (CDFG's) California Natural Diversity Database (CNDDB) (CDFG 2011).

Reference populations were monitored for annual and difficult-to-detect target species to ensure that the scheduled surveys were comprehensive and conducted during the appropriate blooming period for these species, as shown in Table 1. Reference populations of CNPS List 3 and 4 species, and perennial species that are readily observable were not monitored. Known reference populations of Plummer's mariposa lily (*Calochortus plummerae*), California satintail (*Imperata brevifolia*), fragrant pitcher sage (*Lepechinia fragrans*), Davidson's bush-mallow (*Malacothamnus davidsonii*), and Greata's aster (*Symphyotrichum greatae*) were monitored to confirm their flowering status and to verify that project surveys were conducted during the appropriate blooming period for these species. Based on the reference survey results, the project surveys were conducted during a time frame when the target plant species were observable.

TABLE 1
SPECIAL STATUS PLANT SPECIES REFERENCE POPULATIONS

Species	Status	Date Checked	General Location
Malacothamnus davidsonii Davidson's bush-mallow	Flowering	April 20, 2011	Lower Big Tujunga Canyon, Sunland, California
Calochortus plummerae Plummer's mariposa lily	Flowering	June 9, 2011	Van Tassel Ridge, Azusa, California
Lepechinia fragrans fragrant pitcher sage	Flowering	June 13, 2011	Survey Area
Symphyotrichum greatae Greata's aster	Flowering	August 15, 2011	Monte Cristo Creek, Angeles National Forest
Imperata brevifolia California satintail	Flowering	August 26, 2011	Wildwood picnic area, Angeles National Forest

According to the National Weather Service (NWS), the region (data taken from Burbank) received 19.72 inches of precipitation this season (i.e., July 1, 2010–June 30, 2011), which is 113 percent of the average precipitation between 1971 and 2000 (NWS 2011). Rainfall was recorded at above-average levels throughout the Los Angeles Basin, with many areas receiving the highest rainfall since the 2005–2006 season (NWS 2011).

All potentially suitable habitats for special status plant species within the survey area were systematically surveyed during the site visits. Target species consisted of special status plant species known to occur in the vicinity and with potentially suitable habitat present in the survey area (Table 1). The special status plant species survey was conducted on April 20 and 27, 2011, by BonTerra Consulting Senior Botanist Robert Allen and Consulting Botanist David Bramlet; June 13, 2011, by Mr. Bramlet and Consulting Botanist Sandy Leatherman; and June 15, 16, and August 26, 2011, by Mr. Bramlet. The total number of person-hours spent was 69 hours.

All plant species observed were recorded in field notes. Plant species were identified in the field or collected for later identification. Plants were identified to the taxonomic level necessary to determine whether or not they are a special status species. Plants were identified using taxonomic keys, descriptions, and illustrations in Baldwin et al. (2011), Hickman (1993), and Munz (1974). Taxonomy and nomenclature follows Baldwin et al. (2011), Hickman (1993), and current scientific journals for scientific and common names.

For each special status species population observed, data was collected on the number and phenology of individuals and microsite characteristics such as slope, aspect, soil texture, surrounding habitat, and associated species.

SITE DESCRIPTION

The following vegetation types and land covers were observed in the survey area: coastal sage scrub, chaparral (with chamise chaparral, scrub oak chaparral, and mixed chaparral subassociations), California annual grassland, disturbed freshwater seep, riparian herb, willow riparian scrub, willow riparian forest, white alder – Fremont cottonwood – willow riparian forest, California sycamore woodland, coast live oak stands, bigcone Douglas-fir – canyon live oak woodland (forest), open water, streambed, cliff, and developed (Exhibit 4). Many of these areas were burned in the 2009 Station Fire, but are now recovering.

Coastal Sage Scrub

Coastal sage scrub vegetation is uncommon in the survey area, but was located near some of the disturbed areas below and adjacent to the dam. Common shrub species in this vegetation type include deerweed (*Acmispon glaber* [*Lotus scoparius*]), leafy California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), thick-leaved yerba santa (*Eriodictyon crassifolium*), poodle-dog bush (*Eriodictyon parryi* [*Turricula parryi*]), California-aster (*Corethrogyne filaginifolia* [*Lessingia filaginifolia*]), black sage (*Salvia mellifera*), white sage (*Salvia apiana*), and our Lord's candle (*Hesperoyucca whipplei* [*Yucca whipplei*]).

Chaparral

Chaparral vegetation is the most common vegetation type within the survey area, occurring along most canyon slopes. This vegetation type is highly variable and has been delineated into various subassociations. The following subassociations were observed in the survey area: (1) chamise chaparral; (2) scrub oak chaparral; and (3) mixed chaparral. Chamise chaparral occurs along most of the canyon slopes in the survey area. This vegetation type has a relatively open canopy and is dominated by the large shrubs chamise (*Adenostoma fasciculatum var. fasciculatum*) and thick-leaved yerba santa. Scrub oak chaparral occurs on the north-facing slopes in the Maple Canyon SPS and on some slopes above the dam. This vegetation type is dominated by scrub oak (*Quercus berberidifolia*) in some areas that were previously burned and is currently regrowing; other areas are dominated by canyon live oak (*Quercus chrysolepis*). The understory includes species such as California poppy (*Eschscholzia californica*), ripgut brome (*Bromus diandrus*), and foxtail chess (*Bromus madritensis* ssp. *rubens*). Mixed chaparral occurs on canyon slopes throughout the survey area. These areas contain a mix of chaparral species, and vegetative cover is sparser than in the chamise chaparral with more exposed rock and bare ground present. Most of the slopes on which this vegetation type is found burned during the 2009 Station Fire and shrubs and trees are commonly sprouting from the base.

California Annual Grassland

California annual grassland occurs between the switchbacks of the access roads near the entrance to the dam facilities and the Maple Canyon SPS. This area has been previously used to deposit sediment from the reservoir. This vegetation type is dominated by a variety of non-native grasses including ripgut brome, foxtail chess, and wild oat (*Avena* sp.). Some scattered California poppy, Spanish broom (*Spartium junceum*), scrub oak, and pine (*Pinus* sp.) are also present.

Disturbed Freshwater Seep

Disturbed freshwater seep occurs downstream of Big Tujunga Reservoir on the slope north of the canyon bottom. While there is an underlying native component of species such as thick-leaved yerba santa, stream orchid (*Epipactis gigantea*), cryptantha (*Cryptantha* sp.), and deerweed, the area contains a large proportion of non-native species such as crofton weed

(*Ageratina adenophora*), Mediterranean schismus (*Schismus barbatus*), fescue (*Festuca* sp. [*Vulpia* sp.]), foxtail chess, ripgut brome, wild oat, red-stemmed filaree (*Erodium cicutarium*), and tree tobacco (*Nicotiana glauca*).

Riparian Herb

Riparian herb vegetation occurs along the canyon bottom above Big Tujunga Reservoir. This vegetation type is generally dominated by herbaceous species such as seep monkeyflower (*Mimulus guttatus*), bentgrass (*Agrostis* sp.), smilo grass (*Piptatherum miliaceum*), long-leaved rush (*Juncus macrophyllus*), great marsh evening primrose (*Oenothera elata*), great water speedwell (*Veronica anagallis-aquatica*), water cress (*Nasturtium officinale* [*Rorippa nasturtium-aquaticum*]), common beggar-ticks (*Bidens pilosa*), annual beard grass (*Polypogon monspeliensis*), willow weed (*Persicaria lapathifolia* [*Polygonum lapathifolium*]), crofton weed, white sweetclover (*Melilotus alba*), scarlet monkeyflower (*Mimulus cardinalis*), barnyard grass (*Echinochloa crus-galli*), false daisy (*Eclipta prostrata*), and tall umbrella-sedge (*Cyperus eragrostis*).

Willow Riparian Scrub

Willow riparian scrub occurs along the canyon bottom and up some side drainages above Big Tujunga Reservoir. This vegetation type is dominated by arroyo willow (*Salix lasiolepis*) and mule fat (*Baccharis salicifolia*) with lesser amounts of red willow (*Salix laevigata*) and black willow (*Salix gooddingii*). The understory contains western poison oak (*Toxicodendron diversilobum*), mugwort (*Artemisia douglasiana*), branching phacelia (*Phacelia ramosissima*), crofton weed, and white sweetclover.

Willow Riparian Forest

Willow riparian forest occurs at the canyon bottom downstream of the dam. This vegetation type is dominated by a mix of arroyo willow and Goodding's black willow with an understory containing tree tobacco, ripgut brome, and chaparral nightshade (*Solanum xanti*). A few scattered white alder (*Alnus rhombifolia*) and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) are also present. This vegetation type burned during the 2009 Station Fire, and willow trees are re-sprouting from the base.

White Alder – Fremont Cottonwood – Willow Riparian Forest

White alder – Fremont cottonwood – willow riparian forest occurs along some side drainages above Big Tujunga Reservoir. This vegetation type is composed of white alder, Fremont cottonwood, red willow, black willow, and Pacific willow (*Salix lasiandra* var. *lasiandra* [*Salix lucida* ssp. *lasiandra*]), with some tall arroyo willows.

California Sycamore Woodland

California sycamore woodland occurs in smaller drainages within the Maple Canyon SPS. This vegetation type is dominated by scattered stands of California sycamore with arroyo willow, black willow, and red willow in the overstory. Other shrubs and perennial herbs in the understory consist of California brickellbush (*Brickellia californica*), narrow-leaved fuchsia (*Epilobium canum*), branching phacelia, everlasting (*Pseudognaphalium canescens* [*Gnaphalium canescens*]), seep monkeyflower, bentgrass, and showy monkeyflower (*Mimulus floribundus*).

Coast Live Oak Stands

A few stands of coast live oak individuals occur in the survey area. The stand along the access road leading to the Maple Canyon SPS has an understory of chamise, thick-leaved yerba santa, our Lord's candle, black sage, deerweed, and chaparral nightshade. The stand along the access road downstream of the dam contains a sparse understory of non-native grasses with much bare ground. No significant fire damage to oak trees was noted during the field survey.

Bigcone Douglas-fir – Canyon Live Oak Woodland (Forest)

Bigcone Douglas-fir – canyon live oak woodland (forest) occurs on the steep slopes above Big Tujunga Reservoir. This vegetation type is dominated by bigcone Douglas-fir (*Pseudotsuga macrocarpa*) and canyon live oak. This area was inaccessible during the surveys, but other species expected to be present include those found in the mixed chaparral, such as scrub oak and birch-leaf mountain-mahogany (*Cercocarpus betuloides* var. *betuloides*).

Open Water

Open water occurs upstream of Big Tujunga Dam along the active channel. Water levels were high during the initial survey and made much of the canyon (upstream of the dam) inaccessible. Water levels decreased over the course of the season, and the areas above the dam were more accessible. Open water downstream of the dam that was flowing through the willow riparian forest is not included in this category because of the willow canopy and relatively limited extent of open water.

Streambed

Areas mapped as streambed are the portions of Big Tujunga Creek that are currently unvegetated and adjacent to the current active channel. Some of the areas consist of gravel or sandbars while other areas contain woody debris or sediment deposits. Some scattered vegetation, including old "islands" of broad-leaved cattail (*Typha latifolia*) or germinating herbaceous species, are also present in the streambed; these vegetated areas are too small and patchy to be mapped separately.

Cliff

Cliff faces occur on the steep slopes throughout the survey area. These areas are rocky and largely unvegetated. No impacts are expected to this vegetation type as it occurs outside of the proposed sediment excavation limits.

Ornamental

Ornamental plantings along the existing roads include common oleander (*Nerium oleander*), gum (*Eucalyptus* sp.), pine, and coast live oak.

Developed

Developed areas occur throughout the lower portion of the survey area. This consists of the dam facilities, access roads, debris piles, concrete canyon walls, and riprap.

SURVEY RESULTS

Four special status plant species were observed during focused surveys: Plummer's mariposa lily, fragrant pitcher sage, San Gabriel oak, and Greata's aster. Table 2 summarizes the survey results and characterizes the habitat suitability for each special status plant species in the survey area. A list of all plants observed during the 2011 surveys is included in Appendix A.

Special status plant observations are discussed in more detail below and are shown in Exhibit 5. Voucher specimens were collected and deposited in the herbarium at Rancho Santa Ana Botanical Gardens. Representative photographs of each species are included in Appendix B. Details on individual populations are included in Appendix C. A CNDDB Field Survey Form for each species' occurrences is included in Appendix D.

TABLE 2
SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR IN THE VICNITY OF THE SURVEY AREA

Species	Status[a]				Likelihood for Occurrence
	USFWS	CDFG	CNPS	USFS	
Astragalus brauntonii Braunton's milk-vetch	FE	—	1B.1	—	Not expected to occur; outside known range.
Atriplex parishii Parish's brittlescale	—	—	1B.1	—	Not expected to occur; no suitable habitat.
Berberis nevinii Nevin's barberry	FE	SE	1B.1	—	May occur; potentially suitable habitat. Not observed during focused surveys.
California macrophylla round-leaved filaree	—	—	1B.1	—	Not expected to occur; no suitable habitat.
Calochortus clavatus var. *gracilis* slender mariposa lily	—	—	1B.2	FSS	May occur; potentially suitable habitat. Not observed during focused surveys.
***Calochortus plummerae* Plummer's mariposa lily**	**—**	**—**	**1B.2**	**FSS**	**Suitable habitat present. Observed during focused surveys.**
Calochortus striatus alkali mariposa lily	—	—	1B.2	FSS	Not expected to occur; no suitable habitat; outside known range.
Castilleja gleasonii Mount Gleason paintbrush	—	SR	1B.2	FSS	Not expected to occur; no suitable habitat; outside known range.
Centromadia parryi ssp. *australis* southern tarplant	—	—	1B.1	—	Not expected to occur; no suitable habitat.
Chorizanthe parryi var. *fernandina* San Fernandino Valley spineflower	FC	SE	1B.1	FSS	Not expected to occur; outside known range.
Chorizanthe parryi var. *parryi* Parry's spineflower	—	—	1B.1	FSS	May occur; potentially suitable habitat. Not observed during focused surveys.
Cladium californicum California saw-grass	—	—	2.2	—	May occur; potentially suitable habitat. Not observed during focused surveys.
Dodecahema leptoceras slender-horned spineflower	FE	SE	1B.1	—	Not expected to occur; no suitable habitat.
Dudleya multicaulis many-stemmed dudleya	—	—	1B.2	FSS	Not expected to occur; no suitable habitat.
Galium grande San Gabriel bedstraw	—	—	1B.2	FSS	Not expected to occur; no suitable habitat.
Helianthus nuttallii ssp. *parishii* Los Angeles sunflower	—	—	1A	—	Not expected to occur; no suitable habitat; presumed extinct.
Horkelia cuneata ssp. *puberula* mesa horkelia	—	—	1B.1	FSS	May occur; potentially suitable habitat. Not observed during focused surveys.
Imperata brevifolia California satintail	—	—	2.1	FSS	May occur; potentially suitable habitat. Not observed during focused surveys.

TABLE 2 (Continued)
SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR IN THE VICNITY OF THE SURVEY AREA

Species	Status[a]				Likelihood for Occurrence
	USFWS	CDFG	CNPS	USFS	
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields	—	—	1B.1	—	Not expected to occur; no suitable habitat.
***Lepechinia fragrans* fragrant pitcher sage**	**—**	**—**	**4.2**	**FSS**	**Suitable habitat present. Observed during focused surveys.**
Lepidium virginicum var. *robinsonii* Robinson's pepper-grass	—	—	1B.2	—	Not expected to occur; no suitable habitat.
Linanthus concinnus San Gabriel linanthus	—	—	1B.2	FSS	Not expected to occur; outside known elevational range.
Malacothamnus davidsonii Davidson's bush-mallow	—	—	1B.2	—	May occur; potentially suitable habitat. Not observed during focused surveys.
Muhlenbergia californica California muhly	—	—	4.3	—	Not expected to occur; no suitable habitat.
Opuntia basilaris var. *brachyclada* short-joint beavertail	—	—	1B.2	—	Not expected to occur; no suitable habitat.
Pseudognaphalium leucocephalum white rabbit-tobacco	—	—	2.2	—	May occur; potentially suitable habitat. Not observed during focused surveys.
***Quercus durata* var. *gabrielensis* San Gabriel oak**	**—**	**—**	**4.2**	—	**Suitable habitat present. Observed during focused surveys.**
Ribes divaricatum var. *parishii* Parish's gooseberry	—	—	1A	—	Not expected to occur; no suitable habitat; presumed extinct.
***Symphyotrichum greatae* Greata's aster**	**—**	**—**	**1B.3**	—	**Suitable habitat present. Observed during focused surveys.**
Symphyotrichum defoliatum San Bernardino aster	—	—	1B.2	FSS	May occur; potentially suitable habitat. Not observed during focused surveys.
Thelypteris puberula var. *sonorensis* Sonoran maiden fern	—	—	2.2	FSS	May occur; potentially suitable habitat. Not observed during focused surveys.

[a] **Status Definitions**

Federal (USFWS)
FE Endangered
FC Candidate

State (CDFG)
SE Endangered
SR Rare

Federal (USFS)
FSS Forest Service Sensitive

California Native Plant Society (CNPS) List Categories
List 1A Plants Presumed Extinct in California
List 1B Plants Rare, Threatened, or Endangered in California and Elsewhere
List 2 Plants Rare, Threatened, or Endangered in California But More Common Elsewhere
List 4 Plants of Limited Distribution – A Watch List

California Native Plant Society (CNPS) Threat Code Extensions
None Plants lacking any threat information
.1 Seriously Endangered in California (over 80% of occurrences threatened; high degree and immediacy of threat)
.2 Fairly Endangered in California (20–80% of occurrences threatened)
.3 Not Very Threatened in California (low degree/immediacy of threat or no current threats known)

Agency Abbreviations:
CDFG: California Department of Fish and Game
CNPS: California Native Plant Society
USFS: United States Forest Service
USFWS: United States Fish and Wildlife Service

PROJECT IMPACTS

A preliminary discussion of project impacts is presented below. The proposed impact area is still being developed and may change prior to issuance of the project's environmental document. Table 3 summarizes the Proposed Project's potential impact on special status plant species that were observed during the survey.

TABLE 3
SUMMARY OF SPECIAL STATUS PLANT SPECIES OCCURRENCES WITHIN SURVEY AREA

Species	Number of Occurrences		Total Individual Plants		Mitigation Required
	Within Survey Area	Within Impact Boundary	Within Survey Area	Within Impact Boundary	
Calochortus plummerae Plummer's mariposa lily	5	2 (40%)	30	25 (83%)	yes, if impacted[1]
Lepechinia fragrans fragrant pitcher sage	3	3 (100%)	14	14 (100%)	yes, if impacted[1]
Symphyotrichum greatae Greata's aster	2	0 (0%)	5	0 (0%)	no[2]
Quercus durata var. *gabrielensis* San Gabriel oak	3	3 (100%)	48	48 (100%)	no[3]

[1] Plummer's mariposa lily and fragrant pitcher plant occur in portions of the Maple Canyon SPS, but outside of the expected footprint for sediment placement.
[2] Greata's aster is located adjacent to the route for transporting sediment to Maple Canyon SPS and no impacts are expected to this species.
[3] San Gabriel oak is a CNPS List 4 species. Impacts to List 4 species do not typically require mitigation under CEQA. This species is also located outside of the expected footprint for sediment placement.

Plummer's Mariposa Lily

Plummer's mariposa lily is a CNPS List 1B.2 species and is listed as a sensitive species for the Angeles National Forest by the U.S. Forest Service (USFS). It typically blooms between May and July (CNPS 2011). This perennial bulbiferous herb occurs in coastal sage scrub; dry, rocky chaparral; and yellow-pine forest at elevations between sea level and approximately 5,580 feet above msl (Baldwin et al. 2011). This species is known from the South Coast and Peninsular Ranges (Baldwin et al. 2011). Thirty individuals were observed in five populations in the survey area on rocky cliff faces and burned chaparral (Exhibit 5). Three populations are located along the haul route between Big Tujunga Reservoir and the Maple Canyon SPS, and two others are in the extreme upper portions of the Maple Canyon SPS. The plants along the haul route are not expected to be affected by the Proposed Project because no ground disturbing activities are planned for this area. The populations located within the Maple Canyon SPS are not expected to be impacted as they occur outside of the expected footprint for sediment placement. Potential impacts on Plummer's mariposa lily would be considered potentially significant under the California Environmental Quality Act (CEQA), and therefore, may require mitigation. Additionally, Plummer's mariposa lily is listed as USFS Sensitive by the Angeles National Forest; therefore, impacts to this species may require mitigation under the National Environmental Policy Act (NEPA) and/or as a condition of a USFS Special Use Permit for the Proposed Project.

Fragrant Pitcher Sage

Fragrant pitcher sage is a CNPS List 4.2 species and is listed as a sensitive species for the Angeles National Forest by the U.S. Forest Service (USFS). It typically blooms between March and October (CNPS 2011). This perennial shrub occurs in chaparral vegetation at elevations between sea level and approximately 4,265 feet above msl (Baldwin et al. 2011). It is known from the Western Transverse Ranges, the San Gabriel Mountains, the South Coast, and the northern Channel Islands (Baldwin et al. 2011). Fourteen individuals were observed in three populations in the survey area (Exhibit 5) in mixed-scrub oak chaparral and coastal sage scrub in the survey area. These populations are located in the Maple Canyon SPS though no impacts are expected as these populations are located outside of the planned footprint for sediment placement. Fragrant pitcher sage is listed as USFS Sensitive by the Angeles National Forest; therefore, impacts to this species may require mitigation under the NEPA and/or as a condition of a USFS Special Use Permit for the Proposed Project.

Greata's Aster

Greata's aster is a CNPS List 1B.3 species. It typically blooms between June and October (CNPS 2011). This rhizomatous perennial herb occurs in damp places in canyons at elevations between approximately 985 and 6,560 feet above msl (Baldwin et al. 2011). It is known from the south slopes of the San Gabriel Mountains (Baldwin et al. 2011). Five individuals were observed in two populations in freshwater seep in the survey area (Exhibit 5). These populations are located along the haul route between Big Tujunga Reservoir and the Maple Canyon SPS and are not expected to be affected by the proposed Project because no ground disturbing activities are planned for this area. Therefore, no mitigation would be necessary.

San Gabriel Oak

San Gabriel oak is a CNPS List 4.2 species. It occurs on granitic soil in chaparral at elevations between approximately 1,475 and 3,280 feet above msl (Baldwin et al. 2011). It is known from the southeast Western Transverse Ranges and south slopes of the San Gabriel Mountains (Baldwin et al. 2011). Forty-eight individuals were observed in three populations in the Maple Canyon SPS in mixed chaparral, chamise chaparral, and burned mixed chaparral (Exhibit 5). These populations are located outside of the expected footprint for sediment placement and no impacts are anticipated. This species is on a "watch list" for plants of limited distribution. Due to the relatively common distribution of this species in the region, any potential impacts are not expected to reduce its regional populations to below self-sustaining levels. Therefore, potential impacts would likely be considered adverse but less than significant under CEQA and mitigation would not be required.

RECOMMENDATIONS

Recommended mitigation measures for Plummer's mariposa lily and fragrant pitcher sage include the following:

- ***Avoidance.*** Populations shall be avoided to the extent possible.
- ***Compensation.*** If avoidance is not possible, a potential mitigation strategy is the off-site purchase of mitigation sites that contain substantial populations of the species in question. The potential mitigation sites shall be in open spaces and shall be permanently preserved to complement existing open space areas.

- ***Propagation.*** If avoidance and compensation are not viable options, then a program will be developed to collect and transplant seeds/bulbs to an appropriate mitigation site. A mitigation plan would be developed to include the following topics: (1) identification of an appropriate mitigation site; (2) methods of seed/bulb collection and application/ transplant; (3) methods for site maintenance and monitoring; and (4) a description of performance standards that will indicate successful completion of the mitigation program.

Recommended mitigation measures for San Gabriel oak include the following:

- ***Avoidance.*** Populations shall be avoided to the extent possible.

- ***Propagation.*** If avoidance is not a viable option, then a program should be developed to collect acorns from San Gabriel oaks within the impact area for use in revegetation efforts associated with the Proposed Project's mitigation requirements. Possible future threats to on-site preserved special status species include horticultural plant collection, access road widening and maintenance, fire clearance, additional sediment removal, fire, erosion, and increased distribution of non-native invasive plant species. Any special status plants preserved on site should be protected from these threats to the extent practicable through the use of best management practices to minimize fire, erosion, and the spread of invasive non-native plant species.

If you have any comments or questions, please call David Hughes at (626) 351-2000.

Sincerely,

BONTERRA CONSULTING

for David T. Hughes
Senior Project Manager

for Robert L. Allen
Senior Botanist

Enclosures: Exhibit 1 – Project Location
Exhibit 2 – U.S. Geological Survey 7.5-Minute Quadrangle
Exhibit 3 – Soil Types
Exhibit 4 – Vegetation Types and Other Areas
Exhibit 5 – Special Status Plant Species Locations
Appendix A – Plant Compendium
Appendix B – Special Status Plant Photographs
Appendix C – Special Status Plant Population Details
Appendix D – California Natural Diversity Database Forms

cc: David Bramlet
Sandy Leatherman

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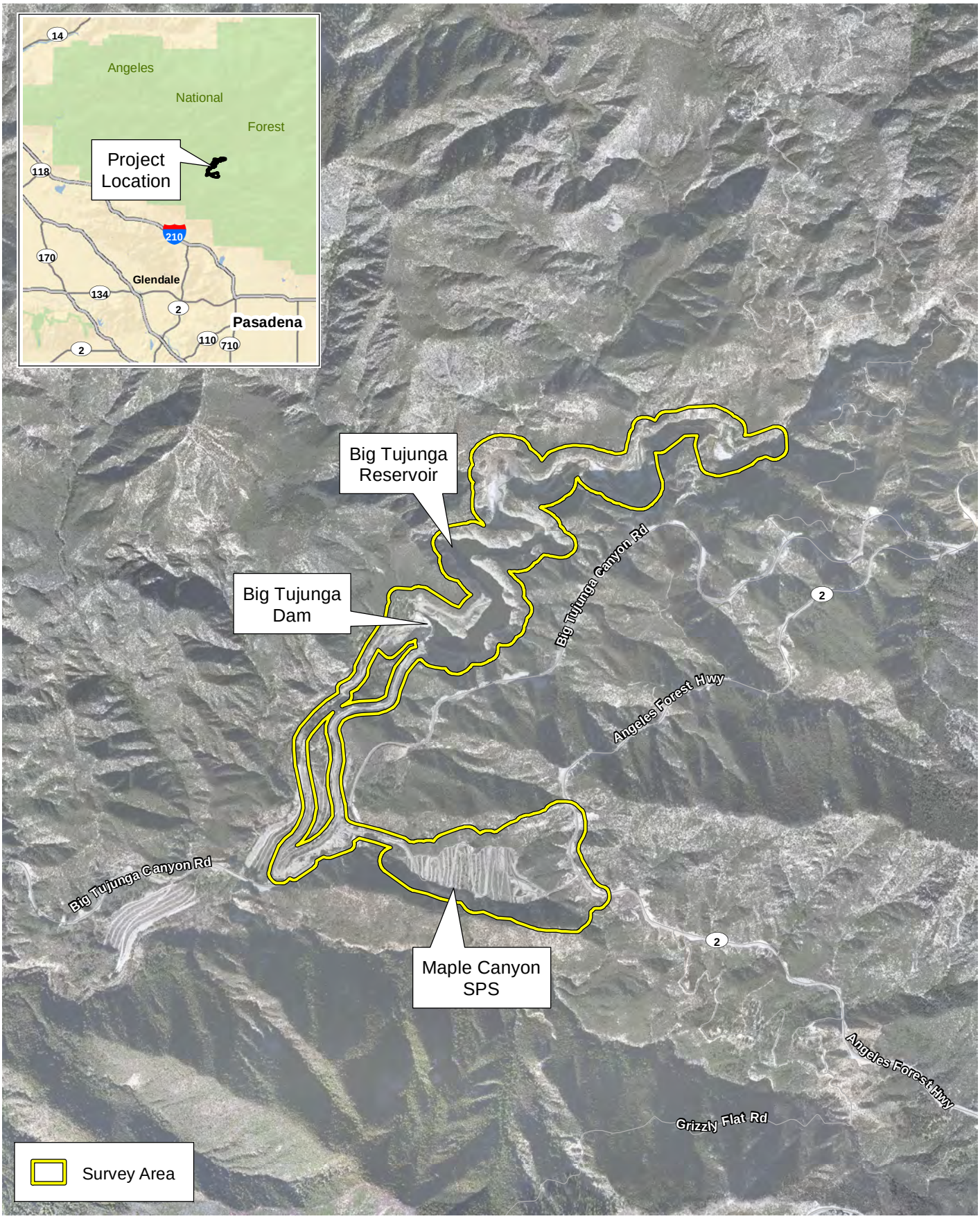

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Project Location

Exhibit 1

Big Tujunga Reservoir Sediment Removal Project

N W E S

2,000 1,000 0 2,000 Feet

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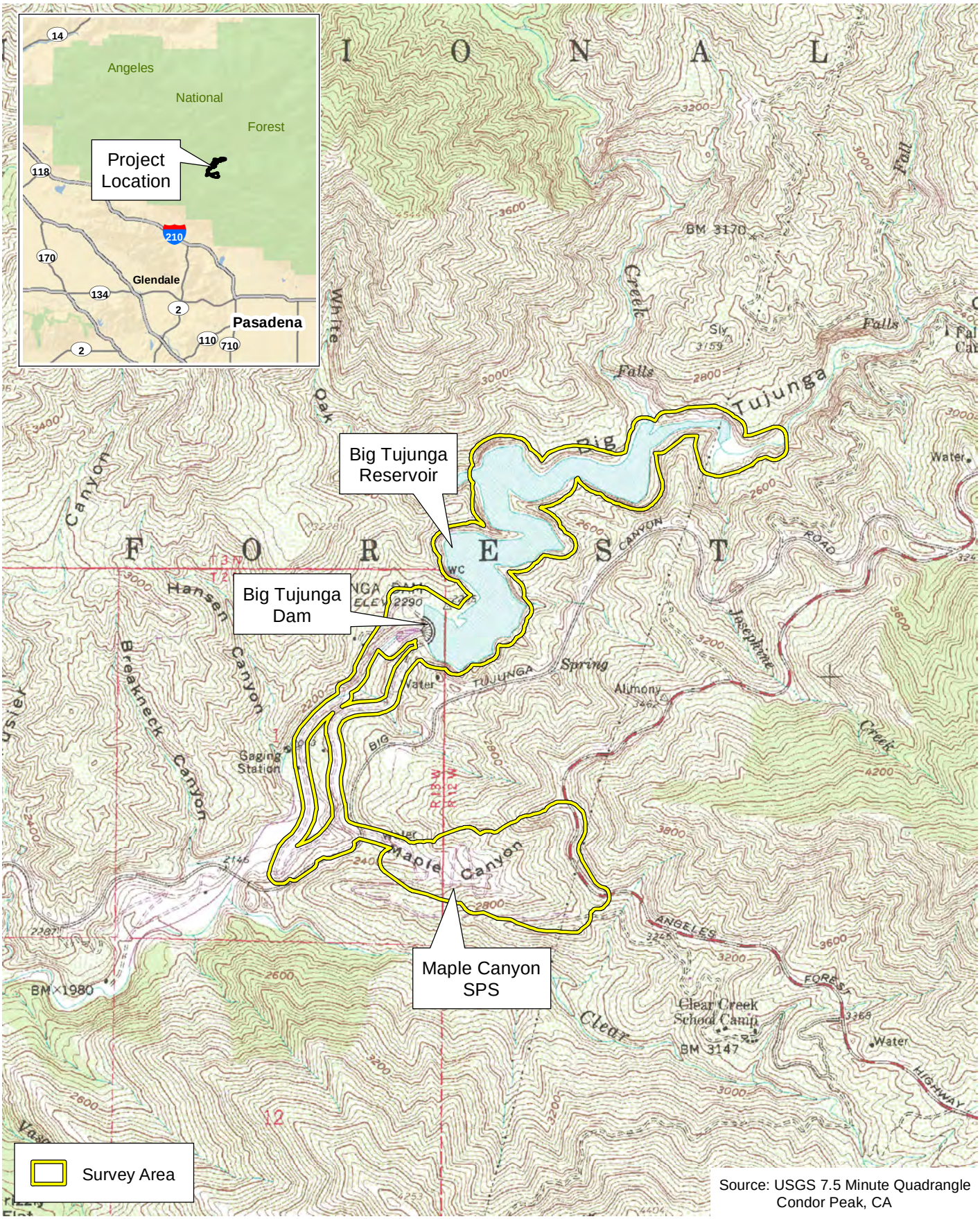

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U.S. Geological Survey 7.5-Minute Quadrangle

Exhibit 2

Big Tujunga Reservoir Sediment Removal Project

N W E S

2,000 1,000 0 2,000 Feet

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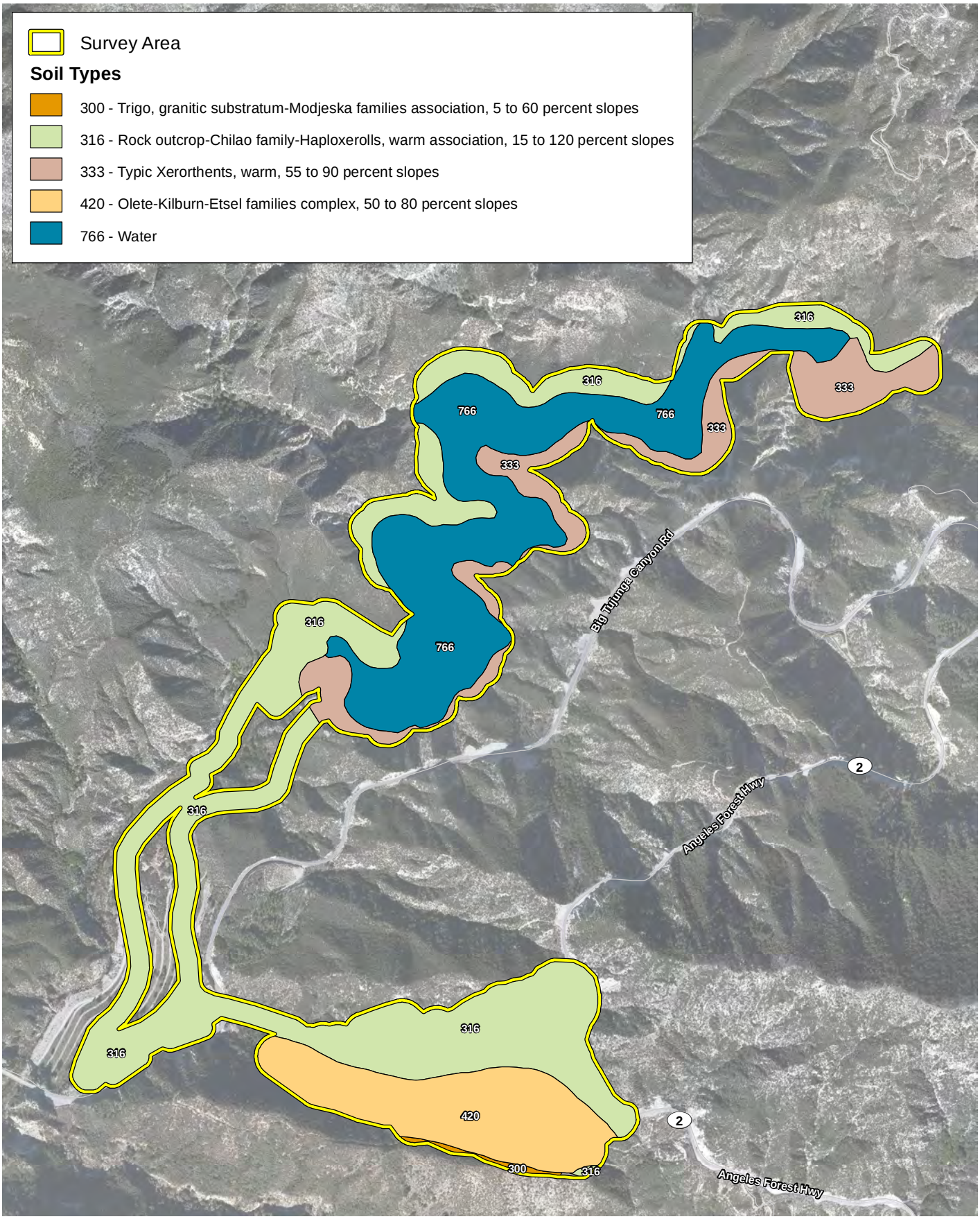

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Soil Types

Exhibit 3

Big Tujunga Reservoir Sediment Removal Project

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1,200 600 0 1,200 Feet

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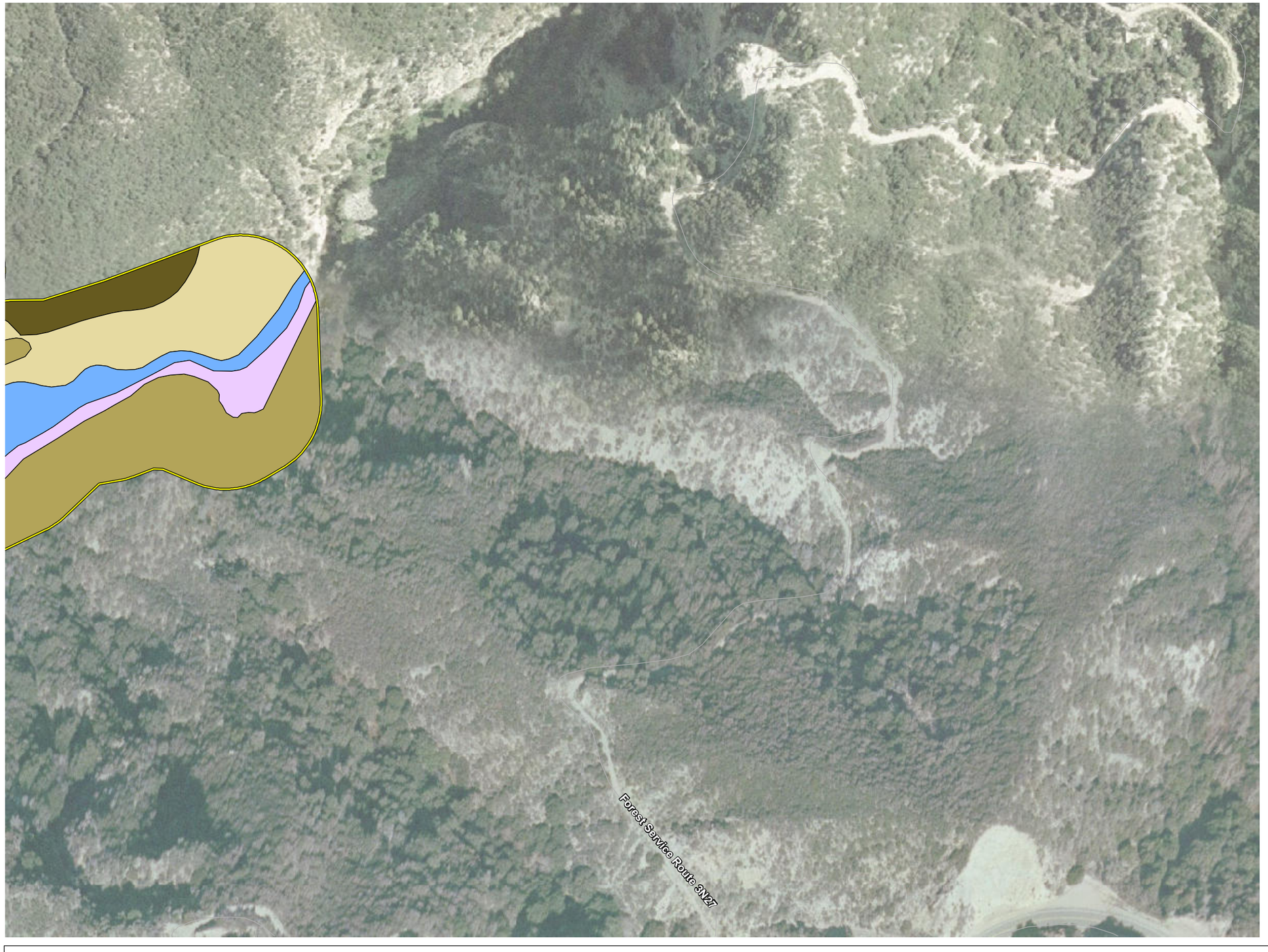

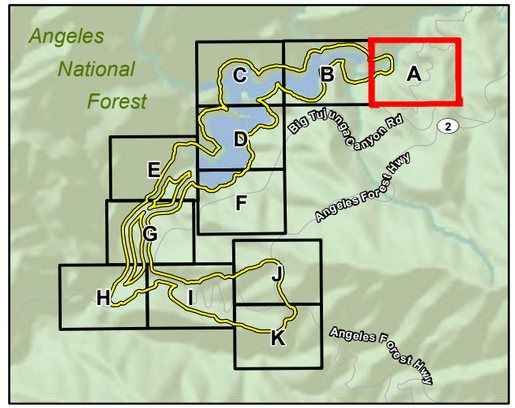

Survey Area

Vegetation Types and Other Areas

- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

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Vegetation Types and Other Areas

Exhibit 4A

Big Tujunga Reservoir Sediment Removal Project

N W E S

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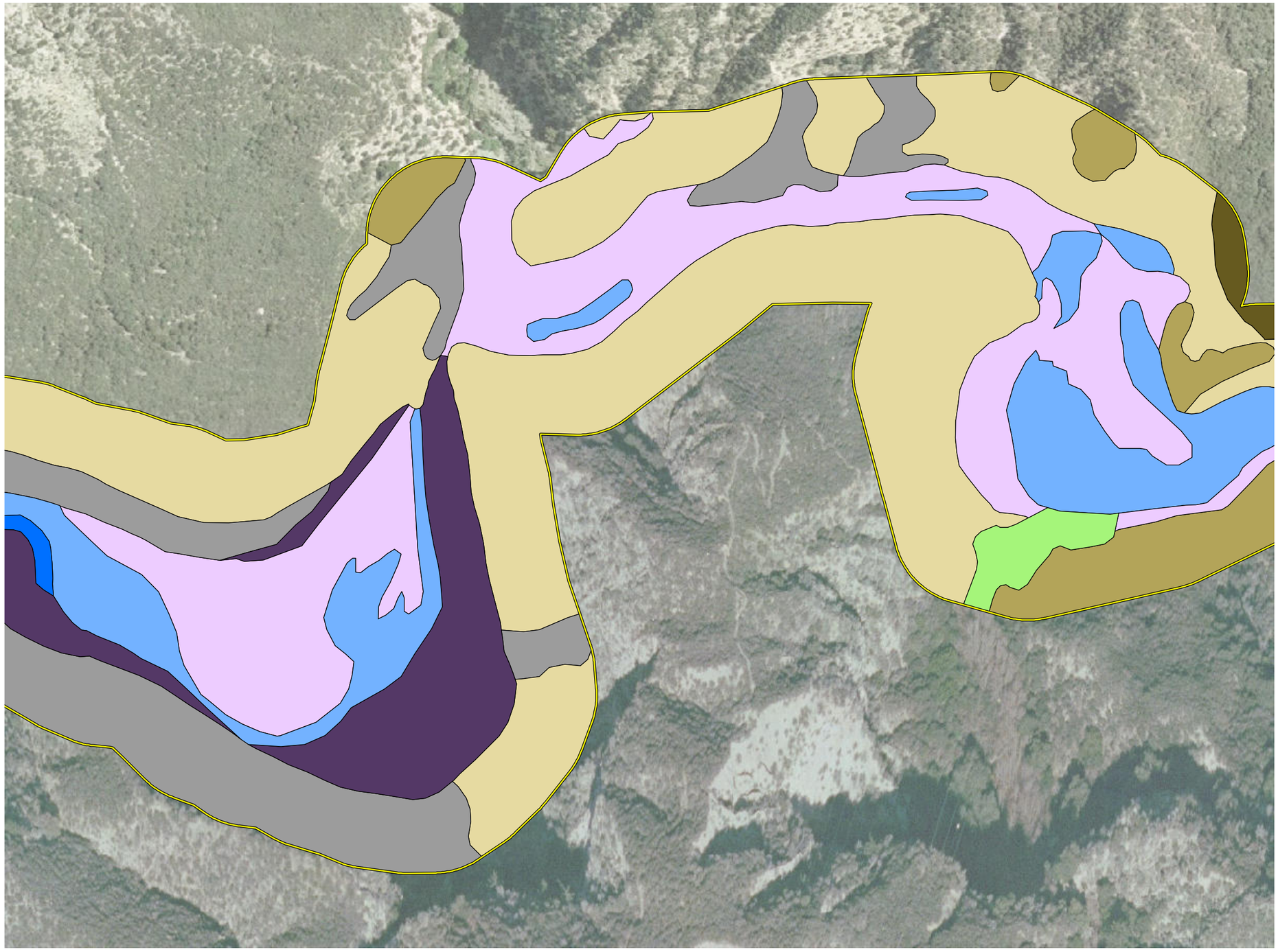

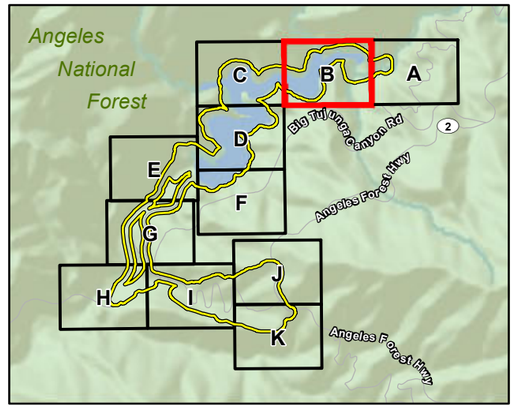

Survey Area

Vegetation Types and Other Areas

- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

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Vegetation Types and Other Areas

Exhibit 4B

Big Tujunga Reservoir Sediment Removal Project

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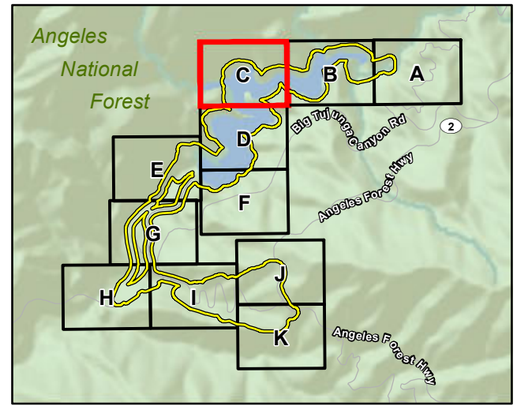

Survey Area

Vegetation Types and Other Areas

- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

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Vegetation Types and Other Areas

Exhibit 4C

Big Tujunga Reservoir Sediment Removal Project

N W E S

200 100 0 200 Feet

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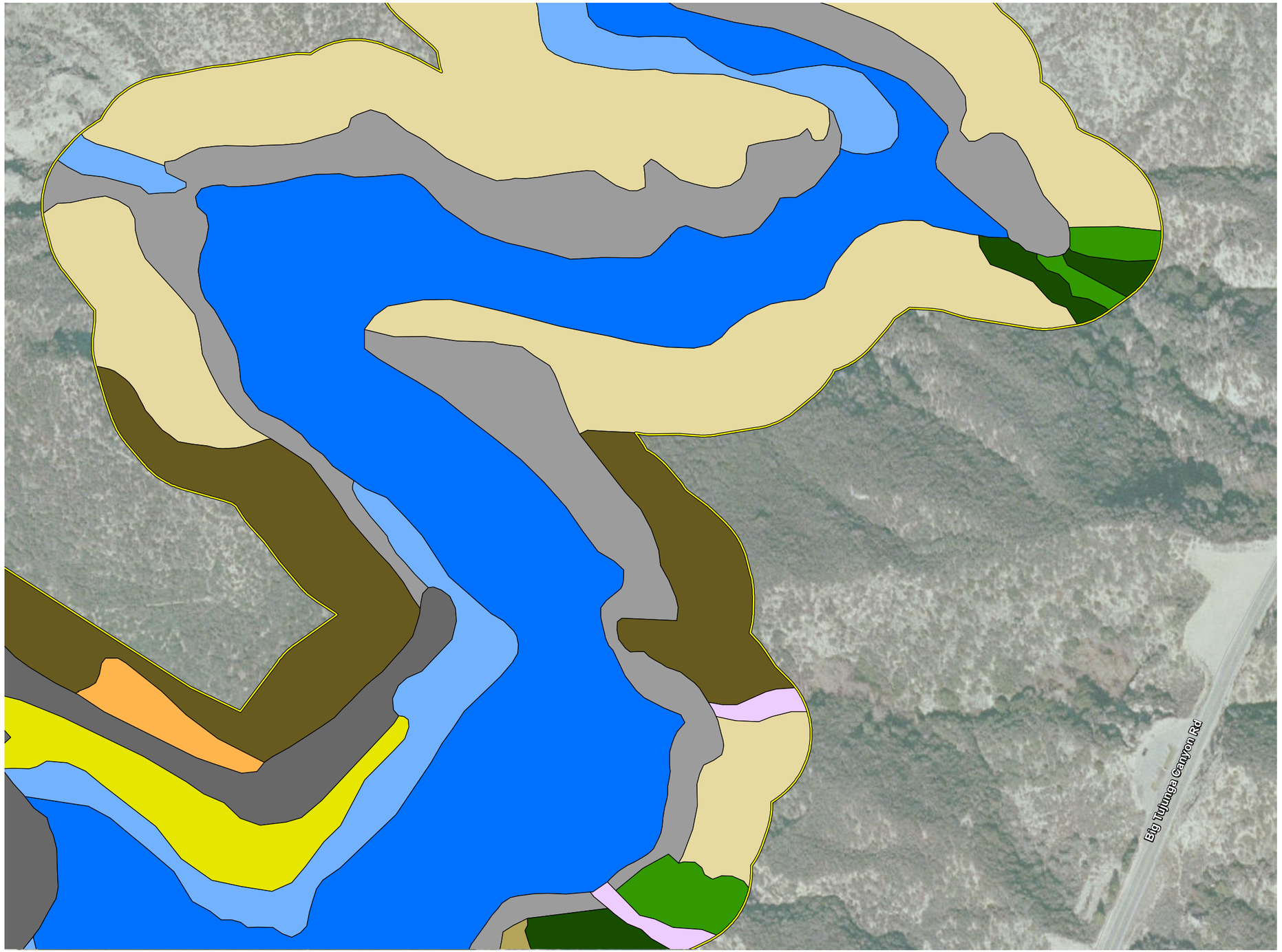

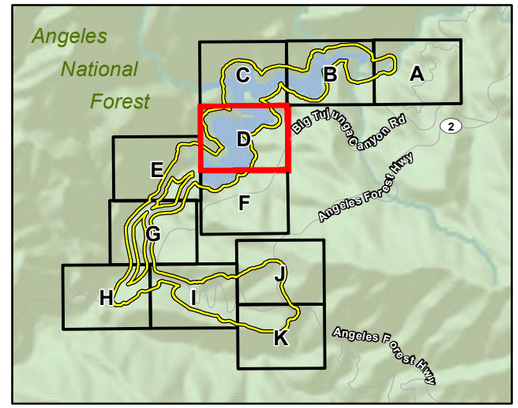

Survey Area

Vegetation Types and Other Areas

- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

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Vegetation Types and Other Areas

Exhibit 4D

Big Tujunga Reservoir Sediment Removal Project

N W E S

200 100 0 200

Feet

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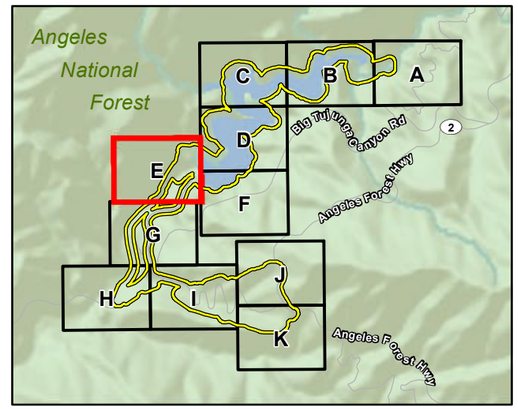

Survey Area

Vegetation Types and Other Areas

- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

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Vegetation Types and Other Areas

Exhibit 4E

Big Tujunga Reservoir Sediment Removal Project

N W E S

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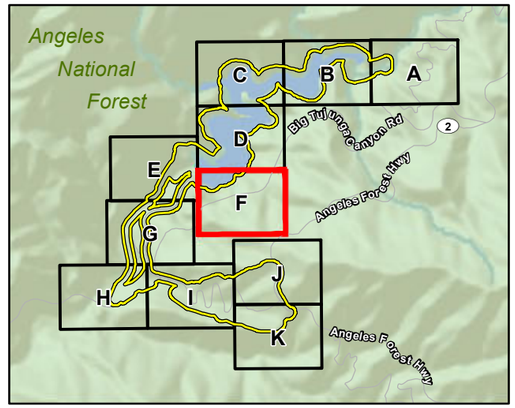

Survey Area

Vegetation Types and Other Areas

- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

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Vegetation Types and Other Areas

Exhibit 4F

Big Tujunga Reservoir Sediment Removal Project

N W E S

200 100 0 200 Feet

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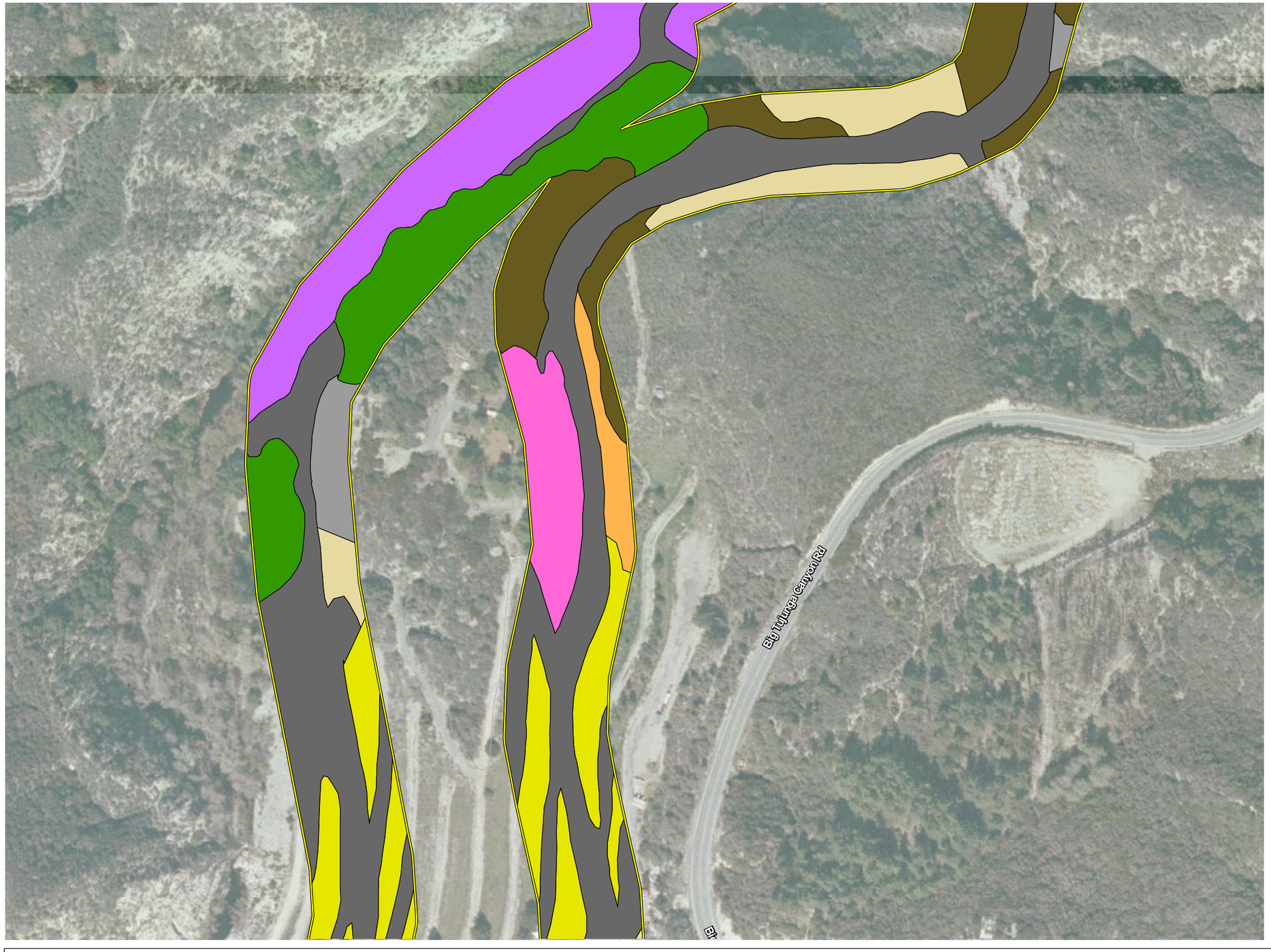

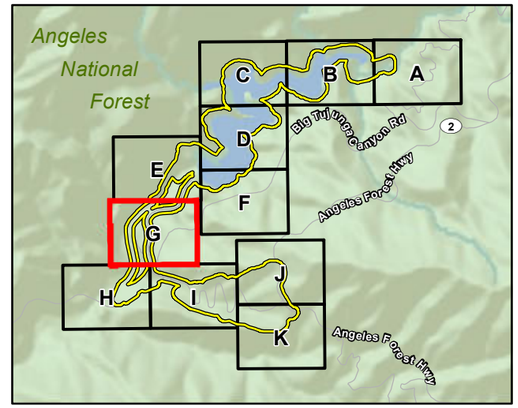

Survey Area

Vegetation Types and Other Areas

- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

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Vegetation Types and Other Areas

Exhibit 4G

Big Tujunga Reservoir Sediment Removal Project

N W E S

200 100 0 200 Feet

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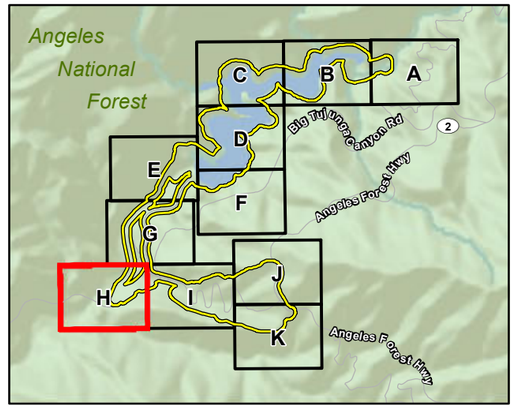

Survey Area

Vegetation Types and Other Areas

- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

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Vegetation Types and Other Areas

Exhibit 4H

Big Tujunga Reservoir Sediment Removal Project

N W E S

200 100 0 200 Feet

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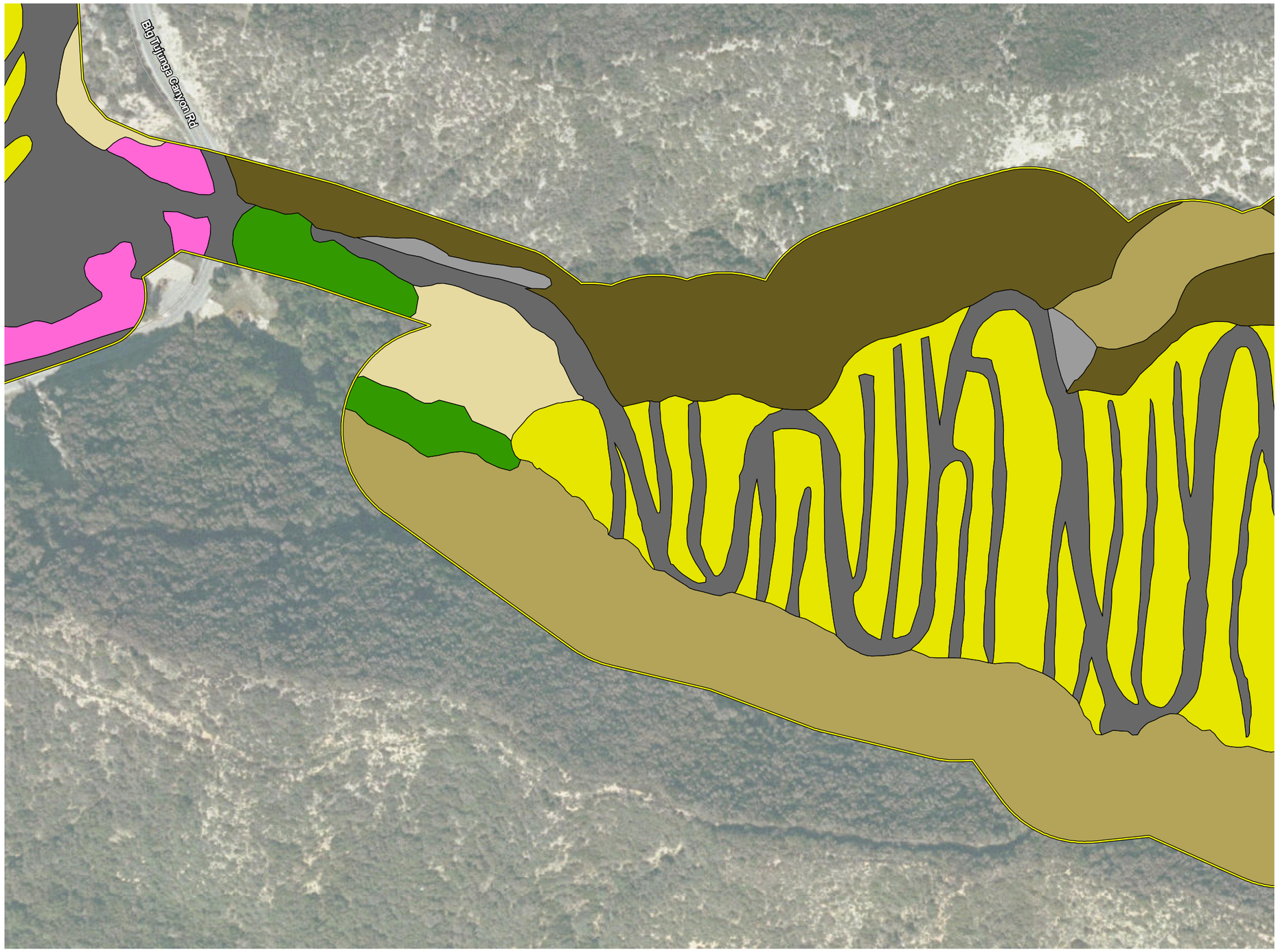

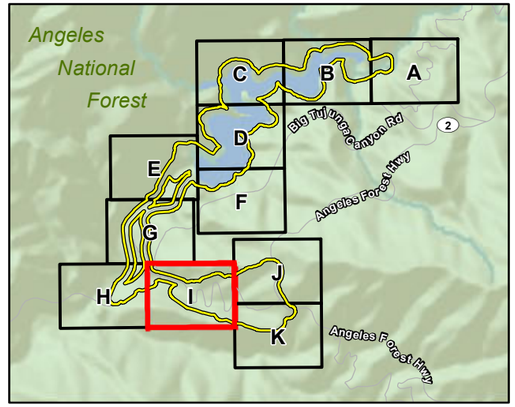

Survey Area

Vegetation Types and Other Areas

- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

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Vegetation Types and Other Areas

Exhibit 4I

Big Tujunga Reservoir Sediment Removal Project

N W E S

200 100 0 200 Feet

Bonterra CONSULTING

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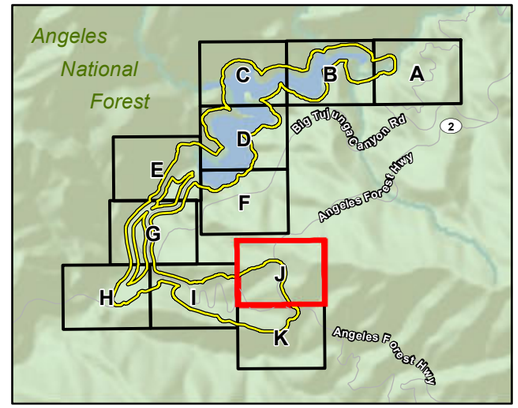

Survey Area

Vegetation Types and Other Areas

- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

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Vegetation Types and Other Areas

Exhibit 4J

Big Tujunga Reservoir Sediment Removal Project

N W E S

200 100 0 200

Feet

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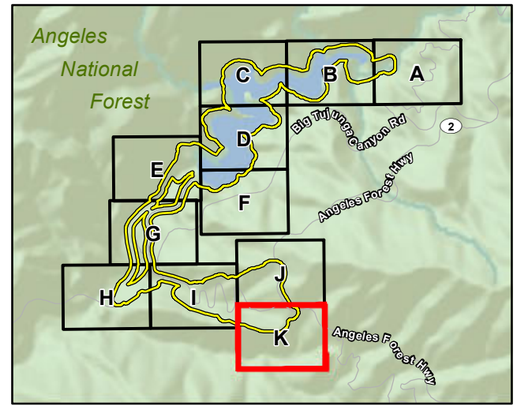

Survey Area

Vegetation Types and Other Areas

- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

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Vegetation Types and Other Areas

Exhibit 4K

Big Tujunga Reservoir Sediment Removal Project

N W E S

200 100 0 200 Feet

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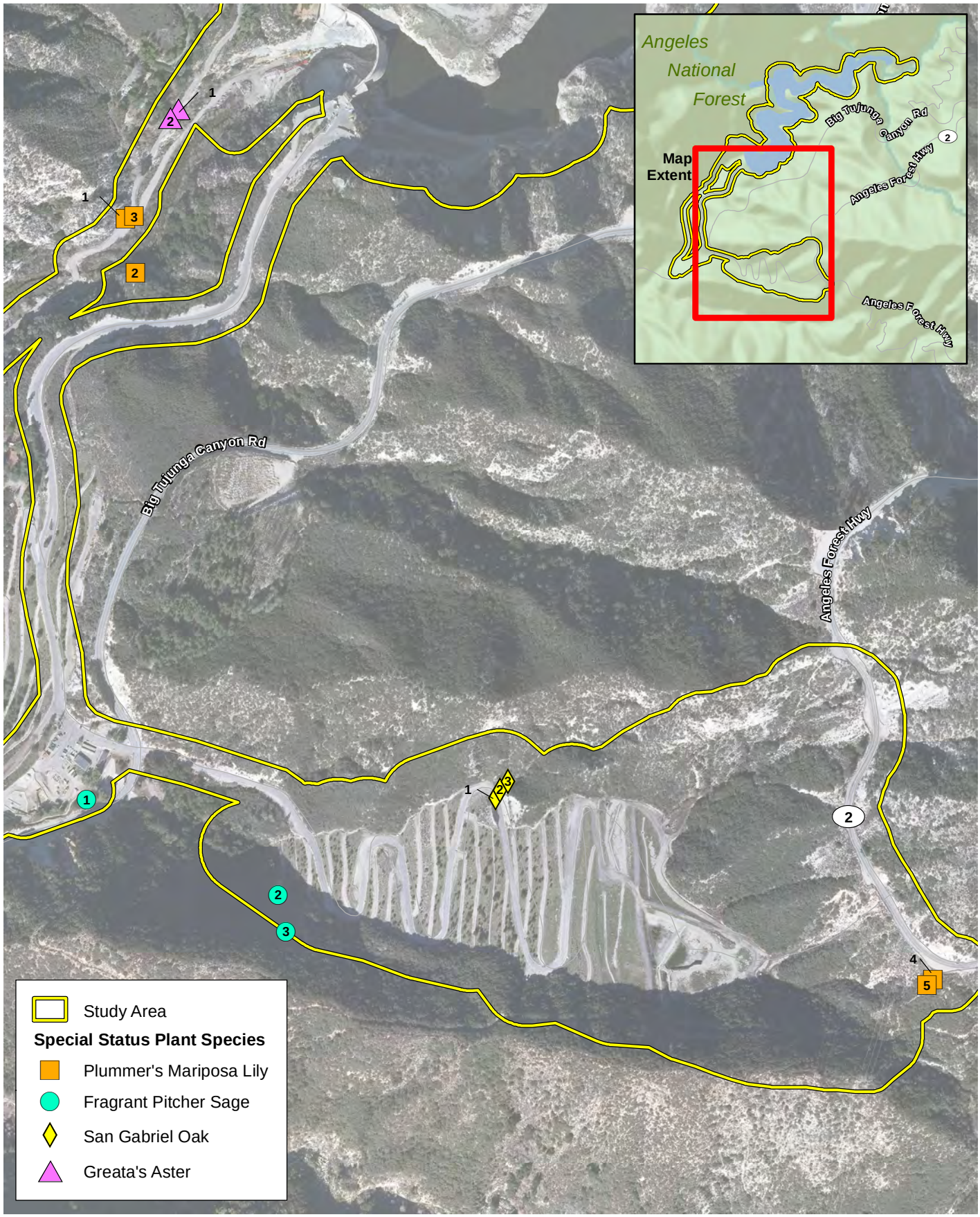

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Special Status Plant Species

Exhibit 5

Big Tujunga Reservoir Sediment Removal Project

N W E S

600 300 0 600 Feet

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APPENDIX A

PLANT COMPENDIUM

PLANTS SPECIES OBSERVED WITHIN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
***PTERIDOPHYTES* – FERNS AND ALLIES**	
***Blechnaceae* – Deer Fern Family**	
Woodwardia fimbriata	giant chain fern
***Dryopteridaceae* – Wood Fern Family**	
Dryopteris arguta	coastal wood fern
***Polypodiaceae* – Polypody Family**	
Polypodium californicum	California polypody
***Pteridaceae* – Brake Family**	
Adiantum jordanii	California maidenhair
Notholaena californica	California cloak-fern
Pellaea andromedifolia	coffee fern
Pellaea mucronata	bird's foot fern
Pellaea mucronata var. *mucronata*	bird's-foot fern
Pentagramma triangularis ssp. *triangularis*	goldenback fern
***Selaginellaceae* – Spike-Moss Family**	
Selaginella bigelovii	Bigelow's or bushy spike-moss
GYMNOSPERMS	
***Pinaceae* – Pine Family**	
Pinus coulteri	coulter pine
Pinus canariensis	Canary Island pine
Pinus halepensis	Aleppo pine
Pseudotsuga macrocarpa	bigcone douglas-fir
***ANGIOSPERMAE* – FLOWERING PLANTS**	
DICOTYLEDONES	
***Adoxaceae* – Muskroot Family**	
Sambucus nigra ssp. *caerulea*	blue elderberry
***Amaranthaceae* – Amaranth Family**	
*Amaranthus albus**	tumbleweed
***Anacardiaceae* – Sumac Family**	
Malosma laurina	laurel sumac
Rhus integrifolia	lemonade berry
Rhus ovata	sugar bush
Rhus aromatica [*Rhus trilobata*]	skunkbush
Toxicodendron diversilobum	western poison oak
***Apocynaceae* – Dogbane Family**	
*Nerium oleander**	common oleander
***Asteraceae* – Sunflower Family**	
*Ageratina adenophora**	crofton weed
Agoseris retrorsa	spear-leaved agoseris
Ambrosia acanthicarpa	annual bur-sage
Ambrosia psilostachya	western ragweed
Artemisia douglasiana	mugwort
Artemisia dracunculus	tarragon

PLANTS SPECIES OBSERVED WITHIN THE SURVEY AREA DURING FOCUSED SURVEYS (Continued)

Species	
Baccharis salicifolia ssp. *salicifolia* [*Baccharis salicifolia*]	mule fat
*Bidens pilosa**	common beggar-ticks
Brickellia californica	California brickellbush
Brickellia nevinii	Nevin's brickellia
*Centaurea melitensis**	tocalote/Maltese star thistle
Chaenactis artemisiifolia	white pincushion
Chaenactis glabriuscula	yellow pincushion
Cirsium occidentale	cobweb thistle
Erigeron bonariensis [*Conyza bonariensis*]*	flax-leaved horseweed
Erigeron canadensis [*Conyza canadensis*]	common horseweed
Corethrogyne filaginifolia [*Lessingia filaginifolia*]	California-aster
Eclipta prostrata	false daisy
Ericameria parishii var. *parishii*	Parish's goldenbush
Erigeron foliosus	leafy flebane
Eriophyllum confertiflorum	golden-yarrow
Gutierrezia californica	California matchweed
Hazardia squarrosa	saw-toothed goldenbush
Helianthus annuus	western sunflower
Heterotheca grandiflora	telegraph weed
Heterotheca sessiliflora	sessileflower goldenaster
Heterotheca sessiliflora ssp. *fastigiata*	fastigiate golden aster
*Hypochaeris glabra**	smooth cat's-ear
*Lactuca serriola**	prickly lettuce
Lasthenia californica	California goldfields
Lepidospartum squamatum	scale-broom
Logfia filaginoides [*Filago californica*]	California cottonrose
Malacothrix saxatilis var. *tenuifolia*	slender-leaved malacothrix
Matricaria discoidea [*Chamomilla suaveolens*]*	pineapple weed
Pseudognaphalium californicum [*Gnaphalium californicum*]	California everlasting
Pseudognaphalium canescens [*Gnaphalium canescens*]	Wright's cudweed
Pseudognaphalium luteoalbum [*Gnaphalium luteoalbum*]*	weedy cudweed
Rafinesquia californica	California chicory
Senecio flaccidus var. *douglasii*	Douglas' threadleaf ragwort
*Senecio vulgaris**	common groundsel
Solidago velutina ssp. *californica* [*Solidago californica*]	California goldenrod
Sonchus asper ssp. *asper**	prickly sow thistle
*Sonchus oleraceus**	common sow thistle
Stephanomeria virgata ssp. *virgata*	tall wreath plant
Symphyotrichum greatea	Greata's aster
Uropappus lindleyi	silver puffs
Xanthium strumarium	cocklebur

PLANTS SPECIES OBSERVED WITHIN THE SURVEY AREA DURING FOCUSED SURVEYS (Continued)

Species	
***Betulaceae* – Birch Family**	
Alnus rhombifolia	white alder
***Boraginaceae* – Borage Family**	
Cryptantha intermedia	common cryptantha
Cryptantha microstachys	Tejon cryptantha
Cryptantha muricata	prickly cryptantha
Emmenanthe penduliflora	whispering bells
Eriodictyon crassifolium	thick-leaved yerba santa
Eriodictyon parryi [*Turricula parryi*]	poodle-dog bush
Eucrypta chrysanthemifolia	common eucrypta
Nemophila menziesii var. *menziesii*	baby blue-eyes
Phacelia brachyloba	short-lobed phacelia
Phacelia cicutaria	caterpillar phacelia
Phacelia minor	wild canterbury-bell
Phacelia ramosissima	branching phacelia
***Brassicaceae* – Mustard Family**	
Arabis sparsiflora	rock cress
Caulanthus heterophyllus	San Diego jewel flower
*Hirschfeldia incana**	shortpod mustard
Nasturtium officinale [*Rorippa nasturtium-aquaticum*]*	water cress
*Sisymbrium orientale**	hare's ear cabbage
Thysanocarpus curvipes	hairy lacepod
***Campanulaceae* – Bellflower Family**	
Lobelia dunnii var. *serrata*	rothrock lobelia
***Caprifoliaceae* – Honeysuckle Family**	
Lonicera subspicata var. *denudata*	southern honeysuckle
***Chenopodiaceae* – Goosefoot Family**	
*Chenopodium album**	lamb's quarters
Chenopodium berlandieri	pitseed goosefoot
Dysphania ambrosioides [*Chenopodium ambrosioides*] *	Mexican tea
Dysphania botrys [*Chenopodium botrys*] *	Jerusalum oak
Dysphania pumilio [*Chenopodium pumilio*] *	Tasmanian goosefoot
*Salsola tragus**	Russian thistle
***Cistaceae* – Rock-Rose Family**	
Helianthemum scoparium	peak rush-rose
***Crassulaceae* – Stonecrop Family**	
Crassula connata	pygmy-weed
Dudleya cymosa ssp. *pumila*	canyon liveforever
Dudleya lanceolata	lance-leaved dudleya
***Cucurbitaceae* – Gourd Family**	
Marah macrocarpus	chilicothe

PLANTS SPECIES OBSERVED WITHIN THE SURVEY AREA DURING FOCUSED SURVEYS (Continued)

Species	
***Ericaceae* – Heath Family**	
Arctostaphylos glauca	bigberry manzanita
***Euphorbiaceae* – Spurge Family**	
*Chamaesyce maculata**	spotted spurge
*Ricinus communis**	castor bean
***Fabaceae* – Legume Family**	
Acmispon glaber [*Lotus scoparius* var. *scoparius*]	deerweed
*Gleditsia triacanthos**	honey locust
Lathyrus vestitus ssp. *vestitus*	chaparral sweet pea
*Lotus unifoliolatus**	Spanish lotus
Lupinus hirsutissimus	stinging lupine
Lupinus truncatus	truncate lupine/collar lupine
*Melilotus alba**	white sweetclover
*Melilotus indica**	sourclover
*Spartium junceum**	Spanish broom
*Trifolium hirtum**	rose clover
*Vicia villosa**	hairy vetch/winter vetch
***Fagaceae* – Oak / Beech Family**	
Quercus agrifolia	coast live oak
Quercus berberidifolia	scrub oak/California scrub oak
Quercus chrysolepis	maul oak/canyon live oak
Quercus durata ssp. *gabrielensis*	San Gabriel Mountains leather oak
***Geraniaceae* – Geranium Family**	
*Erodium botrys**	long-beaked filaree
*Erodium cicutarium**	red-stemmed filaree
***Grossulariaceae* – Gooseberry Family**	
Ribes indecorum	white-flowered currant
***Lamiaceae* – Mint Family**	
Lepechinia fragrans	fragrant pitcher-sage
*Marrubium vulgare**	common horehound
Pycnanthemum californicum	California mountain mint
Salvia apiana	white sage
Salvia columbariae	chia
Salvia mellifera	black sage
***Loasaceae* – Loasa Family**	
Mentzelia affinis	hydra stick-leaf
Mentzelia micrantha	small-flowered stick-leaf
***Lythraceae* – Loosestrife Family**	
*Lythrum hyssopifolia**	grass poly
Montiaceae	
Calyptridium monandrum	common pussypaws
***Myrtaceae* – Myrtle Family**	
*Eucalyptus camaldulensis**	river red gum

PLANTS SPECIES OBSERVED WITHIN THE SURVEY AREA DURING FOCUSED SURVEYS (Continued)

Species	
***Oleaceae* – Olive Family**	
Fraxinus velutina	velvet ash
***Onagraceae* – Evening Primrose Family**	
Camissonia bistorta	California sun cup
Camissonia californica	false mustard
Camissonia ignota	petioled primrose
Camissonia micrantha	small primrose
Epilobium canum	California fuchsia
***Orobanchaceae* – Broomrape Family**	
Castilleja affinis ssp. *affinis*	coastal/Indian paintbrush
Castilleja foliolosa	woolly indian paintbrush
Orobanche fasciculata	clustered broomrape
***Papaveraceae* – Poppy Family**	
Dendromecon rigida	bush poppy
Ehrendorferia chrysantha [*Dicentra chrysantha*]	golden ear-drops
Eschscholzia caespitosa	tufted poppy
Eschscholzia californica	California poppy
Meconella denticulata	small-flowered meconella
Papaver californicum	fire poppy
***Phrymaceae* – Lopseed Family**	
Mimulus aurantiacus	bush monkeyflower
Mimulus brevipes	slope semaphore
Mimulus cardinalis	scarlet monkeyflower
Mimulus floribundus	showy monkeyflower
Mimulus pilosus	downy monkeyflower
***Plantaginaceae* – Plantain Family**	
Antirrhinum coulterianum	white snapdragon
Antirrhinum multiflorum	perennial snapdragon
Keckiella cordifolia	heart-leaved bush-penstemon
Keckiella ternata ssp. *ternata*	blue-stemmed bush-penstemon
Penstemon spectabilis	royal penstemon
*Plantago major**	common plantain
*Veronica anagallis-aquatica**	water speedwell
***Platanaceae* – Sycamore Family**	
Platanus racemosa	western sycamore
***Polemoniaceae* – Phlox Family**	
Allophyllum glutinosum	blue false-gilia
Saltugilia splendens [*Gilia splendens*]	splendid woodland-gilia
Linanthus californicum [*Leptodactylon californicum*]	prickly phlox
***Polygonaceae* – Buckwheat Family**	
Erigonum fasciculatum var. *polifolium*	Mojave Desert California buckwheat
Eriogonum elongatum var. *elongatum*	long-stemmed wild buckwheat
Eriogonum fasciculatum var. *foliolosum*	leafy California buckwheat
Persicaria lapathifolia [*Polygonum lapathifolium*]	willow weed

PLANTS SPECIES OBSERVED WITHIN THE SURVEY AREA DURING FOCUSED SURVEYS (Continued)

Species	
*Polygonum argyrocoleon**	Persian knotweed
Pterostegia drymarioides	woodland threadstem
*Rumex conglomeratus**	whorled dock
*Rumex crispus**	curly dock
***Portulacaceae* – Purslane Family**	
Claytonia perfoliata	miner's lettuce
***Ranunculaceae* – Crowfoot Family**	
Clematis lasiantha	chaparral clematis, pipestem clematis
Delphinium cardinale	scarlet larkspur
Delphinium parryi ssp. *parryi*	Parry's larkspur/blue larkspur
***Rhamnaceae* – Buckthorn Family**	
Ceanothus crassifolius	hoaryleaf ceanothus
Frangula californica [*Rhamnus californica*]	California coffee berry
Ceanothus leucodermis	chaparral whitethorn
Ceanothus oliganthus	hairy ceanothus
Rhamnus ilicifolia	hollyleaf redberry
***Rosaceae* – Rose Family**	
Adenostoma fasciculatum var. fasciculatum	chamise
Cercocarpus betuloides var. *betuloides*	birch-leaf mountain-mahogany
Heteromeles arbutifolia	toyon/christmas berry
Prunus ilicifolia	holly-leaved cherry
Rubus ursinus	California blackberry
***Rubiaceae* – Madder Family**	
Galium angustifolium	narrowly leaved bedstraw
Galium aparine	goose grass
***Salicaceae* – Willow Family**	
Populus fremontii ssp. *fremontii*	Fremont cottonwood
Salix gooddingii	Goodding's black willow
Salix laevigata	red willow
Salix lasiolepis	arroyo willow
Salix lasiandra var. *lasiandra* [*Salix lucida* ssp. *lasiandra*]	pacific willow
***Sapindaceae* – Soap Berry Family**	
Acer macrophyllum	big-leaf maple
***Saxifragaceae* – Saxifrage Family**	
Lithophragma affine	woodland star
***Scrophulariaceae* – Figwort Family**	
Scrophularia californica	California figwort
*Verbascum virgatum**	wand mullein
***Solanaceae* – Nightshade Family**	
Datura wrightii	jimson weed
*Nicotiana glauca**	tree tobacco
Solanum douglasii	Douglas' nightshade
Solanum xanti	chaparral nightshade

PLANTS SPECIES OBSERVED WITHIN THE SURVEY AREA DURING FOCUSED SURVEYS (Continued)

Species	
***Tamaricaceae* – Tamarisk Family**	
*Tamarix ramosissima**	Mediterranean tamarix
***Ulmaceae* – Elm Family**	
*Ulmus parvifolia**	Chinese elm
***Urticaceae* – Nettle Family**	
Urtica dioica ssp. *holosericea*	hoary nettle
***Zygophyllaceae* – Caltrop Family**	
*Tribulus terrestris**	puncture vine
***MONOCOTYLEDONES* – MONOCOTS**	
***Agavaceae* – Century Plant Family**	
Hesperoyucca whipplei [*Yucca whipplei*]	our Lord's candle
***Araceae* – Arum Family**	
Lemna minor	water lentil/lesser duckweed
***Cyperaceae* – Sedge Family**	
Cyperus eragrostis	tall umbrella-sedge
***Iridaceae* – Iris Family**	
Sisyrinchium bellum	western blue-eyed grass
***Juncaceae* – Rush Family**	
Juncus bufonius	toad rush
Juncus macrophyllus	long-leaved rush
Juncus xiphioides	iris-leaved rush
***Liliaceae* – Lily Family**	
Calochortus plummerae	Plummer's mariposa lily
***Orchidaceae* – Orchid Family**	
Epipactis gigantea	stream orchid
***Poaceae* – Grass Family**	
Stipa coronata [*Achnatherum coronatum*]	crested needlegrass
*Agrostis viridis**	water bentgrass
*Avena barbata**	slender wild oat
*Avena fatua**	wild oat
*Bromus diandrus**	ripgut grass
*Bromus hordeaceus**	soft chess
Bromus madritensis ssp. *rubens**	foxtail chess
*Bromus tectorum**	cheat grass
*Cynodon dactylon**	bermuda grass
*Echinochloa colona**	jungle rice
*Echinochloa crus-galli**	barnyard grass
Elymus condensatus [*Leymus condensatus*]	giant wild rye
Elymus glaucus	blue wild-rye
Festuca microstachys [*Vulpia microstachys* var. *pauciflora*]	Pacific fescue
Festuca myuros [*Vulpia myuros* var. *myuros*]*	rattail fescue
Festuca octoflora [*Vulpia octoflora* var. *hirtella*]	hairy six-weeks fescue
Hordeum murinum var. *leporinum**	hare barley
*Lamarckia aurea**	goldentop

PLANTS SPECIES OBSERVED WITHIN THE SURVEY AREA DURING FOCUSED SURVEYS (Continued)

Species	
Leptochloa fusca ssp. *uninervia* [*Leptochloa uninervia*]	Mexican sprangletop
*Lolium perenne**	perennial ryegrass
Muhlenbergia rigens	deergrass
*Piptatherum miliaceum**	smilo grass/millett ricegrass
Poa secunda	one-sided bluegrass/malpais bluegrass
*Polypogon monspeliensis**	annual beard grass
*Schismus barbatus**	Mediterranean schismus
***Themidaceae* – Brodiaea Family**	
Dichelostemma capitatum	blue dicks
***Typhaceae* – Cattail Family**	
Typha domingensis	southern cattail
Typha latifolia	broad-leaved cattail
* non-native species	

APPENDIX B

SPECIAL STATUS PLANT PHOTOGRAPHS



Plummer's mariposa lily (*Calochortus plummerae*) observed during focused surveys.



Fragrant pitcher sage (*Lepechinia fragrans*) observed during focused surveys.

D:\Projects\CoLADPW\J162\Graphics\AppB_1.ai

Special Status Plant Photographs

Appendix B-1

Big Tujunga Reservoir Sediment Removal Project

BonTerra CONSULTING



San Gabriel oak (*Quercus durata* var. *gabrielensis*) observed during focused surveys.



Greta's aster (*Symphyotrichum greatae*) observed during focused surveys.

D:\Projects\CoLADPW\J162\Graphics\AppB_2.ai

Special Status Plant Photographs

Appendix B-2

Big Tujunga Reservoir Sediment Removal Project

BonTerra CONSULTING

APPENDIX C

SPECIAL STATUS PLANT POPULATION DETAILS

TABLE C-1
PLUMMER'S MARIPOSA LILY POPULATIONS OBSERVED IN THE SURVEY AREA

Population	Number of Individuals	Percent Phenology			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
1	3	—	100	—	rocky cliff face	rocky outcrops	flat above sheer cliff	W	everlasting (*Pseudognaphalium canescens* [*Gnaphalium canescens*]), white sage (*Salvia apiana*), cliff malacothrix (*Malacothrix saxatilis*), deerweed (*Acmispon glaber* [*Lotus scoparius*]), our Lord's candle (*Hesperoyucca whipplei* [*Yucca whipplei*]), slender wild oat (*Avena barbata*), California buckwheat (*Eriogonum fasciculatum*), branching phacelia (*Phacelia ramosissima*), Bigelow's spike-moss (*Selaginella bigelovii*), one-sided bluegrass (*Poa secunda*)
2	1	—	100	—	rocky cliff face	rocky outcrops	flat above sheer cliff	W	everlasting, white sage, cliff malacothrix, deerweed, our Lord's candle, slender wild oat, California buckwheat, branching phacelia, Bigelow's spike-moss, one-sided bluegrass
3	1	—	100	—	rocky cliff face	rocky outcrops	flat above sheer cliff	W	everlasting, white sage, cliff malacothrix, deerweed, our Lord's candle, slender wild oat, California buckwheat, branching phacelia, Bigelow's spike-moss, one-sided bluegrass
4	10	80	20	—	burned chaparral	rocky loamy sand	35%	S	chamise (*Adenostoma fasciculatum*), California buckwheat, thick-leaved yerba santa (*Eriodictyon crassifolium*), our Lord's candle, chia (*Salvia columbariae*), white pincushion (*Chaenactis artemisifolia*)
5	15	80	20	—	burned chaparral	rocky loamy sand	40%	S	chamise, deerweed, hoaryleaf ceanothus (*Ceanothus crassifolius*), thick-leaved yerba santa, our Lord's candle, bush poppy (*Dendromecon rigida*)
Total	**30**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

N/A: not applicable

TABLE C-2
FRAGRANT PITCHER SAGE POPULATIONS OBSERVED IN THE SURVEY AREA

Population	Number of Individuals	Percent Phenology			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
1	7	14	86	—	scrub oak chaparral/ coastal sage scrub	rocky loam	10–15%	N, NW	California buckwheat, birch-leaf mountain-mahogany (*Cercocarpus betuloides* var. *betulodies*), deerweed, hoaryleaf ceanothus, narrowly leaved bedstraw (*Galium angustifolium*), heart-leaved bush-penstemon (*Keckiella cordifolia*), bush monkeyflower (*Mimulus aurantiacus*)
2	4	75	25	—	mixed – scrub oak chaparral	rocky loam	10–20%	N	cliff malacothrix, golden-yarrow (*Eriophyllum confertiflorum*), heart-leaved bush-penstemon, toyon (*Heteromeles arbutifolia*), bush monkeyflower, little California melic grass (*Melica imperfecta*)
3	3	—	100	—	mixed – scrub oak chaparral	rocky loam	10–20%	N	cliff malacothrix, golden-yarrow, heart-leaved bush-penstemon, deerweed, our Lord's candle, slender wild oat
Total	**14**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

N/A: not applicable

TABLE C-3
SAN GABRIEL OAK POPULATIONS OBSERVED IN THE SURVEY AREA

Population	Number of Individuals	Percent Phenology			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
1	5	40	30	30	mixed chaparral	rocky sandy loam	15%	W	holly-leaved cherry (*Prunus ilicifolia*), California buckwheat, long-stemmed wild buckwheat (*Eriogonum elongatum*), bush poppy, our Lord's candle, bush monkeyflower
2	3	100	—	—	chamise chaparral	rock	45%	N	chamise, California buckwheat, bush monkeyflower, our Lord's candle, threadleaf ragwort (*Senecio flaccidus*)
3	40	80	—	20	burned mixed chaparral	rocky sandy loam	45%	N	toyon, hollyleaf redberry (*Rhamnus ilicifolia*), our Lord's candle, bush poppy, coastal wood fern (*Dryopteris arguta*), cliff malacothrix, common miner's-lettuce (*Claytonia perfoliata*), hairy lilac (*Ceanothus oliganthus*), chilicothe (*Marah macrocarpus*), California everlasting (*Pseudognaphalium californicum* [*Gnaphalium californicum*])
Total	**48**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

N/A: not applicable

TABLE C-4
GREATA'S ASTER POPULATIONS OBSERVED IN THE SURVEY AREA

Population	Number of Individuals	Percent Phenology			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
1	1	—	100	—	freshwater seep	rock (cliff face)	150%	E	crofton weed (*Ageratina adenophora*), bentgrass (*Agrostis* sp.), stream orchid (*Epipactis gigantea*), scarlet monkeyflower (*Mimulus cardinalis*), western blue-eyed grass (*Sisyrinchium bellum*), California maidenhair (*Adiantum jordanii*), smilo grass (*Piptatherum miliaceum*)
2	4	25	75	—	freshwater seep	rock (cliff face)	150%	E	crofton weed, California fuchsia (*Epilobium canum*), western blue-eyed grass, stream orchid, smilo grass, Fremont cottonwood (*Populus fremontii*), scarlet monkeyflower
Total	**5**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
N/A: not applicable									

APPENDIX D

CALIFORNIA NATURAL DIVERSITY DATABASE FORMS

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/16/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Calochortus plummerae*

Common Name: Plummer's mariposa lily

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 25 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: David Bramlet
Address: 1691 Mesa Drive, No. A-2
Newport Beach, CA 92660
E-mail Address: debramlet@earthlink.net
Phone: (714) 549-0647

Plant Information

Phenology: 80 % vegetative 20 % flowering 0 % fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

In Maple Canyon near Big Tujunga Dam.

County: Los Angeles Landowner / Mgr.: Angeles National Forest
Quad Name: Condor Peak Elevation: 3158 ft
T 2N R 12W Sec 6, ___ ¼ of ___ ¼, Meridian: H☐ M☐ S☑ Source of Coordinates (GPS, topo. map & type): GPS
T___ R___ Sec ___, ___ ¼ of ___ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin 60CSX
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 10-20 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: Population 1: 0391454mE, 3794102mN; Population 2: 0391446mE, 3794095mN

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*

Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Population 1 has 10 individuals and population 2 has 15 individuals. Plants in burned chaparral on rocky loamy sand substrate with 35% slope and southern aspect. Population 1 associated species are chamise (Adenostoma fasciculatum), California buckwheat (Eriogonum fasciculatum), thick-leaf yerba santa (Eriodictyon crassifolium), our Lord's candle (Hesperoyucca whipplei [Yucca whipplei]), chia (Salvia columbariae), and white pincushion (Chaenactis artemisifolia). Population 2 associated species are chamise, deerweed (Acmispon glaber [Lotus scoparius]), hoaryleaf ceanothus (Ceanothus crassifolius), thick-leaf yerba santa, our Lord's candle, and bush poppy (Dendromecon rigida).

Please fill out separate form for other rare taxa seen at this site.

Site Information

Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: Big Tujunga Dam sediment placement site and access road; open space

Visible disturbances: access road, sediment placement

Threats: sediment removal and transport from above Big Tujunga Dam to the Maple Canyon sediment placement site

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: familiarity with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/13/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Calochortus plummerae*

Common Name: Plummer's mariposa lily

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 5 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: David Bramlet
Address: 1691 Mesa Drive, No. A-2
Newport Beach, CA 92660
E-mail Address: debramlet@earthlink.net
Phone: (714) 549-0647

Plant Information

Phenology: _____% vegetative 100% flowering _____% fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

In Big Tujunga Canyon downstream of Big Tujunga Dam.

County: Los Angeles Landowner / Mgr.: Angeles National Forest
Quad Name: Condor Peak Elevation: 2,200 feet
T 2N R 13W Sec 1, ___ ¼ of ___ ¼, Meridian: H☐ M☐ S☑ Source of Coordinates (GPS, topo. map & type): GPS
T___ R___ Sec ___, ___ ¼ of ___ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin 60CSX
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 10-20 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: Population 1: 0390384mE, 3795131mN; Population 2: 0390396mE, 3795058mN; Population 3: 0390395mE, 3795134mN

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Population 1 has 3 individuals and populations 2 and 3 each have 1 individual. Plants on flat area above rocky cliff face with western aspect. Associated species are everlasting (Pseudognaphalium canescens [Gnaphalium canescens]), white sage (Salvia apiana), cliff malacothrix (Malacothrix saxatilis), deerweed (Acmispon glaber [Lotus scoparius]), our Lord's candle (Hesperoyucca whipplei [Yucca whipplei]), slender wild oat (Avena barbata), California buckwheat (Eriogonum fasciculatum), branching phacelia (Phacelia ramosissima), Bigelow's spike-moss (Selaginella bigelovii), and one-sided bluegrass (Poa secunda).

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: Big Tujunga Dam and access road; open space

Visible disturbances: adjacent access road to Big Tujunga Dam

Threats: sediment removal above Big Tujunga Dam and transport to Maple Canyon

Comments:

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: familiarity with species

Photographs: *(check one or more)* Slide Print Digital
Plant / animal ☐ ☐ ☑
Habitat ☐ ☐ ☑
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/13/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Lepechinia fragrans*

Common Name: fragrant pitcher sage

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 14 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: David Bramlet
Address: 1691 Mesa Drive, No. A-2
Newport Beach, CA 92660
E-mail Address: debramlet@earthlink.net
Phone: (714) 549-0647

Plant Information

Phenology: 29 % vegetative 71 % flowering 0 % fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Maple Canyon near Big Tujunga Dam

County: Los Angeles Landowner / Mgr.: Angeles National Forest

Quad Name: Condor Peak Elevation: 2,420

T 2N R 13W Sec 1, ___ ¼ of ___ ¼, Meridian: H☐ M☐ S☑ Source of Coordinates (GPS, topo. map & type): GPS

T___ R___ Sec ___, ___ ¼ of ___ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin 60CSX

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 10-20 feet meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: Population 1: 0390324mE, 3794354mN; Population 2: 0390579mN, 3794224mN; Population 3: 0390589mE, 3794175mN

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Population 1 (1 individual) in scrub oak chaparral/coastal sage scrub, rocky loam substrate, 10-15% slope, N/NW aspect. Population 2 (4 individuals) and Population 3 (3 individuals) in mixed scrub oak chaparral, rocky loam substrate, 10-20% slope, N aspect. Associated species: California buckwheat (Eriogonum fasciculatum), birch-leaf mountain-mahogany (Cercocarpus betuloides var. betuloides), deerweed (Acmispon glaber), hoaryleaf ceanothus (Ceanothus crassifolius), narrowly leaved bedstraw (Galium angustifolium), heart-leaved bush-penstemon (Keckiella cordifolia), bush monkeyflower (Mimulus aurantiacus), cliff malacothrix (Malacothrix saxatilis), golden-yarrow (Eriophyllum confertiflorum), toyon (Heteromeles arbutifolia), little California melic grass (Melic imperfecta)

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: Big Tujunga Dam sediment placement site and access road; open space

Visible disturbances: access road, sediment placement

Threats: sediment removal and transport from above Big Tujunga Dam to the Maple Canyon sediment placement site

Comments:

Determination: *(check one or more, and fill in blanks)*
- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: familiarity with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/16/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Quercus durata var. gabrielensis*

Common Name: San Gabriel oak

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 49 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: David Bramlet
Address: 1691 Mesa Drive, No. A-2
Newport Beach, CA 92660
E-mail Address: debramlet@earthlink.net
Phone: (714) 549-0647

Plant Information

Phenology: 75 % vegetative 3 % flowering 22 % fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

In Maple Canyon near Big Tujunga Dam.

County: Los Angeles Landowner / Mgr.: Angeles National Forest
Quad Name: Condor Peak Elevation: 2,880 feet
T 2N R 13W Sec 1, ___ ¼ of ___ ¼, Meridian: H☐ M☐ S☑ Source of Coordinates (GPS, topo. map & type): GPS
T___ R___ Sec ___, ___ ¼ of ___ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin 60CSX
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 10-20 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: Population 1: 390871mE, 3794351mN; Population 2: 390877nE, 3794361mN; Population 3: 390888mE, 3794373mN; Population 4: 390888mE, 3794373mN

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Population 1 (5 individuals) in mixed chaparral, rocky sandy loam substrate, 15% slope, W aspect. Population 2 (3 individuals) in chamise chaparral, rocky substrate, 45% slope, N aspect. Population 3 (1 individual) in mixed chaparral, rocky loamy sand substrate, 20% slope, S aspect. Population 4 (40 individuals) in burned mixed chaparral, rocky sandy loam, 45% slope, N aspect. Associated species: Prunus ilicifolia, Eriogonum fasciculatum, Eriogonum elongatum, Dendromecon rigida, Hesperoyucca whipplei (Yucca whipplei), Mimulus aurantiacus, Adenostoma fasciculatum, Senecio flaccidus, Salvia mellifera, Ceanothus crassifolius, Heteromeles arbutifolia, Rhamnus ilicifolia, Dryopteris arguta, Malacothrix saxatilis, Claytonia perfoliata, Ceanothus oliganthus, Marah macrocarpus

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: Big Tujunga Dam sediment placement site and access road; open space

Visible disturbances: access road, sediment placement

Threats: sediment removal and transport from above Big Tujunga Dam to the Maple Canyon sediment placement site

Comments:

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: familiarity with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/26/2011

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Symphyotrichum greatae*

Common Name: Greata's aster

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 5 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: David Bramlet
Address: 1691 Mesa Drive, No. A-2
Newport Beach, CA 92660
E-mail Address: debramlet@earthlink.net
Phone: (714) 549-0647

Plant Information

Phenology: 20 % vegetative 80 % flowering 0 % fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

In Big Tujunga Canyon immediately downstream of Big Tujunga Dam.

County: Los Angeles Landowner / Mgr.: Angeles National Forest

Quad Name: Condor Peak Elevation: 2,200 ft

T 2N R 13W Sec 1, ___ ¼ of ___ ¼, Meridian: H☐ M☐ S☑ Source of Coordinates (GPS, topo. map & type): GPS

T___ R___ Sec ___, ___ ¼ of ___ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin 60CSX

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 10-20 feet meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: Population 1: 0390456mE, 3795277mN; Population 2: 0390445mE, 3795265nM

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Population 1 has 1 individual and Population 2 has 4 individuals. Individuals located on rock substrate (cliff face) of freshwater seep. Slope is 150% and aspect is east. Population 1 associated species are crofton weed (Ageratina adenophora), bentgrass (Agrostis sp.), stream orchid (Epipactis gigantea), scarlet monkeyflower (Mimulus cardinalis), western blue-eyed grass (Sisyrinchium bellum), California maidenhair (Adiantum jordanii), and smilo grass (Piptatherum miliaceum). Population 2 associated species are crofton weed, California fuchsia (Epilobium canum), western blue-eyed grass, stream orchid, smilo grass, Fremont cottonwood (Populus fremontii), and scarlet monkeyflower.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: Big Tujunga Dam and access road; open space

Visible disturbances: adjacent access road to Big Tujunga Dam

Threats: sediment removal and transport from above Big Tujunga Dam to the Maple Canyon sediment placement site

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: familiarity with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

March 13, 2017

Alex Ho
Water Resources Division
Department of Public Works
County of Los Angeles
900 South Fremont Avenue
Alhambra, California 91803-1331

VIA EMAIL
AlHo@dpw.lacounty.gov

Subject: Results of 2016 Focused Plant Surveys for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles County, California

Dear Mr. Ho:

This Letter Report presents the findings of 2016 focused plant surveys conducted for the Big Tujunga Reservoir Sediment Removal Project (hereinafter referred to as "the proposed Project") in Los Angeles County, California (Exhibit 1).

SURVEY AREA

Big Tujunga Canyon is located on the southern edge of the San Gabriel Mountains in the Angeles National Forest and is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute topographic quadrangle at the following Townships (T), Ranges (R), and Sections (S): T 2 North, R 12 West, S 06; T 2 North, R 13 West, S 01; and T 3 North, R 12 West, S 31 (Exhibit 2).

The survey area consists of the slopes along Big Tujunga Creek, both the reservoir upstream of Big Tujunga Dam and the creek below the dam, and the adjacent Maple Canyon Sediment Placement Site (SPS). Topography above the dam consists of sheer cliffs and steep slopes. Below the dam, road cuts have terraced the slopes southeast of the creek. Maple Canyon is a more open canyon with moderate to steep slopes; it has been partially filled with sediment. Elevations range from approximately 2,150 to 3,400 feet above mean sea level (msl). The survey area and surrounding vicinity consist of open space in the Angeles National Forest. The survey area for special status plants consists of the project impact areas; a 50-foot buffer around the sediment removal area; and an approximately 100-foot buffer around the haul routes and the Maple Canyon SPS.

Soils in the survey area consist of Trigo, granitic substratum-Modjeska families association (5 to 60 percent slopes); Rock outcrop-Chilao family-Haploxerolls, warm association (15 to 120 percent slopes); Typic Xerorthents, warm (55 to 90 percent slopes); Olete-Kilburn-Etsel families complex (50 to 80 percent slopes), and Stukel-Sur-Winthrop families complex (60 to 100 percent slopes) (Exhibit 3).

The following vegetation types and land covers were observed in the survey area: California sycamore woodland, coastal sage scrub, chamise chaparral, scrub oak chaparral, mixed chaparral, California annual grassland, disturbed freshwater seep, riparian herb, willow riparian forest, willow riparian scrub, white alder–Fremont cottonwood–willow riparian forest, coast live oak stands, bigcone Douglas-fir–canyon live oak woodland (forest), open water, streambed, cliff, ornamental, and developed (Exhibit 4). Many of these areas were burned in the 2009 Station Fire, but are now recovered.

METHODS

Botanical surveys were floristic in nature and conducted following the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009). A literature search was conducted to identify special status plant species reported to occur in the vicinity of the survey area. Sources reviewed include the USGS Sunland, Condor Peak, Chilao Flat, Burbank, Pasadena, and Mount Wilson 7.5-minute quadrangles in the California Native Plant Society's (CNPS') Locational Inventory of Rare and Endangered Vascular Plants of California (CNPS 2016) and the California Department of Fish and Wildlife's (CDFW's) California Natural Diversity Database (CNDDB) (CDFW 2016a).

Rainfall received in the winter and spring determines the germination of many annual and perennial herb species. According to the Western Regional Climate Center, the region (data taken from Big Tujunga Dam) received 21.74 inches of precipitation between May 1, 2015 and April 30, 2016; the average annual precipitation is 25.56 inches (WRCC 2016). This is the fourth consecutive year of below average rainfall in the project region.

Reference populations were monitored for annual and difficult-to-detect target species to ensure that the scheduled surveys were comprehensive and conducted during the appropriate blooming period for these species, as shown in Table 1. Reference populations of species with a California Rare Plant Rank (CRPR) of 3 or 4[1], and perennial species that are readily observable were not monitored. Known reference populations of Davidson's bush-mallow (*Malacothamnus davidsonii*), fragrant pitcher sage (*Lepechinia fragrans*), Greata's aster (*Symphyotrichum greatae*), and California satintail (*Imperata brevifolia*) were monitored to confirm their flowering status and to verify that surveys were conducted during the appropriate blooming period for these species. Based on the reference survey results, the surveys were conducted during a timeframe when the target plant species were observable.

TABLE 1
SPECIAL STATUS PLANT SPECIES REFERENCE POPULATIONS

Species	Status	Date Checked	General Location
Malacothamnus davidsonii Davidson's bush-mallow	Flowering	May 12, 2016	Pacoima Reservoir
Lepechinia fragrans fragrant pitcher sage	Early flowering	May 4, 2016	Survey Area
Symphyotrichum greatae Greata's aster	Early flowering	May 4, 2016	Survey Area
Imperata brevifolia California satintail	Flowering	May 18, 2016	Wildwood picnic area, Angeles National Forest

[1] Species with a California Rare Plant Rank of 3 or 4 are not considered Rare, Threatened, or Endangered, but are on a review list or watch list, respectively.

Surveys were conducted on May 4 and 18 and June 7 and 8, 2016, by Psomas Senior Biologist Allison Rudalevige and Biologist Katie Gallagher and on September 13, 2016, by Ms. Rudalevige and Psomas Biologist Jonathan Aguayo. The total number of person-hours spent surveying was approximately 66 hours. A systematic survey was conducted in all areas of suitable special status plant habitat within the survey area. In the reservoir portion of the survey area, a boat was used to access the Big Tujunga Creek portion of the survey area upstream of the dam; the surrounding cliffs and steep slopes were scanned with binoculars from the boat. Portions of the survey area that were not safely accessible due to the steepness of the terrain were also scanned with binoculars.

All plant species observed were recorded in field notes. Plant species were identified in the field or collected for later identification. Plants were identified to the taxonomic level necessary to determine whether or not they are a special status species. Plants were identified using taxonomic keys, descriptions, and illustrations in Jepson Herbarium (2015), Hickman (1993), and Munz (1974). Taxonomy and nomenclature follows CDFW (2016b) for scientific and common names of special status plant species and Jepson Herbarium (2015) for the names of all other species.

For each special status species population observed, data was collected on the number and phenology of individuals and microsite characteristics such as slope, aspect, soil texture, surrounding habitat, and associated species.

SURVEY RESULTS

Table 2 identifies the special status plants reported from the literature review with their status; their potential to occur in the survey area; and the survey results. Four special status plant species were observed during focused surveys: Plummer's mariposa lily (*Calochortus plummerae*), fragrant pitcher sage, San Gabriel oak (*Quercus durata* ssp. *gabrielensis*), and Greata's aster. A list of all plants observed during the 2016 surveys is included in Attachment A.

Special status plant observations are discussed in more detail below and are shown in Exhibit 5. Voucher specimens were not collected due to the small population sizes observed. Representative photographs of each species are included in Attachment B. A CNDDB Field Survey Form for Greata's aster is included in Attachment C; CNDDB forms will not be submitted for Plummer's mariposa lily, fragrant pitcher sage, or San Gabriel Oak because the CNDDB does not track lower status species (i.e., CRPR List 4 species).

TABLE 2
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE VICINITY OF THE SURVEY AREA

Species	Status				Potential to Occur in the Survey Area and Survey Results
	USFWS	CDFW	CRPR	USFS	
Arctostaphylos glandulosa ssp. *gabrielensis* San Gabriel manzanita	—	—	1B.2	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Astragalus brauntonii Braunton's milk-vetch	FE	—	1B.1	—	Outside current known range; therefore, not expected to occur.
Atriplex parishii Parish's brittlescale	—	—	1B.1	—	No suitable habitat; therefore not expected to occur.
Berberis nevinii Nevin's barberry	FE	SE	1B.1	—	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
California macrophylla round-leaved filaree	—	—	1B.2	—	No suitable habitat; therefore not expected to occur.

TABLE 2
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE VICNITY OF THE SURVEY AREA

Species	Status				Potential to Occur in the Survey Area and Survey Results
	USFWS	CDFW	CRPR	USFS	
Calochortus clavatus var. *gracilis* slender mariposa lily	—	—	1B.2	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Calochortus palmeri var. *palmeri* Palmer's mariposa lily	—	—	1B.2	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
***Calochortus plummerae* Plummer's mariposa lily**	**—**	**—**	**4.2**	**—**	**Observed; suitable habitat.**
Calochortus striatus alkali mariposa lily	—	—	1B.2	FSS	No suitable habitat and outside current known range; therefore, not expected to occur.
Camissoniopsis lewisii Lewis' evening-primrose	—	—	3	—	Outside current known range; therefore, not expected to occur.
Castilleja gleasonii Mount Gleason paintbrush	—	SR	1B.2	FSS	No suitable habitat and outside current known range; therefore, not expected to occur.
Centromadia parryi ssp. *australis* southern tarplant	—	—	1B.1	—	No suitable habitat; therefore not expected to occur.
Centromadia pungens ssp. *laevis* smooth tarplant	—	—	1B.1	—	Outside current known range; therefore, not expected to occur.
Chorizanthe parryi var. *fernandina* San Fernando Valley spineflower	FC	SE	1B.1	—	Outside current known range; therefore, not expected to occur.
Chorizanthe parryi var. *parryi* Parry's spineflower	—	—	1B.1	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Cladium californicum California saw-grass	—	—	2B.2	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Dodecahema leptoceras slender-horned spineflower	FE	SE	1B.1	—	No suitable habitat; therefore not expected to occur.
Dudleya multicaulis many-stemmed dudleya	—	—	1B.2	FSS	No suitable habitat; therefore not expected to occur.
Galium grande San Gabriel bedstraw	—	—	1B.2	FSS	No suitable habitat; therefore not expected to occur.
Helianthus nuttallii ssp. *parishii* Los Angeles sunflower	—	—	1A	—	No suitable habitat and presumed extinct; therefore, not expected to occur.
Horkelia cuneata ssp. *puberula* mesa horkelia	—	—	1B.1	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Imperata brevifolia California satintail	—	—	2B.1	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields	—	—	1B.1	—	No suitable habitat; therefore not expected to occur.
***Lepechinia fragrans* fragrant pitcher sage**	**—**	**—**	**4.2**	**FSS**	**Observed; suitable habitat.**
Lepidium virginicum var. *robinsonii* Robinson's pepper-grass	—	—	4.3	—	No suitable habitat; therefore not expected to occur.
Linanthus concinnus San Gabriel linanthus	—	—	1B.2	FSS	Outside known elevational range; therefore, not expected to occur.
Linanthus orcuttii Orcutt's linanthus	—	—	1B.3	FSS	Outside current known range; therefore, not expected to occur.
Lupinus peirsonii Peirson's lupine	—	—	1B.3	FSS	Outside current known range; therefore, not expected to occur.

TABLE 2
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE VICNITY OF THE SURVEY AREA

Species	Status				Potential to Occur in the Survey Area and Survey Results
	USFWS	CDFW	CRPR	USFS	
Malacothamnus davidsonii Davidson's bush-mallow	—	—	1B.2	—	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Muhlenbergia californica California muhly	—	—	4.3	—	No suitable habitat; therefore not expected to occur.
Opuntia basilaris var. *brachyclada* short-joint beavertail	—	—	1B.2	—	No suitable habitat; therefore not expected to occur.
Orobanche valida ssp. *valida* Rock Creek broomrape	—	—	1B.2	FSS	No suitable habitat and outside known elevational range; therefore, not expected to occur.
Pseudognaphalium leucocephalum white rabbit-tobacco	—	—	2B.2	—	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
***Quercus durata* var. *gabrielensis* San Gabriel oak**	**—**	**—**	**4.2**	—	**Observed; suitable habitat.**
Ribes divaricatum var. *parishii* Parish's gooseberry	—	—	1A	—	No suitable habitat and presumed extinct; therefore, not expected to occur.
***Symphyotrichum greatae* Greata's aster**	**—**	**—**	**1B.3**	—	**Observed; suitable habitat.**
Symphyotrichum defoliatum San Bernardino aster	—	—	1B.2	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Thelypteris puberula var. *sonorensis* Sonoran maiden fern	—	—	2B.2	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.

USFWS: U.S. Fish and Wildlife Service; CDFW: California Department of Fish and Wildlife; CRPR: California Rare Plant Rank; USFS: U.S. Forest Service.

Federal (USFWS)
FE Endangered
FC Candidate

State (CDFW)
SE Endangered
SR Rare

Federal (USFS)
FSS Forest Service Sensitive

California Rare Plant Rank (CRPR)
1A Plants Presumed Extinct in California
1B Plants Rare, Threatened, or Endangered Throughout Their Range
2B Plants Rare, Threatened, or Endangered in California But More Common Elsewhere
3 Plants of About Which We Need More Information – A Review List
4 Plants of Limited Distribution – A Watch List

CRPR Threat Rank Extensions
None Plants lacking any threat information
.1 Seriously Endangered in California (over 80% of occurrences threatened; high degree and immediacy of threat)
.2 Fairly Endangered in California (20–80% of occurrences threatened)
.3 Not Very Threatened in California (low degree/immediacy of threat or no current threats known)

Plummer's Mariposa Lily

Plummer's mariposa lily has a CRPR of 4.2. It typically blooms between May and July. This perennial bulbiferous herb occurs in dry, rocky chaparral and yellow-pine forest at elevations between sea level and approximately 5,577 feet above msl. This species is known from the South Coast, Transverse Ranges, and Peninsular Ranges (Jepson Herbarium 2015). Ten individuals were observed in four populations (three of which were new) during the survey (Exhibit 5; Table 3). Two of the populations were observed on the cliff faces above Big Tujunga Reservoir; one population was observed along the haul route below the reservoir; and one population was observed in the Maple Canyon SPS. Note that during the 2011 survey, 30 individuals were observed in 5 populations; of the 2011 locations, only 1 had lilies blooming in 2016.

TABLE 3
PLUMMER'S MARIPOSA LILY POPULATIONS OBSERVED

Population	Number of Individuals	Phenology (%)			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
1	5	—	100	—	open chaparral	rocky slope	steep	SW	thickleaf yerba santa (*Eriodictyon crassifolium* var. *crassifolium*), chamise (*Adenostoma fasciculatum*), leafy California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), bush poppy (*Dendromecon rigida*), and scarlet larkspur (*Delphinium cardinale*).
2	3	—	100	—	open chaparral	rocky slope	steep	SW	chamise, bush poppy, leafy California buckwheat, longstem buckwheat (*Eriogonum elongatum* var. *elongatum*), and red brome (*Bromus madritensis* ssp. *rubens*).
3	1	—	100	—	open chaparral	rocky slope	steep	N	birch-leaf mountain mahogany (*Cercocarpus betuloides* var. *betuloides*), chaparral yucca (*Hesperoyucca whipplei*), scarlet larkspur, and bushy spike-moss (*Selaginella bigelovii*).
4	1	—	100	—	open chaparral	rocky knoll	steep	S	chamise, black sage (*Salvia mellifera*), thickleaf yerba santa, leafy California buckwheat, and crested needle grass (*Stipa coronata*).
Total	**10**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

SW: southwest; N: north; S: south; N/A: not applicable

Fragrant Pitcher Sage

Fragrant pitcher sage has a CRPR of 4.2 and is listed as a sensitive species for the Angeles National Forest by the U.S. Forest Service (USFS). It typically blooms between March and October (Jepson Herbarium 2015). This perennial shrub occurs in chaparral vegetation at elevations between sea level and approximately 4,265 feet above msl. It is known from the Western Transverse Ranges, the San Gabriel Mountains, the South Coast, and the northern Channel Islands. Nine individuals were observed in two populations in dense scrub oak chaparral and coastal sage scrub in the survey area (Exhibit 5; Table 4). One population was observed adjacent to Big Tujunga Canyon Road and the other population is located in the Maple Canyon SPS. Both of these populations had been observed in 2011. Note that, during 2011 surveys, an additional population of three individuals was documented in the Maple Canyon SPS; this area was inaccessible during the current survey due to the dense vegetation.

TABLE 4
FRAGRANT PITCHER SAGE POPULATIONS OBSERVED

Population	Number of Individuals	Phenology (%)			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
1	7	100	—	—	scrub oak chaparral/ coastal sage scrub	rocky loam	moderate	N, NW	leafy California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), birch-leaf mountain-mahogany (*Cercocarpus betuloides* var. *betulodies*), California everlasting (*Pseudognaphalium californicum*), narrow leaved bedstraw (*Galium angustifolium* ssp. *angustifolium*), scrub oak (*Quercus berberidifolia*), heart-leaved bush penstemon (*Keckiella cordifolia*), and bush monkeyflower (*Mimulus aurantiacus*).
2	2	100	—	—	scrub oak chaparral	rocky loam	moderate	N	California-lilac (*Ceanothus* sp.), heart-leaved bush penstemon, bush poppy (*Dendromecon rigida*), leafy California buckwheat, and California brickellbush (*Brickellia californica*).
Total	**9**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

N: north; NW: northwest; N/A: not applicable

San Gabriel Oak

San Gabriel oak has a CRPR of 4.2. It occurs on granitic soil in chaparral at elevations between approximately 1,475 and 3,280 feet above msl (Jepson Herbarium 2015). It is known from the southeast Western Transverse Ranges and south slopes of the San Gabriel Mountains. Eighty-four individuals were observed in ten populations in the Maple Canyon SPS and along the haul route below the reservoir in mixed chaparral, chamise chaparral, and scrub oak chaparral (Exhibit 5; Table 5). In 2011, 48 individuals were observed in 3 populations. The increase in the number of individuals observed is likely due to survey timing—acorn production was at a peak during the final 2016 survey and individuals were easily visible in dense chaparral vegetation.

TABLE 5
SAN GABRIEL OAK POPULATIONS OBSERVED

Population	Number of Individuals	Phenology (%)			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
1	7	—	—	100	mixed chaparral	rocky sandy loam	on outcrop	W	holly-leaved cherry (*Prunus ilicifolia*), leafy California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), longstem buckwheat (*Eriogonum elongatum* var. *elongatum*), bush poppy (*Dendromecon rigida*), chaparral yucca (*Hesperoyucca whipplei*), bush monkeyflower (*Mimulus aurantiacus*), California everlasting (*Pseudognaphalium californicum*), and ripgut brome (*Bromus diandrus*).
2	10	—	—	100	mixed chaparral	rocky sandy loam	steep	N	toyon (*Heteromeles arbutifolia*), hollyleaf redberry (*Rhamnus ilicifolia*), chaparral yucca, bush poppy, coastal woodfern (*Dryopteris arguta*), slender leaf cliff malacothrix (*Malacothrix saxatilis* var. *tenuifolia*), small-flowered miner's-lettuce (*Claytonia parviflora* ssp. *parviflora*), hairy ceanothus (*Ceanothus oliganthus*), chilicothe (*Marah macrocarpa*), and California everlasting.

TABLE 5
SAN GABRIEL OAK POPULATIONS OBSERVED

Population	Number of Individuals	Phenology (%)			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
3	3	—	—	100	chamise chaparral	rock	steep	S	chamise (*Adenostoma fasciculatum*), thickleaf yerba santa (*Eriodictyon crassifolium* var. *crassifolium*), leafy California buckwheat, bush monkeyflower, chaparral yucca, threadleaf ragwort (*Senecio flaccidus*), and black sage (*Salvia mellifera*).
4	10	—	—	100	mixed chaparral	sandy loam	steep	W	sugar bush (*Rhus ovata*), laurel sumac (*Malosma laurina*), California everlasting, and bush poppy.
5	24	4	—	96	scrub oak chaparral	sandy loam	steep	N	toyon, hairy Ceanothus, bush poppy, chilicothe, California everlasting, and chaparral virgin's bower (*Clematis lasiantha*)
6	10	10	—	90	scrub oak chaparral	sandy loam	steep	N	toyon, hairy Ceanothus, bush poppy, chilicothe, California everlasting, and chaparral virgin's bower (*Clematis lasiantha*)
7	1	—	—	100	scrub oak chaparral	sandy loam	steep	N	toyon, hairy Ceanothus, bush poppy, chilicothe, California everlasting, and chaparral virgin's bower
8	16	—	—	100	scrub oak chaparral	sandy loam	steep	N	toyon, hairy Ceanothus, bush poppy, chilicothe, California everlasting, and chaparral virgin's bower
9	2	—	—	100	mixed chaparral	rocky loam	at road cut	N	toyon, leafy California buckwheat
10	1	—	—	100	chamise chaparral	rocky loam	at road cut	N	chamise, thickleaf yerba santa, leafy California buckwheat
Total	**84**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

W: west; N: north; S: south; N/A: not applicable

Greata's Aster

Greata's aster has a CRPR of 1B.3. It typically blooms between August and October (Jepson Herbarium 2015). This rhizomatous perennial herb occurs in damp places in canyons at elevations between approximately 985 and 6,560 feet above msl. It is known from the southern slopes of the San Gabriel Mountains. A total of ten individuals were observed at three locations (one of which was new) in the survey area (Exhibit 5, Table 6). Five individuals were observed in two populations at a freshwater seep along the haul route (previously observed in 2011) and five individuals were observed at the creek edge at the upstream end of the reservoir (Exhibit 5; Table 6). Conditions at the seep were similar to those observed in 2011.

TABLE 6
GREATA'S ASTER POPULATIONS OBSERVED

Population	Number of Individuals	Percent Phenology			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
1	1	—	100	—	freshwater seep	rock (cliff face)	steep	E	crofton weed (*Ageratina adenophora*), bentgrass (*Agrostis* sp.), giant stream orchid (*Epipactis gigantea*), scarlet monkeyflower (*Mimulus cardinalis*), western blue-eyed-grass (*Sisyrinchium bellum*), California maidenhair (*Adiantum jordanii*), smilo grass (*Stipa miliacea* var. *miliacea*)
2	4	75	25	—	freshwater seep	rock (cliff face)	steep	E	crofton weed, California fuchsia (*Epilobium canum* ssp. *canum*), western blue-eyed-grass, giant stream orchid, smilo grass, Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), scarlet monkeyflower

TABLE 6
GREATA'S ASTER POPULATIONS OBSERVED

Population	Number of Individuals	Percent Phenology			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
3	5	—	60	40	streambed	sandy alluvium	flat canyon bottom	N/A	arroyo willow (*Salix lasiolepis*), mule fat (*Baccharis salicifolia* ssp. *salicifolia*), broad-leaved cattail (*Typha latifolia*), cocklebur (*Xanthium strumarium*), and crofton weed.
Total	**10**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
E: east; N/A: not applicable									

PROJECT IMPACTS

All observed Plummer's mariposa lily and fragrant pitcher sage populations are located outside the proposed Project impact area. Therefore, there would be no impacts on these species and no mitigation would be required.

San Gabriel Oak Population 4 and a portion of Population 5 are located in the proposed impact area of the Maple Canyon SPS. This species is on a "watch list" for plants of limited distribution. Due to the relatively common distribution of this species in the region, proposed Project impacts are not expected to reduce the regional populations below self-sustaining levels. Therefore, impacts would be considered adverse, but less than significant under the California Environmental Quality Act (CEQA) and mitigation would not be required. The remaining oak populations are located outside the proposed Project impact area.

Greata's aster Population 3 is located at the upper end of the area proposed for sediment removal above Big Tujunga Dam. As a species considered rare throughout its range (CRPR 1B.3), impacts on this species would be considered potentially significant under CEQA and, therefore, would require mitigation if impacted. Mitigation measures included in the CEQA document require that pre-construction surveys would be conducted and any populations of Greata's aster near the sediment removal area would be flagged for avoidance. If Greata's aster is observed in the sediment removal boundary, then the impact boundary will be adjusted to avoid the location of Greata's aster. The remaining populations observed during 2016 surveys are located along the proposed haul route and are not expected to be affected by the proposed Project because no ground-disturbing activities are expected outside the haul routes.

CONCLUSIONS AND RECOMMENDATIONS

The 2016 survey results were consistent with the results of the previous 2011 surveys; no new species were observed. Observed differences in population sizes are not unexpected; population sizes may fluctuate for a variety of reasons, such as differences in annual rainfall. Additionally, every individual doesn't bloom every year; thus, when populations are of limited size and extent, they may be detectable one year and not another depending on the collective flowering of the individuals in that population.

However, it is expected that if a large population were present, it would be detectable (assuming adequate rainfall) because there would always be some individuals blooming.

A pre-construction survey by a qualified Biologist will be conducted in the spring prior to sediment removal to flag Greata's aster populations near the sediment removal footprint for avoidance. Additionally, pre-construction surveys would flag populations of Plummer's mariposa lily, fragrant pitcher sage, San Gabriel oak, and Greata's aster that are located adjacent to the haul routes and sediment placement site so they would not be inadvertently impacted by project activities.

Although reference populations and regional rainfall amounts were monitored to ensure the scientific adequacy of these focused surveys, there is always a minimal potential for false negative survey results as species could possibly be present on a site but may not be detectable at the time of the surveys.

Coast horned lizard (*Phrynosoma blainvillii*), a California Species of Special Concern, was incidentally observed in the Maple Canyon SPS during the focused plant survey; a CNDDB form for this observation is included in Attachment C.

If you have any comments or questions, please call Amber Heredia at (714) 751-7373.

Sincerely,
BonTerra Psomas

Amber O. Heredia
Senior Project Manager

Allison D. Rudalevige
Senior Biologist

Enclosures: Exhibit 1 – Project Location
Exhibit 2 – U.S. Geological Survey 7.5-Minute Quadrangle
Exhibit 3 – Soil Types
Exhibit 4 – Vegetation Types and Other Areas
Exhibit 5 – Special Status Plant Species
Attachment A – Plant Compendium
Attachment B – Representative Photographs
Attachment C – California Natural Diversity Database Forms

REFERENCES

California Department of Fish and Game (CDFG). 2009 (November 24). *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities*. Sacramento, CA: CDFG.

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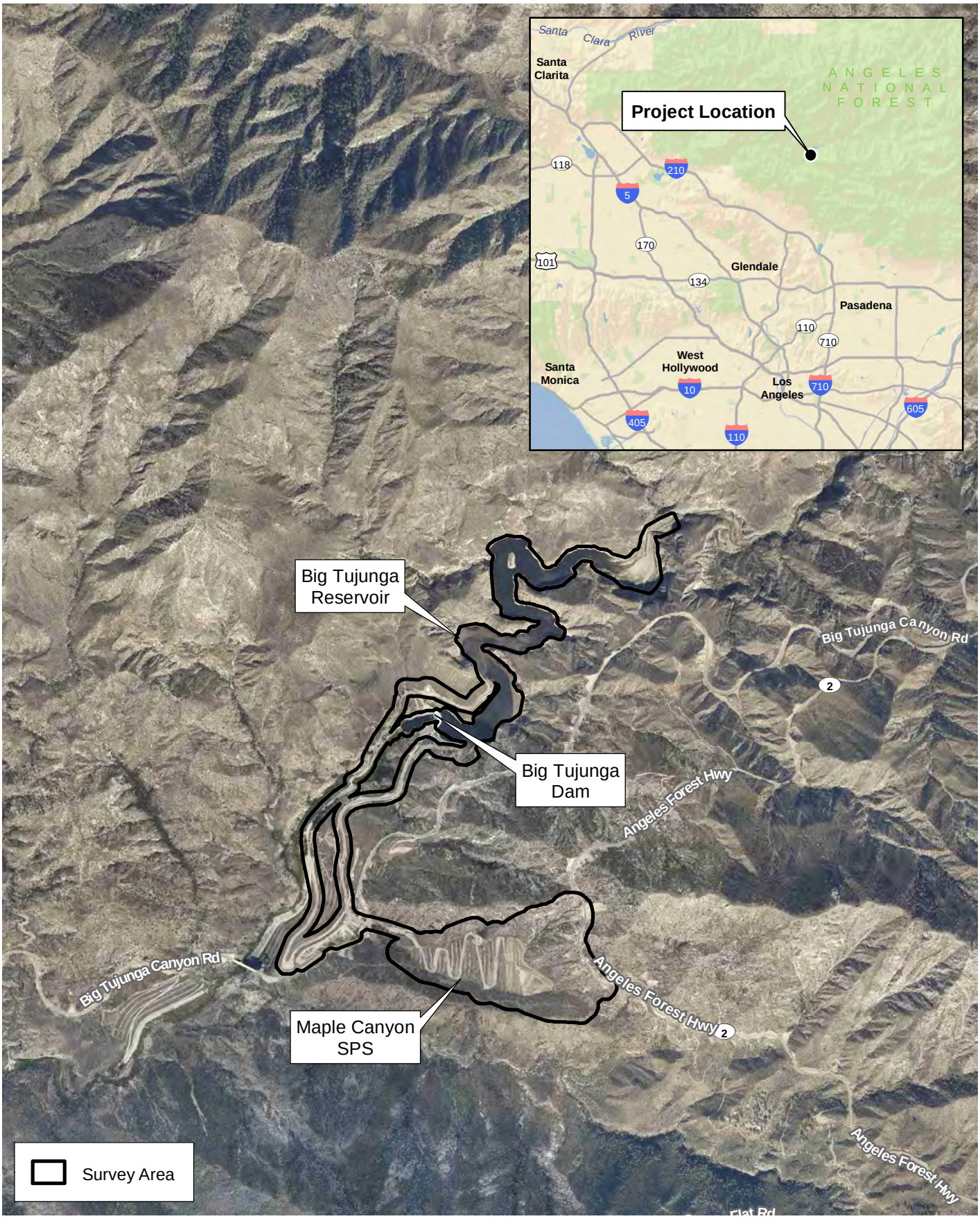

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Project Location

Exhibit 1

Big Tujunga Reservoir Sediment Removal Project

N W E S

2,000 1,000 0 2,000 Feet

Bonterra PSOMAS

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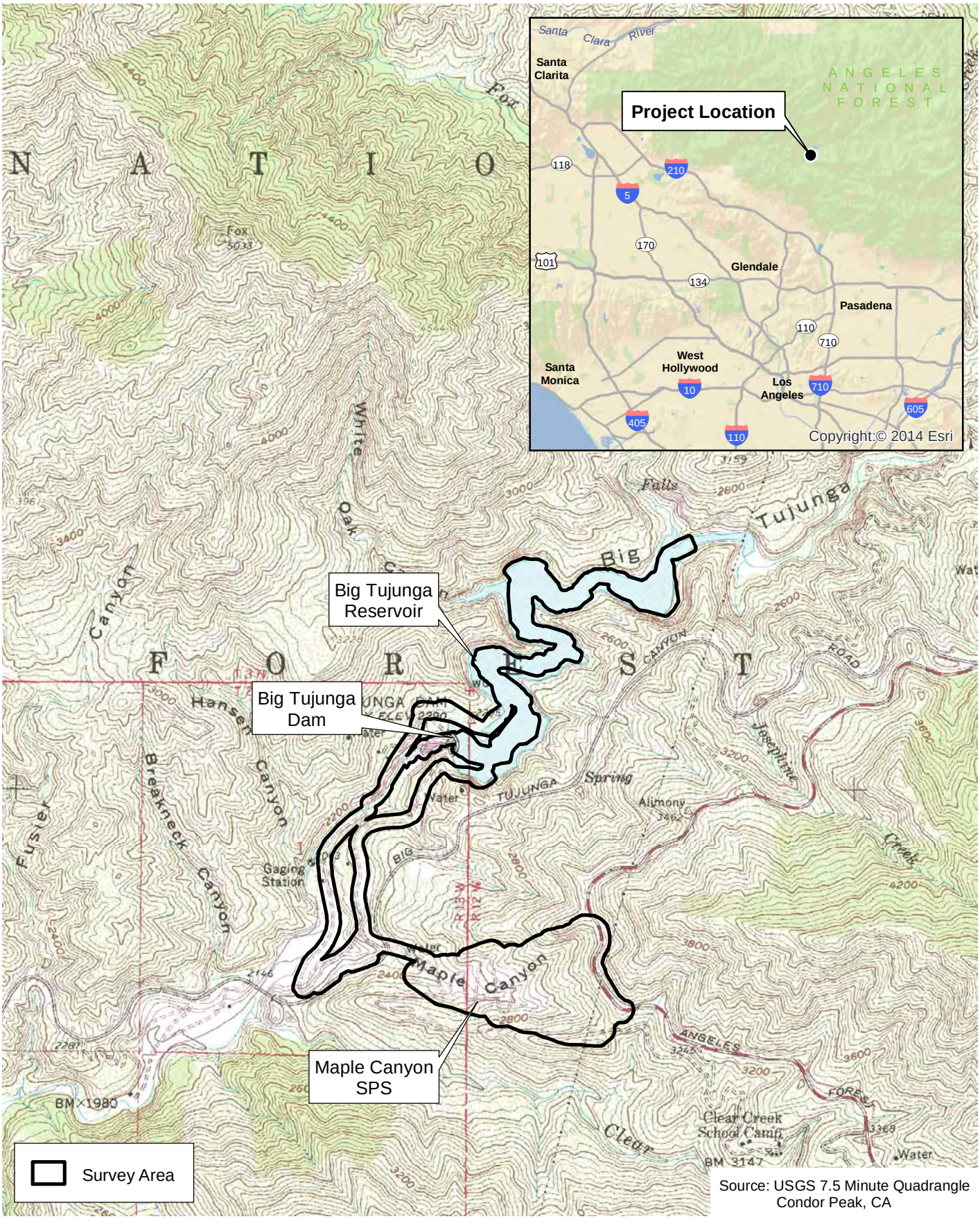

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U.S. Geological Survey 7.5-Minute Quadrangle

Exhibit 2

Big Tujunga Reservoir Sediment Removal Project

N W E S

2,000 1,000 0 2,000 Feet

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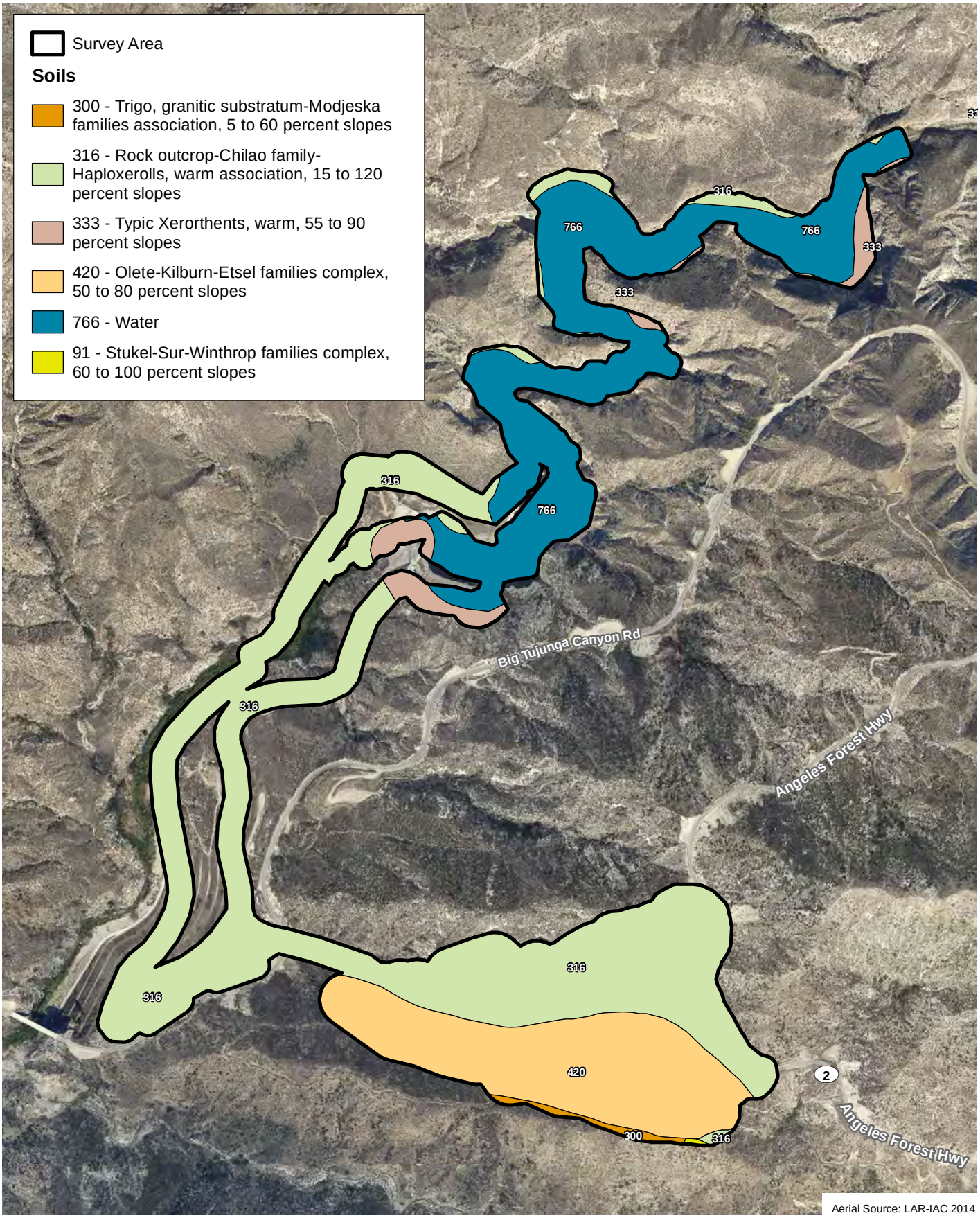

Aerial Source: LAR-IAC 2014

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Soil Types

Exhibit 3

Big Tujunga Reservoir Sediment Removal Project

N
W E
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1,000 500 0 1,000

Feet

BonTerra PSOMAS

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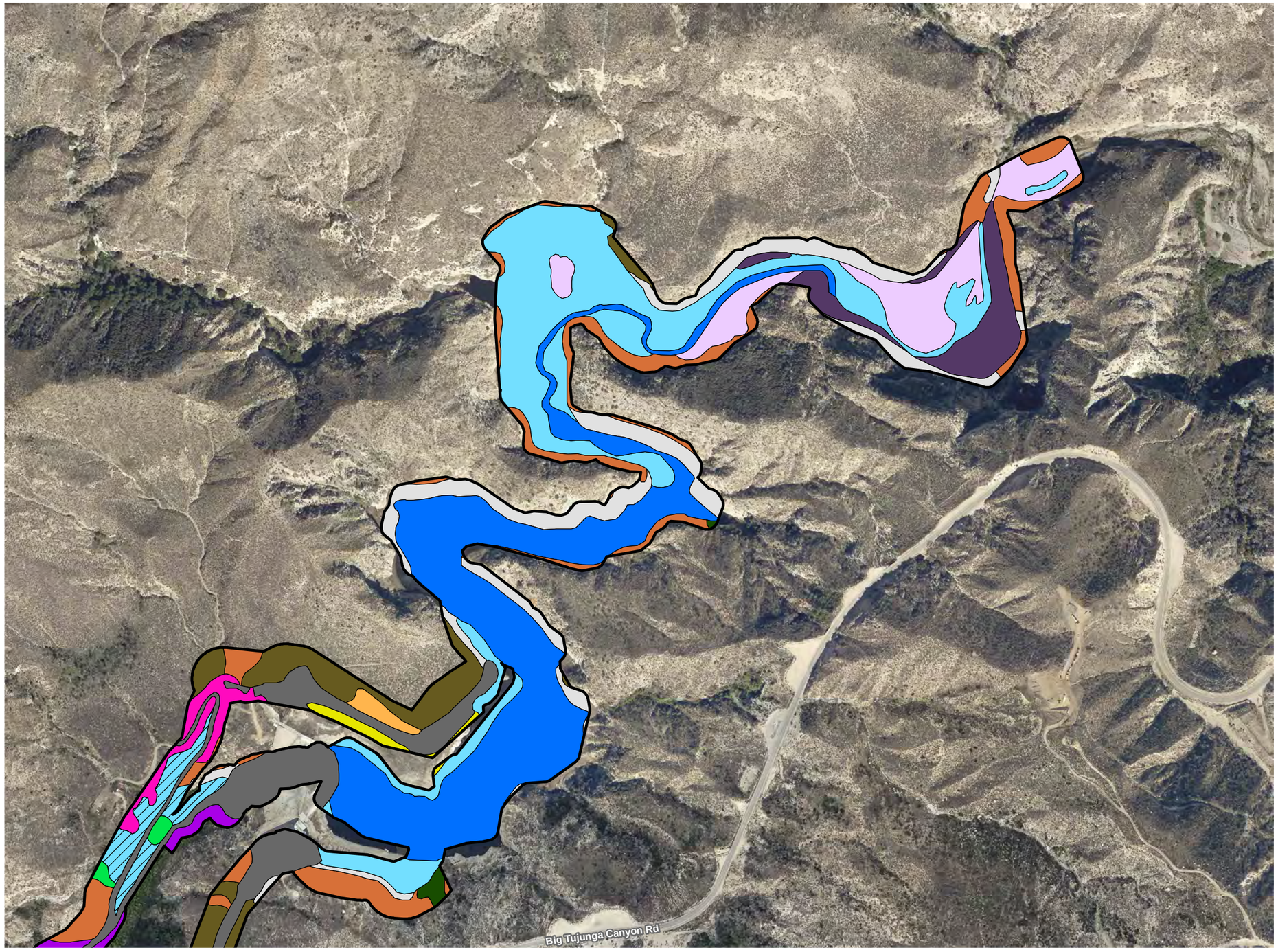

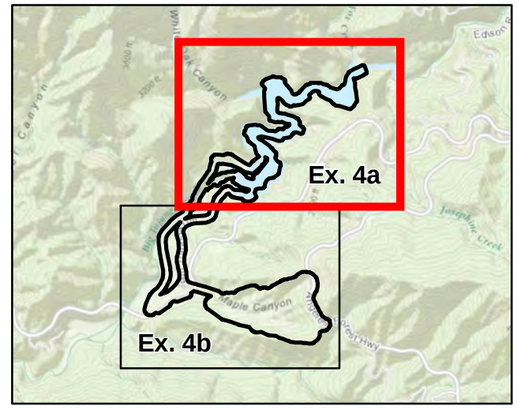

Survey Area

Vegetation Types and Other Areas

- California Sycamore Woodland
- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

Aerial Source: LAR-IAC 2014

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Vegetation Types and Other Areas

Exhibit 4a

Big Tujunga Reservoir Sediment Removal Project

N W E S

500 250 0 500 Feet

Bonterra PSOMAS

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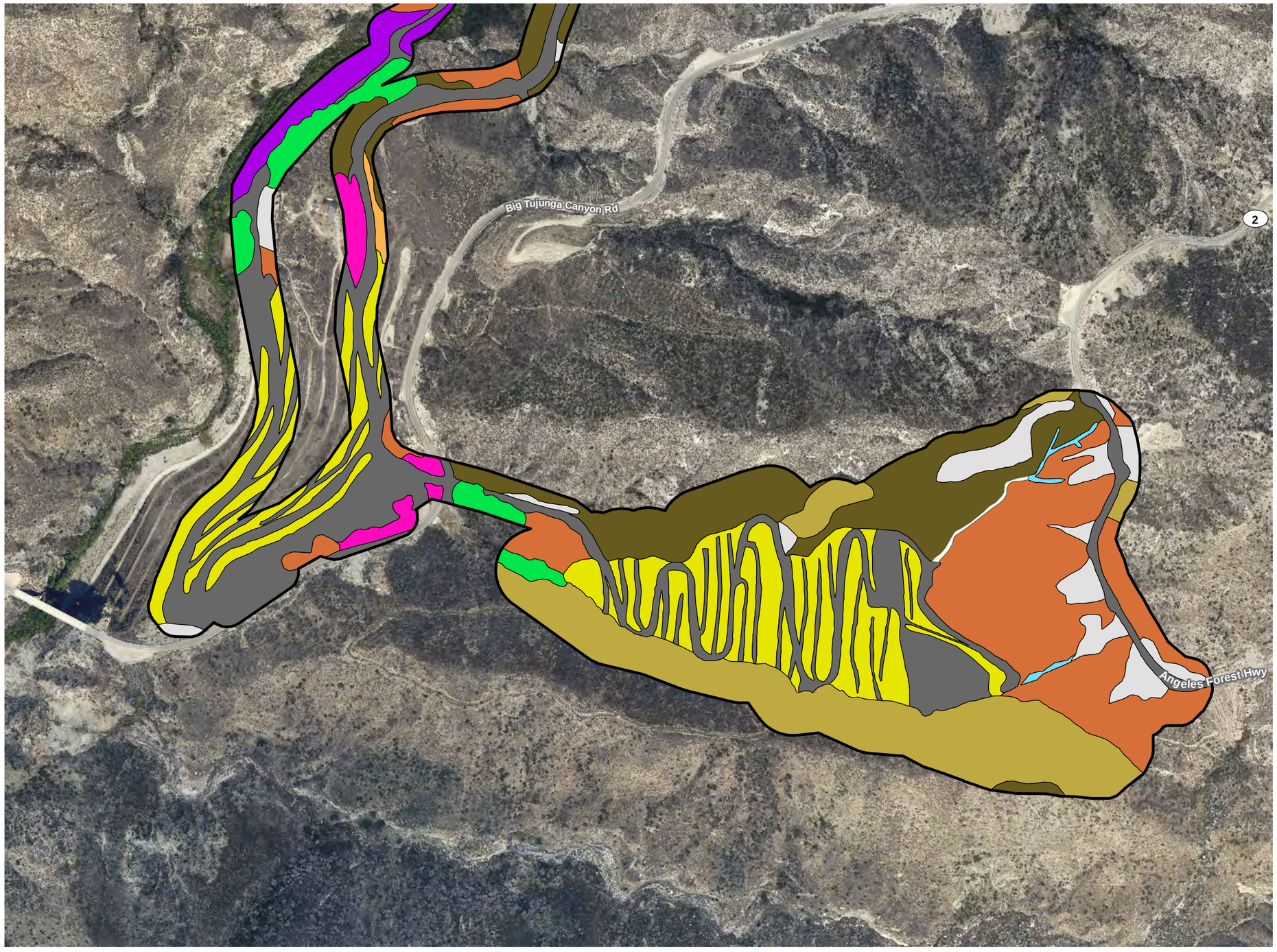

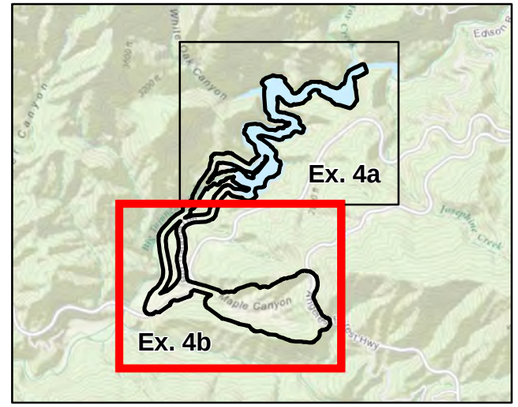

Survey Area

Vegetation Types and Other Areas

- California Sycamore Woodland
- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

Aerial Source: LAR-IAC 2014

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Vegetation Types and Other Areas

Exhibit 4b

Big Tujunga Reservoir Sediment Removal Project

N W E S

500 250 0 500 Feet

BonTerra PSOMAS

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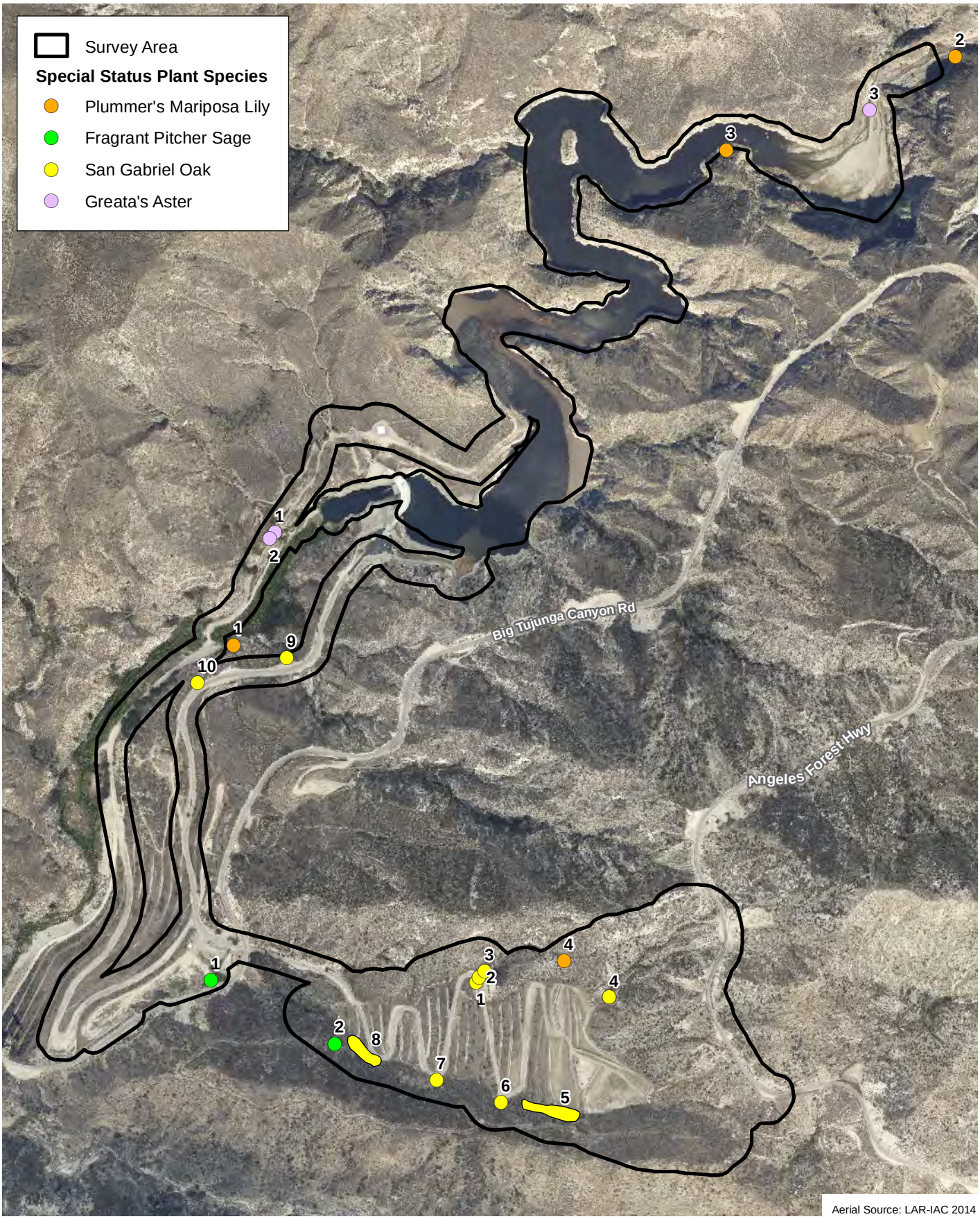

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Special Status Plant Species

Exhibit 5

Big Tujunga Reservoir Sediment Removal Project

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900 450 0 900

Feet

BonTerra PSOMAS

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ATTACHMENT A

PLANT COMPENDIUM

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
*Cedrus deodara**	Deodar cedar
SELAGINELLACEAE - SPIKE-MOSS FAMILY	
Selaginella bigelovii	bushy spike-moss
DRYOPTERIDACEAE - WOOD FERN FAMILY	
Dryopteris arguta	coastal woodfern
POLYPODIACEAE - POLYPODY FAMILY	
Polypodium californicum	California polypody
PTERIDACEAE - BRAKE FAMILY	
Adiantum jordanii	California maidenhair
Pellaea andromedifolia	coffee cliff-brake
Pellaea mucronata	bird's-foot cliff-brake
*Pteris vittata**	ladder brake
PINACEAE - PINE FAMILY	
*Pinus canariensis**	Canary Island pine
Pinus coulteri	Coulter pine
ADOXACEAE - MUSKROOT FAMILY	
Sambucus nigra ssp. *caerulea*	blue elderberry
ANACARDIACEAE - SUMAC FAMILY	
Malosma laurina	laurel sumac
Rhus ovata	sugar bush
Toxicodendron diversilobum	western poison oak
APIACEAE - CARROT FAMILY	
*Anthriscus caucalis**	bur-chervil
APOCYNACEAE - DOGBANE FAMILY	
Asclepias fascicularis	narrow-leaf milkweed
*Nerium oleander**	oleander
ASTERACEAE - SUNFLOWER FAMILY	
*Ageratina adenophora**	crofton weed
Ambrosia acanthicarpa	annual bur-sage
Ambrosia psilostachya	western ragweed
Artemisia californica	California sagebrush
Artemisia douglasiana	mugwort
Baccharis salicifolia ssp. *salicifolia*	mule fat
Brickellia californica	California brickellbush
Brickellia nevinii	Nevin's brickellbush
*Centaurea melitensis**	tocalote
Chaenactis artemisiifolia	white pincushion
Cirsium occidentale var. californicum	California thistle
Corethrogyne filaginifolia	common sand aster
Eclipta prostrata	false daisy
Ericameria cuneata var. cuneata	wedgeleaf goldenbush
Ericameria parishii var. parishii	Parish's goldenbush

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
*Erigeron bonariensis**	flax-leaved horseweed
Erigeron canadensis	horseweed
Eriophyllum confertiflorum var. confertiflorum	golden woolly sunflower
Gnaphalium palustre	western marsh cudweed
Heterotheca grandiflora	telegraph weed
Heterotheca sessiliflora	sessileflower goldenaster
*Hypochaeris glabra**	smooth cat's-ear
*Lactuca serriola**	prickly lettuce
Logfia filaginoides	California cottonrose
*Logfia gallica**	french cottonrose
Malacothrix saxatilis var. *tenuifolia*	slender leaf cliff malacothrix
Pseudognaphalium biolettii	bi-color everlasting
Pseudognaphalium californicum	California everlasting
Pseudognaphalium canescens	hairy everlasting
*Pseudognaphalium luteoalbum**	white lamb everlasting
Rafinesquia californica	California chicory
Senecio flaccidus	threadleaf ragwort
Solidago velutina ssp. *californica*	California goldenrod
Sonchus asper ssp. *asper**	prickly sow thistle
*Sonchus oleraceus**	common sow thistle
Stephanomeria sp.	wire-lettuce
Symphyotrichum greatae	Greata's aster
Tetradymia comosa	tufted cottonthorn
Uropappus lindleyi	Lindley's silverpuffs
Xanthium strumarium	cocklebur
BETULACEAE - BIRCH FAMILY	
Alnus rhombifolia	white alder
BORAGINACEAE - BORAGE FAMILY	
Cryptantha intermedia var. *intermedia*	common cryptantha
Cryptantha microstachys	Tejon cryptantha
Cryptantha muricata var. *jonesii*	Jones' cryptantha
Emmenanthe penduliflora	whispering bells
Eriodictyon crassifolium var. *crassifolium*	thickleaf yerba santa
Eriodictyon parryi	poodle-dog bush
Eucrypta chrysanthemifolia var. *chrysanthemifolia*	spotted hideseed
Phacelia cicutaria var. *hispida*	hairy caterpillar phacelia
Phacelia distans	wild heliotrope phacelia
Phacelia minor	wild canterbury bells
Phacelia ramosissima	branching phacelia
BRASSICACEAE - MUSTARD FAMILY	
Boechera arcuata	arching rockcress
*Hirschfeldia incana**	shortpod mustard

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
Nasturtium officinale	medicinal water cress
*Sisymbrium altissimum**	tumble mustard
*Sisymbrium orientale**	indian hedgemustard
Thysanocarpus curvipes	curvy fringepod
Thysanocarpus laciniatus	notch fringepod
CAPRIFOLIACEAE - HONEYSUCKLE FAMILY	
Lonicera subspicata var. *denudata*	Johnston's honeysuckle
CHENOPODIACEAE - GOOSEFOOT FAMILY	
*Chenopodium album**	lamb's quarters
*Dysphania botrys**	clustered goosefoot
*Salsola tragus**	prickly Russian thistle
CONVOLVULACEAE - MORNING-GLORY FAMILY	
Cuscuta californica var. *californica*	chaparral dodder
CRASSULACEAE - STONECROP FAMILY	
Dudleya cymosa ssp. *pumila*	canyon dwarf dudleya
CUCURBITACEAE - GOURD FAMILY	
Marah macrocarpa	chilicothe
DATISCACEAE - DATISCA FAMILY	
Datisca glomerata	durango root
ERICACEAE - HEATH FAMILY	
Arctostaphylos glauca	big berry manzanita
EUPHORBIACEAE - SPURGE FAMILY	
Euphorbia polycarpa	many seed spurge
*Ricinus communis**	castorbean
FABACEAE - LEGUME FAMILY	
Acmispon americanus var. *americanus*	American deervetch
Acmispon argophyllus var. *argophyllus*	silver-leaved deervetch
Acmispon glaber var. *glaber*	glabrous deerweed
Acmispon strigosus	strigose deervetch
Hosackia oblongifolia var. *oblongifolia*	oblong bird's-foot trefoil
Lathyrus vestitus var. *vestitus*	canyon sweet pea
Lupinus bicolor	miniature lupine
Lupinus concinnus	bajada lupine
Lupinus latifolius var. *latifolius*	broad leaf lupine
Lupinus truncatus	cut leaf lupine
*Medicago polymorpha**	variable burclover
*Melilotus albus**	white sweetclover
*Melilotus indicus**	indian sweetclover
*Robinia pseudoacacia**	black locust
*Spartium junceum**	Spanish broom
Trifolium variegatum var. *major*	large variegated clover

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
FAGACEAE - OAK FAMILY	
Quercus agrifolia var. *agrifolia*	coast live oak
Quercus berberidifolia	scrub oak
Quercus chrysolepis	canyon live oak
Quercus durata var. *gabrielensis*	San Gabriel oak
GERANIACEAE - GERANIUM FAMILY	
*Erodium botrys**	longbeak filaree
*Erodium cicutarium**	redstem filaree
GROSSULARIACEAE - GOOSEBERRY FAMILY	
Ribes indecorum	white flowering currant
LAMIACEAE - MINT FAMILY	
Lepechinia fragrans	fragrant pitcher sage
Mentha sp.	mint
Salvia apiana	white sage
Salvia columbariae	chia
Salvia mellifera	black sage
Stachys albens	whitestem hedgenettle
LOASACEAE - BLAZING STAR FAMILY	
Mentzelia affinis	white blazing star
Mentzelia dispersa	bushy blazing star
LYTHRACEAE - LOOSESTRIFE FAMILY	
*Lythrum hyssopifolia**	grass poly
MALVACEAE - MALLOW FAMILY	
Malacothamnus fremontii	Fremont's bush-mallow
*Malva sylvestris**	high mallow
MONTIACEAE - MINER'S-LETTUCE FAMILY	
Calyptridium monandrum	common pussypaws
Claytonia parviflora ssp. *parviflora*	small flowered miner's-lettuce
MORACEAE - MULBERRY FAMILY	
*Morus sp.**	mulberry
MYRTACEAE - MYRTLE FAMILY	
*Eucalyptus globulus**	blue gum
ONAGRACEAE - EVENING PRIMROSE FAMILY	
Camissoniopsis hirtella	hairy suncup
Camissoniopsis micrantha	miniature suncup
Clarkia dudleyana	Dudley's clarkia
Clarkia unguiculata	elegant clarkia
Epilobium canum ssp. *canum*	California fuchsia
Epilobium ciliatum ssp. *ciliatum*	fringed willowherb
Eulobus californicus	false-mustard
Oenothera elata	great marsh evening primrose

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
OROBANCHACEAE - BROOM-RAPE FAMILY	
Castilleja applegatei	Applegate's indian paintbrush
Castilleja foliolosa	woolly indian paintbrush
Orobanche fasciculata	clustered broom-rape
PAPAVERACEAE - POPPY FAMILY	
Argemone munita	chicalote
Dendromecon rigida	bush poppy
Ehrendorferia chrysantha	golden eardrops
Eschscholzia caespitosa	tufted poppy
Eschscholzia californica	California poppy
PHRYMACEAE - LOPSEED FAMILY	
Mimulus aurantiacus	bush monkeyflower
Mimulus brevipes	widethroat yellow monkeyflower
Mimulus cardinalis	scarlet monkeyflower
Mimulus floribundus	manyflowered monkeyflower
Mimulus guttatus	seep monkeyflower
Mimulus moschatus	musk monkeyflower
Mimulus pilosus	downy monkey flower
Mimulus rubellus	little redstem monkeyflower
PLANTAGINACEAE - PLANTAIN FAMILY	
Antirrhinum coulterianum	Coulter's snapdragon
Antirrhinum multiflorum	many-flowered snapdragon
Keckiella cordifolia	heart-leaved bush penstemon
Penstemon spectabilis var. *spectabilis*	showy beardtongue
*Plantago major**	common plantain
*Veronica anagallis-aquatica**	water speedwell
PLATANACEAE - SYCAMORE FAMILY	
Platanus racemosa	western sycamore
POLEMONIACEAE - PHLOX FAMILY	
Gilia brecciarum ssp. *brecciarum*	break gilia
Linanthus californicus	prickly phlox
POLYGONACEAE - BUCKWHEAT FAMILY	
Eriogonum davidsonii	Davidson's buckwheat
Eriogonum elongatum var. *elongatum*	longstem buckwheat
Eriogonum fasciculatum var. *foliolosum*	leafy California buckwheat
Eriogonum gracile var. *gracile*	slender woolly buckwheat
*Polygonum aviculare**	oval leaf knotweed
Pterostegia drymarioides	granny's hairnet
*Rumex acetosella**	sheep dock
*Rumex crispus**	curly dock
Rumex salicifolius	willow dock

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
RANUNCULACEAE - BUTTERCUP FAMILY	
Aquilegia formosa	handsome columbine
Clematis lasiantha	chaparral virgin's bower
Delphinium cardinale	scarlet larkspur
RHAMNACEAE - BUCKTHORN FAMILY	
Ceanothus crassifolius var. *crassifolius*	thick leaf ceanothus
Ceanothus leucodermis	whitebark ceanothus
Ceanothus oliganthus	hairy ceanothus
Frangula californica ssp. *californica*	California coffeeberry
Rhamnus ilicifolia	hollyleaf redberry
ROSACEAE - ROSE FAMILY	
Adenostoma fasciculatum	chamise
Cercocarpus betuloides var. *betuloides*	birch-leaf mountain mahogany
Heteromeles arbutifolia	toyon
Prunus ilicifolia	holly leaf cherry
Rubus ursinus	California blackberry
RUBIACEAE - COFFEE FAMILY	
Galium angustifolium ssp. *angustifolium*	narrow leaved bedstraw
Galium aparine	common bedstraw
SALICACEAE - WILLOW FAMILY	
Populus fremontii ssp. *fremontii*	Fremont cottonwood
Salix exigua	sandbar willow
Salix gooddingii	Goodding's black willow
Salix laevigata	red willow
Salix lasiandra var. *lasiandra*	shining willow
Salix lasiolepis	arroyo willow
SAXIFRAGACEAE - SAXIFRAGE FAMILY	
Boykinia rotundifolia	roundleaf brookfoam
SCROPHULARIACEAE - FIGWORT FAMILY	
*Verbascum thapsus**	woolly mullein
*Verbascum virgatum**	wand mullein
SOLANACEAE - NIGHTSHADE FAMILY	
*Nicotiana glauca**	tree tobacco
Solanum douglasii	Douglas' nightshade
Solanum xanti	chaparral nightshade
TAMARICACEAE - TAMARISK FAMILY	
*Tamarix ramosissima**	saltcedar
ULMACEAE - ELM FAMILY	
*Ulmus parvifolia**	Chinese elm
URTICACEAE - NETTLE FAMILY	
Urtica dioica ssp. *holosericea*	hoary nettle

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
ZYGOPHYLLACEAE - CALTROP FAMILY	
*Tribulus terrestris**	puncture vine
AGAVACEAE - AGAVE FAMILY	
Hesperoyucca whipplei	chaparral yucca
ARACEAE - ARUM FAMILY	
Lemna sp.	duckweed
CYPERACEAE - SEDGE FAMILY	
Carex alma	sturdy sedge
Carex aurea	golden sedge
Carex barbarae	Santa Barbara sedge
Carex praegracilis	slender sedge
Eleocharis acicularis var. *acicularis*	needle spikerush
Eleocharis parishii	Parish's spikerush
HYDROCHARITACEAE - WATERWEED FAMILY	
Najas sp.	water-nymph
IRIDACEAE - IRIS FAMILY	
*Iris germanica**	german iris
Sisyrinchium bellum	western blue-eyed-grass
JUNCACEAE - RUSH FAMILY	
Juncus bufonius var. *bufonius*	toad rush
Juncus effusus	soft rush
Juncus macrophyllus	long leaf rush
Juncus mexicanus	Mexican rush
Juncus oxymeris	pointed rush
LILIACEAE - LILY FAMILY	
Calochortus plummerae	Plummer's mariposa lily
ORCHIDACEAE - ORCHID FAMILY	
Epipactis gigantea	giant stream orchid
POACEAE - GRASS FAMILY	
Agrostis sp.	bentgrass
Andropogon glomeratus var. *scabriglumis*	southwestern bushy bluestem
*Avena barbata**	slender wild oat
*Bromus diandrus**	ripgut brome
Bromus madritensis ssp. *rubens**	red brome
*Bromus sterilis**	poverty brome
*Bromus tectorum**	cheat grass
*Cortaderia selloana**	Selloa pampas grass
*Cynodon dactylon**	bermuda grass
Elymus condensatus	giant wildrye
Elymus glaucus	western wildrye
*Festuca myuros**	rattail fescue
*Festuca perennis**	rye grass

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
*Hordeum murinum**	wall barley
Melica imperfecta	coast range onion grass
Muhlenbergia rigens	deer grass
Panicum acuminatum var. *fasciculatum*	narrow tip panic grass
*Polypogon monspeliensis**	rabbit foot beard grass
*Polypogon viridis**	water beard grass
*Schismus arabicus**	Arabian schismus
Stipa coronata	crested needle grass
Stipa miliacea var. *miliacea**	smilo grass
THEMIDACEAE - BRODIAEA FAMILY	
Dichelostemma capitatum	blue dicks
TYPHACEAE - CATTAIL FAMILY	
Typha latifolia	broad-leaved cattail
* non-native species	

ATTACHMENT B

REPRESENTATIVE PHOTOGRAPHS



Plummer's mariposa lily habitat; the species was observed at this location on June 8, 2016.



San Gabriel Oak observed on May 18, 2016, in Maple Canyon.

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Special Status Plant Photographs

Attachment B-1

Big Tujunga Reservoir Sediment Removal Project

BonTerra PSOMAS

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Greata's aster observed on May 18, 2016, at the upstream end of the reservoir.



Greata's aster habitat at the upstream end of the reservoir; Greata's aster is visible in the bottom center.

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Special Status Plant Photographs

Attachment B-2

Big Tujunga Reservoir Sediment Removal Project

BonTerra PSOMAS

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Fragrant pitcher sage observed on May 4, 2016, adjacent to Big Tujunga Canyon Road.



Fragrant pitcher sage observed on June 7, 2016, adjacent to Big Tujunga Canyon Road.

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Special Status Plant Photographs

Attachment B-3

Big Tujunga Reservoir Sediment Removal Project

BonTerra PSOMAS

(07/14/2016 LEW) H:\Projects\CoLADPW (DPW)\J293\Graphics\Plants\ExB_SP_20160714.pdf

ATTACHMENT C

CALIFORNIA NATURAL DIVERSITY DATABASE FORMS

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@wildlife.ca.gov

Date of Field Work (mm/dd/yyyy): 05/18/2016

For Office Use Only
Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Symphyotrichum greatae*

Common Name: Greata's aster

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 10 Subsequent Visit? (●) Yes ( ) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [ ] No [X] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Allison Rudalevige
Address: Psomas 3 Hutton Centre Drive, STE 200
Santa Ana, CA 92707-8794
E-mail Address: allison.rudalevige@psomas.com
Phone: 714-481-8024

Plant Information

Phenology:
25 % vegetative | 62 % flowering | 13 % fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

[ ] wintering [ ] breeding [ ] nesting [ ] rookery [ ] burrow site [ ] lek [ ] other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Big Tujunga Dam Reservoir, Angeles National Forest

County: Los Angeles Landowner / Mgr: Angeles National Forest
Quad Name: Condor Peak Elevation: 2,200 feet
T 2N R 13W Sec 1 , ___ 1/4 of ___ 1/4, Meridian: H ( ) M ( ) S (●) Source of Coordinates (GPS, topo. map & type): GPS
T 3N R 12W Sec 31 , ___ 1/4 of ___ 1/4, Meridian: H ( ) M ( ) S (●) GPS Make & Model: Garmin eTrex Vista
DATUM: NAD27 ( ) NAD83 (●) WGS84 ( ) Horizontal Accuracy: 15 feet meters/feet
Coordinate System: UTM Zone 10 ( ) UTM Zone 11 (●) *OR* Geographic (Latitude & Longitude) ( )
Coordinates: Population 1: 0390456mE, 3795277mN; Population 2: 0390445mE, 3795265mN; Population 3: 0391681mE, 3796149mN

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Five individuals observed at two location on rocky cliff face of freshwater seep with slope of 150% and aspect east. Associated species are Ageratina adenophora, Agrostis sp., Epipactis gigantea, Mimulus cardinalis, Sisyrinchium bellum, Adiantum jordanii, Stipa miliacea var. miliacea, Epilobium canum ssp. canum, and Populus fremontii ssp. fremontii. Five individuals observed in sandy alluvium of the active floodplain of Big Tujunga Creek. Associated species are Salix lasiolepis, Baccharis salicifolia ssp. salicifolia, Typha latifolia, Xanthium strumarium, and Ageratina adenophora.

Please fill out separate form for other rare taxa seen at this site.

Site Information

Overall site/occurrence quality/viability (site + population): ( ) Excellent ( ) Good (●) Fair ( ) Poor
Immediate AND surrounding land use: Big Tujunga Dam and access road; open space
Visible disturbances: adjacent access road to Big Tujunga Dam
Threats: sediment removal and transport from above Big Tujunga Dam to the Maple Canyon sediment placement site.
Comments:

Determination: *(check one or more, and fill in blanks)*

[ ] Keyed (cite reference): _____
[ ] Compared with specimen housed at: _____
[ ] Compared with photo / drawing in: _____
[X] By another person (name): Katie Gallagher
[ ] Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	[ ]	[ ]	[X]
Habitat	[ ]	[ ]	[X]
Diagnostic feature	[ ]	[ ]	[ ]

May we obtain duplicates at our expense? (●) yes ( ) no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@wildlife.ca.gov

Date of Field Work (mm/dd/yyyy): 06/08/2016

For Office Use Only
Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Phrynosoma blainvillii*

Common Name: coast horned lizard

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 1 Subsequent Visit? (●) Yes ( ) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [ ] No [X] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Allison Rudalevige
Address: Psomas 3 Hutton Centre Drive, STE 200
Santa Ana, CA 92707-8794
E-mail Address: allison.rudalevige@psomas.com
Phone: 714-481-8024

Plant Information

Phenology:

_____ % vegetative _____ % flowering _____ % fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

[ ] wintering [ ] breeding [ ] nesting [ ] rookery [ ] burrow site [ ] lek [ ] other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Maple Canyon near Big Tujunga Dam Reservoir, Angeles National Forest

County: Los Angeles Landowner / Mgr: Angeles National Forest

Quad Name: Condor Peak Elevation: 2,485 feet

T 3N R 12W Sec 31 , ____ 1/4 of ____ 1/4, Meridian: H ( ) M ( ) S (●) Source of Coordinates (GPS, topo. map & type): iPhone

T ____ R ____ Sec ____ , ____ 1/4 of ____ 1/4, Meridian: H ( ) M ( ) S (●) GPS Make & Model: iPhone 5S

DATUM: **NAD27** ( ) **NAD83** (●) **WGS84** ( ) Horizontal Accuracy: 20 feet meters/feet

Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) ***OR*** Geographic (Latitude & Longitude) (●)

Coordinates: 34°16'59.93", -118°11'17.25"

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

One individual observed basking in sandy substrate of graded area next to access road for Maple Canyon sediment placement site. Proceeded to bury itself in the substrate.

Please fill out separate form for other rare taxa seen at this site.

Site Information

Overall site/occurrence quality/viability (site + population): ( ) Excellent ( ) Good (●) Fair ( ) Poor

Immediate AND surrounding land use: Maple Canyon sediment placement site and access road; open space

Visible disturbances: adjacent access road to Maple Canyon sediment placement site

Threats: sediment removal and transport from above Big Tujunga Dam to the Maple Canyon sediment placement site.

Comments:

Determination: *(check one or more, and fill in blanks)*

[ ] Keyed (cite reference): _____
[ ] Compared with specimen housed at: _____
[X] Compared with photo / drawing in: http://www.californiaherps.com/index.html
[ ] By another person (name): _____
[ ] Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	[ ]	[ ]	[X]
Habitat	[ ]	[ ]	[ ]
Diagnostic feature	[ ]	[ ]	[ ]

May we obtain duplicates at our expense? (●) yes ( ) no

March 13, 2017

Alex Ho
Water Resources Division
Department of Public Works
County of Los Angeles
900 South Fremont Avenue
Alhambra, California 91803-1331

VIA EMAIL
AlHo@dpw.lacounty.gov

Subject: Results of 2016 Focused Plant Surveys for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles County, California

Dear Mr. Ho:

This Letter Report presents the findings of 2016 focused plant surveys conducted for the Big Tujunga Reservoir Sediment Removal Project (hereinafter referred to as "the proposed Project") in Los Angeles County, California (Exhibit 1).

SURVEY AREA

Big Tujunga Canyon is located on the southern edge of the San Gabriel Mountains in the Angeles National Forest and is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute topographic quadrangle at the following Townships (T), Ranges (R), and Sections (S): T 2 North, R 12 West, S 06; T 2 North, R 13 West, S 01; and T 3 North, R 12 West, S 31 (Exhibit 2).

The survey area consists of the slopes along Big Tujunga Creek, both the reservoir upstream of Big Tujunga Dam and the creek below the dam, and the adjacent Maple Canyon Sediment Placement Site (SPS). Topography above the dam consists of sheer cliffs and steep slopes. Below the dam, road cuts have terraced the slopes southeast of the creek. Maple Canyon is a more open canyon with moderate to steep slopes; it has been partially filled with sediment. Elevations range from approximately 2,150 to 3,400 feet above mean sea level (msl). The survey area and surrounding vicinity consist of open space in the Angeles National Forest. The survey area for special status plants consists of the project impact areas; a 50-foot buffer around the sediment removal area; and an approximately 100-foot buffer around the haul routes and the Maple Canyon SPS.

Soils in the survey area consist of Trigo, granitic substratum-Modjeska families association (5 to 60 percent slopes); Rock outcrop-Chilao family-Haploxerolls, warm association (15 to 120 percent slopes); Typic Xerorthents, warm (55 to 90 percent slopes); Olete-Kilburn-Etsel families complex (50 to 80 percent slopes), and Stukel-Sur-Winthrop families complex (60 to 100 percent slopes) (Exhibit 3).

The following vegetation types and land covers were observed in the survey area: California sycamore woodland, coastal sage scrub, chamise chaparral, scrub oak chaparral, mixed chaparral, California annual grassland, disturbed freshwater seep, riparian herb, willow riparian forest, willow riparian scrub, white alder–Fremont cottonwood–willow riparian forest, coast live oak stands, bigcone Douglas-fir–canyon live oak woodland (forest), open water, streambed, cliff, ornamental, and developed (Exhibit 4). Many of these areas were burned in the 2009 Station Fire, but are now recovered.

METHODS

Botanical surveys were floristic in nature and conducted following the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009). A literature search was conducted to identify special status plant species reported to occur in the vicinity of the survey area. Sources reviewed include the USGS Sunland, Condor Peak, Chilao Flat, Burbank, Pasadena, and Mount Wilson 7.5-minute quadrangles in the California Native Plant Society's (CNPS') Locational Inventory of Rare and Endangered Vascular Plants of California (CNPS 2016) and the California Department of Fish and Wildlife's (CDFW's) California Natural Diversity Database (CNDDB) (CDFW 2016a).

Rainfall received in the winter and spring determines the germination of many annual and perennial herb species. According to the Western Regional Climate Center, the region (data taken from Big Tujunga Dam) received 21.74 inches of precipitation between May 1, 2015 and April 30, 2016; the average annual precipitation is 25.56 inches (WRCC 2016). This is the fourth consecutive year of below average rainfall in the project region.

Reference populations were monitored for annual and difficult-to-detect target species to ensure that the scheduled surveys were comprehensive and conducted during the appropriate blooming period for these species, as shown in Table 1. Reference populations of species with a California Rare Plant Rank (CRPR) of 3 or 4[1], and perennial species that are readily observable were not monitored. Known reference populations of Davidson's bush-mallow (*Malacothamnus davidsonii*), fragrant pitcher sage (*Lepechinia fragrans*), Greata's aster (*Symphyotrichum greatae*), and California satintail (*Imperata brevifolia*) were monitored to confirm their flowering status and to verify that surveys were conducted during the appropriate blooming period for these species. Based on the reference survey results, the surveys were conducted during a timeframe when the target plant species were observable.

TABLE 1
SPECIAL STATUS PLANT SPECIES REFERENCE POPULATIONS

Species	Status	Date Checked	General Location
Malacothamnus davidsonii Davidson's bush-mallow	Flowering	May 12, 2016	Pacoima Reservoir
Lepechinia fragrans fragrant pitcher sage	Early flowering	May 4, 2016	Survey Area
Symphyotrichum greatae Greata's aster	Early flowering	May 4, 2016	Survey Area
Imperata brevifolia California satintail	Flowering	May 18, 2016	Wildwood picnic area, Angeles National Forest

[1] Species with a California Rare Plant Rank of 3 or 4 are not considered Rare, Threatened, or Endangered, but are on a review list or watch list, respectively.

Surveys were conducted on May 4 and 18 and June 7 and 8, 2016, by Psomas Senior Biologist Allison Rudalevige and Biologist Katie Gallagher and on September 13, 2016, by Ms. Rudalevige and Psomas Biologist Jonathan Aguayo. The total number of person-hours spent surveying was approximately 66 hours. A systematic survey was conducted in all areas of suitable special status plant habitat within the survey area. In the reservoir portion of the survey area, a boat was used to access the Big Tujunga Creek portion of the survey area upstream of the dam; the surrounding cliffs and steep slopes were scanned with binoculars from the boat. Portions of the survey area that were not safely accessible due to the steepness of the terrain were also scanned with binoculars.

All plant species observed were recorded in field notes. Plant species were identified in the field or collected for later identification. Plants were identified to the taxonomic level necessary to determine whether or not they are a special status species. Plants were identified using taxonomic keys, descriptions, and illustrations in Jepson Herbarium (2015), Hickman (1993), and Munz (1974). Taxonomy and nomenclature follows CDFW (2016b) for scientific and common names of special status plant species and Jepson Herbarium (2015) for the names of all other species.

For each special status species population observed, data was collected on the number and phenology of individuals and microsite characteristics such as slope, aspect, soil texture, surrounding habitat, and associated species.

SURVEY RESULTS

Table 2 identifies the special status plants reported from the literature review with their status; their potential to occur in the survey area; and the survey results. Four special status plant species were observed during focused surveys: Plummer's mariposa lily (*Calochortus plummerae*), fragrant pitcher sage, San Gabriel oak (*Quercus durata* ssp. *gabrielensis*), and Greata's aster. A list of all plants observed during the 2016 surveys is included in Attachment A.

Special status plant observations are discussed in more detail below and are shown in Exhibit 5. Voucher specimens were not collected due to the small population sizes observed. Representative photographs of each species are included in Attachment B. A CNDDB Field Survey Form for Greata's aster is included in Attachment C; CNDDB forms will not be submitted for Plummer's mariposa lily, fragrant pitcher sage, or San Gabriel Oak because the CNDDB does not track lower status species (i.e., CRPR List 4 species).

TABLE 2
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE VICINITY OF THE SURVEY AREA

Species	Status				Potential to Occur in the Survey Area and Survey Results
	USFWS	CDFW	CRPR	USFS	
Arctostaphylos glandulosa ssp. *gabrielensis* San Gabriel manzanita	—	—	1B.2	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Astragalus brauntonii Braunton's milk-vetch	FE	—	1B.1	—	Outside current known range; therefore, not expected to occur.
Atriplex parishii Parish's brittlescale	—	—	1B.1	—	No suitable habitat; therefore not expected to occur.
Berberis nevinii Nevin's barberry	FE	SE	1B.1	—	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
California macrophylla round-leaved filaree	—	—	1B.2	—	No suitable habitat; therefore not expected to occur.

TABLE 2
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE VICNITY OF THE SURVEY AREA

Species	Status				Potential to Occur in the Survey Area and Survey Results
	USFWS	CDFW	CRPR	USFS	
Calochortus clavatus var. *gracilis* slender mariposa lily	—	—	1B.2	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Calochortus palmeri var. *palmeri* Palmer's mariposa lily	—	—	1B.2	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
***Calochortus plummerae* Plummer's mariposa lily**	**—**	**—**	**4.2**	**—**	**Observed; suitable habitat.**
Calochortus striatus alkali mariposa lily	—	—	1B.2	FSS	No suitable habitat and outside current known range; therefore, not expected to occur.
Camissoniopsis lewisii Lewis' evening-primrose	—	—	3	—	Outside current known range; therefore, not expected to occur.
Castilleja gleasonii Mount Gleason paintbrush	—	SR	1B.2	FSS	No suitable habitat and outside current known range; therefore, not expected to occur.
Centromadia parryi ssp. *australis* southern tarplant	—	—	1B.1	—	No suitable habitat; therefore not expected to occur.
Centromadia pungens ssp. *laevis* smooth tarplant	—	—	1B.1	—	Outside current known range; therefore, not expected to occur.
Chorizanthe parryi var. *fernandina* San Fernando Valley spineflower	FC	SE	1B.1	—	Outside current known range; therefore, not expected to occur.
Chorizanthe parryi var. *parryi* Parry's spineflower	—	—	1B.1	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Cladium californicum California saw-grass	—	—	2B.2	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Dodecahema leptoceras slender-horned spineflower	FE	SE	1B.1	—	No suitable habitat; therefore not expected to occur.
Dudleya multicaulis many-stemmed dudleya	—	—	1B.2	FSS	No suitable habitat; therefore not expected to occur.
Galium grande San Gabriel bedstraw	—	—	1B.2	FSS	No suitable habitat; therefore not expected to occur.
Helianthus nuttallii ssp. *parishii* Los Angeles sunflower	—	—	1A	—	No suitable habitat and presumed extinct; therefore, not expected to occur.
Horkelia cuneata ssp. *puberula* mesa horkelia	—	—	1B.1	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Imperata brevifolia California satintail	—	—	2B.1	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields	—	—	1B.1	—	No suitable habitat; therefore not expected to occur.
***Lepechinia fragrans* fragrant pitcher sage**	**—**	**—**	**4.2**	**FSS**	**Observed; suitable habitat.**
Lepidium virginicum var. *robinsonii* Robinson's pepper-grass	—	—	4.3	—	No suitable habitat; therefore not expected to occur.
Linanthus concinnus San Gabriel linanthus	—	—	1B.2	FSS	Outside known elevational range; therefore, not expected to occur.
Linanthus orcuttii Orcutt's linanthus	—	—	1B.3	FSS	Outside current known range; therefore, not expected to occur.
Lupinus peirsonii Peirson's lupine	—	—	1B.3	FSS	Outside current known range; therefore, not expected to occur.

TABLE 2
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE VICNITY OF THE SURVEY AREA

Species	Status				Potential to Occur in the Survey Area and Survey Results
	USFWS	CDFW	CRPR	USFS	
Malacothamnus davidsonii Davidson's bush-mallow	—	—	1B.2	—	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Muhlenbergia californica California muhly	—	—	4.3	—	No suitable habitat; therefore not expected to occur.
Opuntia basilaris var. *brachyclada* short-joint beavertail	—	—	1B.2	—	No suitable habitat; therefore not expected to occur.
Orobanche valida ssp. *valida* Rock Creek broomrape	—	—	1B.2	FSS	No suitable habitat and outside known elevational range; therefore, not expected to occur.
Pseudognaphalium leucocephalum white rabbit-tobacco	—	—	2B.2	—	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
***Quercus durata* var. *gabrielensis* San Gabriel oak**	**—**	**—**	**4.2**	—	**Observed; suitable habitat.**
Ribes divaricatum var. *parishii* Parish's gooseberry	—	—	1A	—	No suitable habitat and presumed extinct; therefore, not expected to occur.
***Symphyotrichum greatae* Greata's aster**	**—**	**—**	**1B.3**	—	**Observed; suitable habitat.**
Symphyotrichum defoliatum San Bernardino aster	—	—	1B.2	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.
Thelypteris puberula var. *sonorensis* Sonoran maiden fern	—	—	2B.2	FSS	Potentially suitable habitat, but not observed during focused surveys; therefore, not expected to occur.

USFWS: U.S. Fish and Wildlife Service; CDFW: California Department of Fish and Wildlife; CRPR: California Rare Plant Rank; USFS: U.S. Forest Service.

Federal (USFWS)
FE Endangered
FC Candidate

State (CDFW)
SE Endangered
SR Rare

Federal (USFS)
FSS Forest Service Sensitive

California Rare Plant Rank (CRPR)
1A Plants Presumed Extinct in California
1B Plants Rare, Threatened, or Endangered Throughout Their Range
2B Plants Rare, Threatened, or Endangered in California But More Common Elsewhere
3 Plants of About Which We Need More Information – A Review List
4 Plants of Limited Distribution – A Watch List

CRPR Threat Rank Extensions
None Plants lacking any threat information
.1 Seriously Endangered in California (over 80% of occurrences threatened; high degree and immediacy of threat)
.2 Fairly Endangered in California (20–80% of occurrences threatened)
.3 Not Very Threatened in California (low degree/immediacy of threat or no current threats known)

Plummer's Mariposa Lily

Plummer's mariposa lily has a CRPR of 4.2. It typically blooms between May and July. This perennial bulbiferous herb occurs in dry, rocky chaparral and yellow-pine forest at elevations between sea level and approximately 5,577 feet above msl. This species is known from the South Coast, Transverse Ranges, and Peninsular Ranges (Jepson Herbarium 2015). Ten individuals were observed in four populations (three of which were new) during the survey (Exhibit 5; Table 3). Two of the populations were observed on the cliff faces above Big Tujunga Reservoir; one population was observed along the haul route below the reservoir; and one population was observed in the Maple Canyon SPS. Note that during the 2011 survey, 30 individuals were observed in 5 populations; of the 2011 locations, only 1 had lilies blooming in 2016.

TABLE 3
PLUMMER'S MARIPOSA LILY POPULATIONS OBSERVED

Population	Number of Individuals	Phenology (%)			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
1	5	—	100	—	open chaparral	rocky slope	steep	SW	thickleaf yerba santa (*Eriodictyon crassifolium* var. *crassifolium*), chamise (*Adenostoma fasciculatum*), leafy California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), bush poppy (*Dendromecon rigida*), and scarlet larkspur (*Delphinium cardinale*).
2	3	—	100	—	open chaparral	rocky slope	steep	SW	chamise, bush poppy, leafy California buckwheat, longstem buckwheat (*Eriogonum elongatum* var. *elongatum*), and red brome (*Bromus madritensis* ssp. *rubens*).
3	1	—	100	—	open chaparral	rocky slope	steep	N	birch-leaf mountain mahogany (*Cercocarpus betuloides* var. *betuloides*), chaparral yucca (*Hesperoyucca whipplei*), scarlet larkspur, and bushy spike-moss (*Selaginella bigelovii*).
4	1	—	100	—	open chaparral	rocky knoll	steep	S	chamise, black sage (*Salvia mellifera*), thickleaf yerba santa, leafy California buckwheat, and crested needle grass (*Stipa coronata*).
Total	**10**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

SW: southwest; N: north; S: south; N/A: not applicable

Fragrant Pitcher Sage

Fragrant pitcher sage has a CRPR of 4.2 and is listed as a sensitive species for the Angeles National Forest by the U.S. Forest Service (USFS). It typically blooms between March and October (Jepson Herbarium 2015). This perennial shrub occurs in chaparral vegetation at elevations between sea level and approximately 4,265 feet above msl. It is known from the Western Transverse Ranges, the San Gabriel Mountains, the South Coast, and the northern Channel Islands. Nine individuals were observed in two populations in dense scrub oak chaparral and coastal sage scrub in the survey area (Exhibit 5; Table 4). One population was observed adjacent to Big Tujunga Canyon Road and the other population is located in the Maple Canyon SPS. Both of these populations had been observed in 2011. Note that, during 2011 surveys, an additional population of three individuals was documented in the Maple Canyon SPS; this area was inaccessible during the current survey due to the dense vegetation.

TABLE 4
FRAGRANT PITCHER SAGE POPULATIONS OBSERVED

Population	Number of Individuals	Phenology (%)			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
1	7	100	—	—	scrub oak chaparral/ coastal sage scrub	rocky loam	moderate	N, NW	leafy California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), birch-leaf mountain-mahogany (*Cercocarpus betuloides* var. *betulodies*), California everlasting (*Pseudognaphalium californicum*), narrow leaved bedstraw (*Galium angustifolium* ssp. *angustifolium*), scrub oak (*Quercus berberidifolia*), heart-leaved bush penstemon (*Keckiella cordifolia*), and bush monkeyflower (*Mimulus aurantiacus*).
2	2	100	—	—	scrub oak chaparral	rocky loam	moderate	N	California-lilac (*Ceanothus* sp.), heart-leaved bush penstemon, bush poppy (*Dendromecon rigida*), leafy California buckwheat, and California brickellbush (*Brickellia californica*).
Total	**9**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

N: north; NW: northwest; N/A: not applicable

San Gabriel Oak

San Gabriel oak has a CRPR of 4.2. It occurs on granitic soil in chaparral at elevations between approximately 1,475 and 3,280 feet above msl (Jepson Herbarium 2015). It is known from the southeast Western Transverse Ranges and south slopes of the San Gabriel Mountains. Eighty-four individuals were observed in ten populations in the Maple Canyon SPS and along the haul route below the reservoir in mixed chaparral, chamise chaparral, and scrub oak chaparral (Exhibit 5; Table 5). In 2011, 48 individuals were observed in 3 populations. The increase in the number of individuals observed is likely due to survey timing—acorn production was at a peak during the final 2016 survey and individuals were easily visible in dense chaparral vegetation.

TABLE 5
SAN GABRIEL OAK POPULATIONS OBSERVED

Population	Number of Individuals	Phenology (%)			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
1	7	—	—	100	mixed chaparral	rocky sandy loam	on outcrop	W	holly-leaved cherry (*Prunus ilicifolia*), leafy California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), longstem buckwheat (*Eriogonum elongatum* var. *elongatum*), bush poppy (*Dendromecon rigida*), chaparral yucca (*Hesperoyucca whipplei*), bush monkeyflower (*Mimulus aurantiacus*), California everlasting (*Pseudognaphalium californicum*), and ripgut brome (*Bromus diandrus*).
2	10	—	—	100	mixed chaparral	rocky sandy loam	steep	N	toyon (*Heteromeles arbutifolia*), hollyleaf redberry (*Rhamnus ilicifolia*), chaparral yucca, bush poppy, coastal woodfern (*Dryopteris arguta*), slender leaf cliff malacothrix (*Malacothrix saxatilis* var. *tenuifolia*), small-flowered miner's-lettuce (*Claytonia parviflora* ssp. *parviflora*), hairy ceanothus (*Ceanothus oliganthus*), chilicothe (*Marah macrocarpa*), and California everlasting.

TABLE 5
SAN GABRIEL OAK POPULATIONS OBSERVED

Population	Number of Individuals	Phenology (%)			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
3	3	—	—	100	chamise chaparral	rock	steep	S	chamise (*Adenostoma fasciculatum*), thickleaf yerba santa (*Eriodictyon crassifolium* var. *crassifolium*), leafy California buckwheat, bush monkeyflower, chaparral yucca, threadleaf ragwort (*Senecio flaccidus*), and black sage (*Salvia mellifera*).
4	10	—	—	100	mixed chaparral	sandy loam	steep	W	sugar bush (*Rhus ovata*), laurel sumac (*Malosma laurina*), California everlasting, and bush poppy.
5	24	4	—	96	scrub oak chaparral	sandy loam	steep	N	toyon, hairy Ceanothus, bush poppy, chilicothe, California everlasting, and chaparral virgin's bower (*Clematis lasiantha*)
6	10	10	—	90	scrub oak chaparral	sandy loam	steep	N	toyon, hairy Ceanothus, bush poppy, chilicothe, California everlasting, and chaparral virgin's bower (*Clematis lasiantha*)
7	1	—	—	100	scrub oak chaparral	sandy loam	steep	N	toyon, hairy Ceanothus, bush poppy, chilicothe, California everlasting, and chaparral virgin's bower
8	16	—	—	100	scrub oak chaparral	sandy loam	steep	N	toyon, hairy Ceanothus, bush poppy, chilicothe, California everlasting, and chaparral virgin's bower
9	2	—	—	100	mixed chaparral	rocky loam	at road cut	N	toyon, leafy California buckwheat
10	1	—	—	100	chamise chaparral	rocky loam	at road cut	N	chamise, thickleaf yerba santa, leafy California buckwheat
Total	**84**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

W: west; N: north; S: south; N/A: not applicable

Greata's Aster

Greata's aster has a CRPR of 1B.3. It typically blooms between August and October (Jepson Herbarium 2015). This rhizomatous perennial herb occurs in damp places in canyons at elevations between approximately 985 and 6,560 feet above msl. It is known from the southern slopes of the San Gabriel Mountains. A total of ten individuals were observed at three locations (one of which was new) in the survey area (Exhibit 5, Table 6). Five individuals were observed in two populations at a freshwater seep along the haul route (previously observed in 2011) and five individuals were observed at the creek edge at the upstream end of the reservoir (Exhibit 5; Table 6). Conditions at the seep were similar to those observed in 2011.

TABLE 6
GREATA'S ASTER POPULATIONS OBSERVED

Population	Number of Individuals	Percent Phenology			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
1	1	—	100	—	freshwater seep	rock (cliff face)	steep	E	crofton weed (*Ageratina adenophora*), bentgrass (*Agrostis* sp.), giant stream orchid (*Epipactis gigantea*), scarlet monkeyflower (*Mimulus cardinalis*), western blue-eyed-grass (*Sisyrinchium bellum*), California maidenhair (*Adiantum jordanii*), smilo grass (*Stipa miliacea* var. *miliacea*)
2	4	75	25	—	freshwater seep	rock (cliff face)	steep	E	crofton weed, California fuchsia (*Epilobium canum* ssp. *canum*), western blue-eyed-grass, giant stream orchid, smilo grass, Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), scarlet monkeyflower

TABLE 6
GREATA'S ASTER POPULATIONS OBSERVED

Population	Number of Individuals	Percent Phenology			Habitat	Soil	Slope	Aspect	Associated Species
		Vegetative	Flowering	Fruiting					
3	5	—	60	40	streambed	sandy alluvium	flat canyon bottom	N/A	arroyo willow (*Salix lasiolepis*), mule fat (*Baccharis salicifolia* ssp. *salicifolia*), broad-leaved cattail (*Typha latifolia*), cocklebur (*Xanthium strumarium*), and crofton weed.
Total	**10**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
E: east; N/A: not applicable									

PROJECT IMPACTS

All observed Plummer's mariposa lily and fragrant pitcher sage populations are located outside the proposed Project impact area. Therefore, there would be no impacts on these species and no mitigation would be required.

San Gabriel Oak Population 4 and a portion of Population 5 are located in the proposed impact area of the Maple Canyon SPS. This species is on a "watch list" for plants of limited distribution. Due to the relatively common distribution of this species in the region, proposed Project impacts are not expected to reduce the regional populations below self-sustaining levels. Therefore, impacts would be considered adverse, but less than significant under the California Environmental Quality Act (CEQA) and mitigation would not be required. The remaining oak populations are located outside the proposed Project impact area.

Greata's aster Population 3 is located at the upper end of the area proposed for sediment removal above Big Tujunga Dam. As a species considered rare throughout its range (CRPR 1B.3), impacts on this species would be considered potentially significant under CEQA and, therefore, would require mitigation if impacted. Mitigation measures included in the CEQA document require that pre-construction surveys would be conducted and any populations of Greata's aster near the sediment removal area would be flagged for avoidance. If Greata's aster is observed in the sediment removal boundary, then the impact boundary will be adjusted to avoid the location of Greata's aster. The remaining populations observed during 2016 surveys are located along the proposed haul route and are not expected to be affected by the proposed Project because no ground-disturbing activities are expected outside the haul routes.

CONCLUSIONS AND RECOMMENDATIONS

The 2016 survey results were consistent with the results of the previous 2011 surveys; no new species were observed. Observed differences in population sizes are not unexpected; population sizes may fluctuate for a variety of reasons, such as differences in annual rainfall. Additionally, every individual doesn't bloom every year; thus, when populations are of limited size and extent, they may be detectable one year and not another depending on the collective flowering of the individuals in that population.

However, it is expected that if a large population were present, it would be detectable (assuming adequate rainfall) because there would always be some individuals blooming.

A pre-construction survey by a qualified Biologist will be conducted in the spring prior to sediment removal to flag Greata's aster populations near the sediment removal footprint for avoidance. Additionally, pre-construction surveys would flag populations of Plummer's mariposa lily, fragrant pitcher sage, San Gabriel oak, and Greata's aster that are located adjacent to the haul routes and sediment placement site so they would not be inadvertently impacted by project activities.

Although reference populations and regional rainfall amounts were monitored to ensure the scientific adequacy of these focused surveys, there is always a minimal potential for false negative survey results as species could possibly be present on a site but may not be detectable at the time of the surveys.

Coast horned lizard (*Phrynosoma blainvillii*), a California Species of Special Concern, was incidentally observed in the Maple Canyon SPS during the focused plant survey; a CNDDB form for this observation is included in Attachment C.

If you have any comments or questions, please call Amber Heredia at (714) 751-7373.

Sincerely,
BonTerra Psomas

Amber O. Heredia
Senior Project Manager

Allison D. Rudalevige
Senior Biologist

Enclosures: Exhibit 1 – Project Location
Exhibit 2 – U.S. Geological Survey 7.5-Minute Quadrangle
Exhibit 3 – Soil Types
Exhibit 4 – Vegetation Types and Other Areas
Exhibit 5 – Special Status Plant Species
Attachment A – Plant Compendium
Attachment B – Representative Photographs
Attachment C – California Natural Diversity Database Forms

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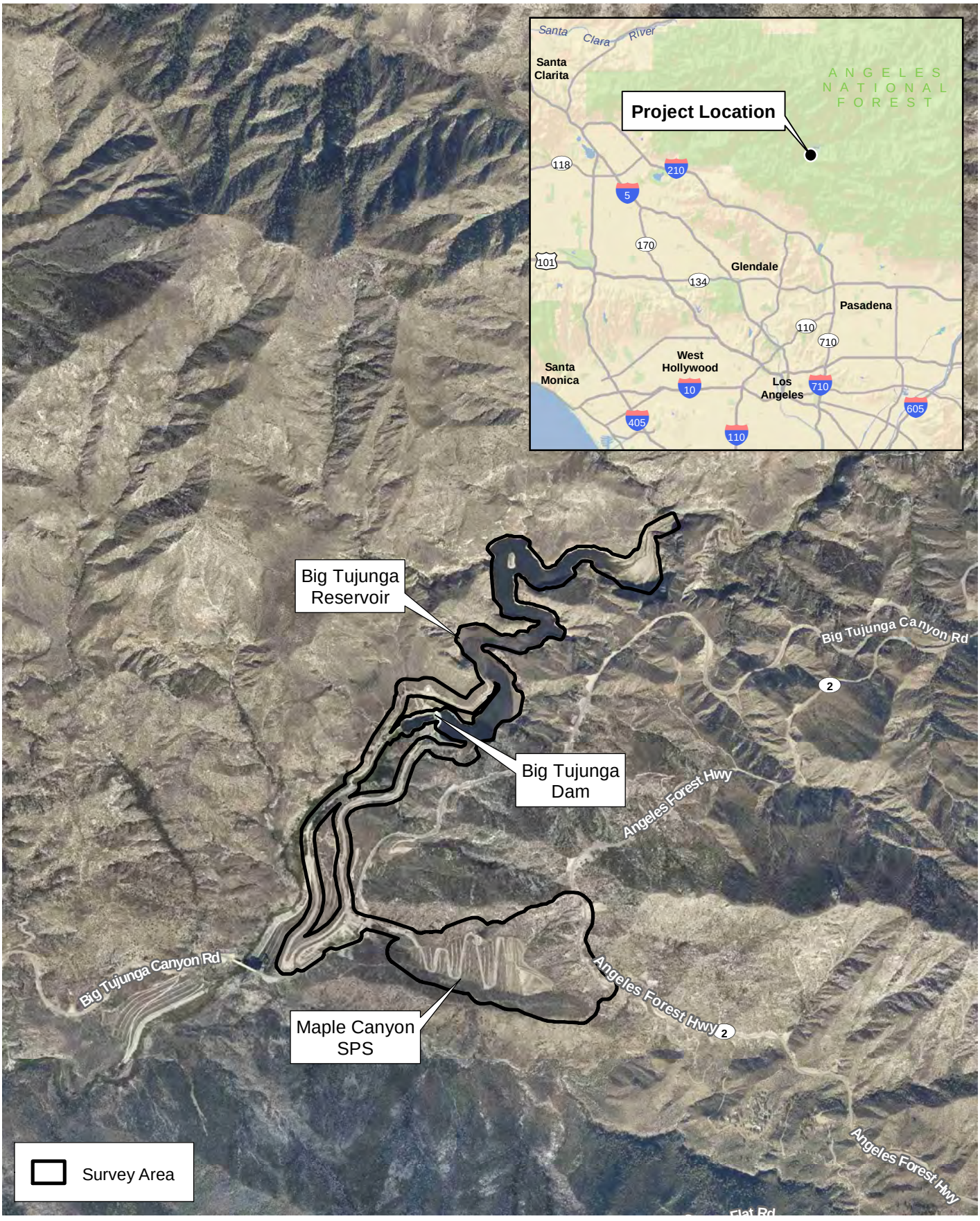

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Project Location

Exhibit 1

Big Tujunga Reservoir Sediment Removal Project

N W E S

2,000 1,000 0 2,000 Feet

Bonterra PSOMAS

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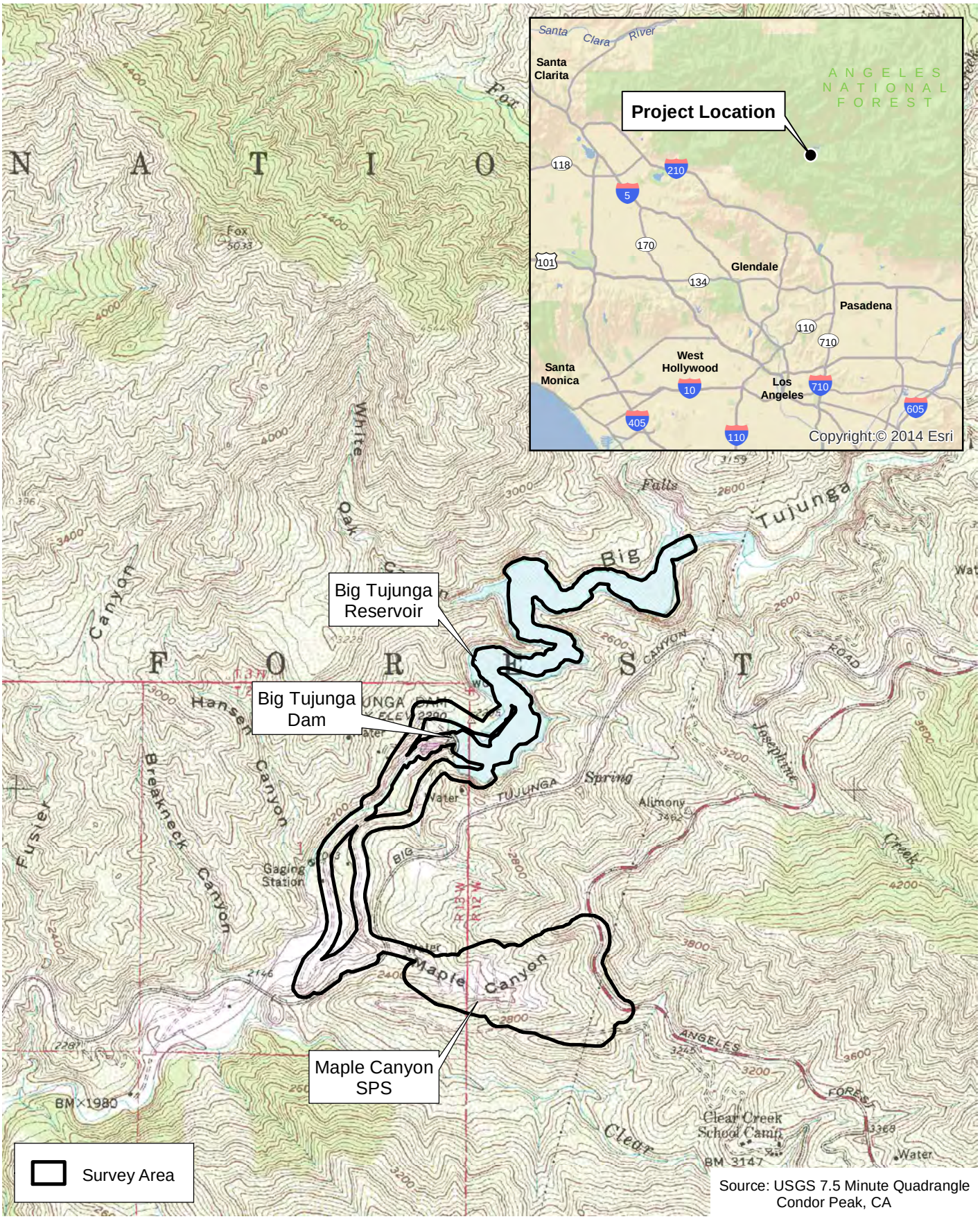

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U.S. Geological Survey 7.5-Minute Quadrangle

Exhibit 2

Big Tujunga Reservoir Sediment Removal Project

N W E S

2,000 1,000 0 2,000 Feet

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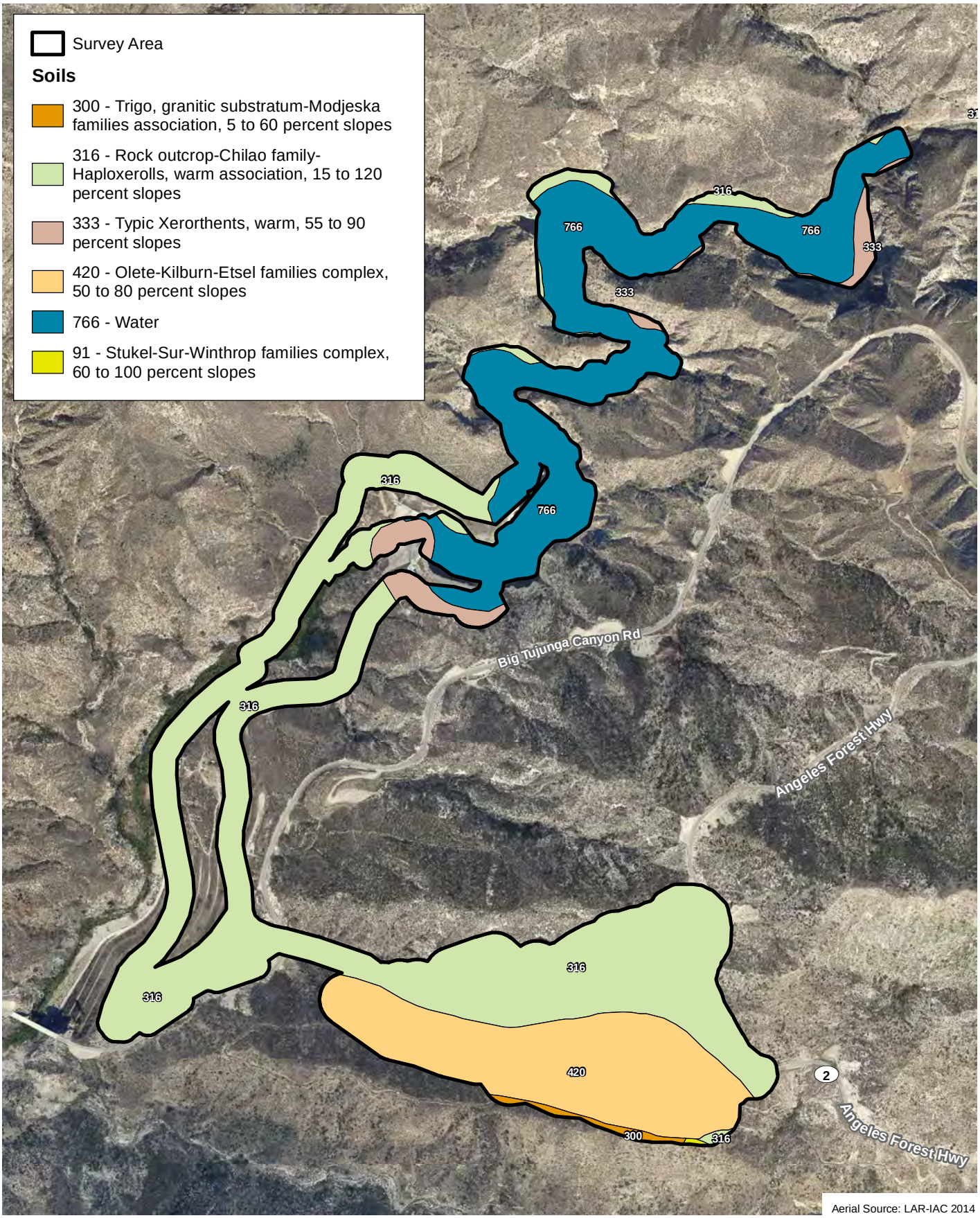

Aerial Source: LAR-IAC 2014

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Soil Types

Exhibit 3

Big Tujunga Reservoir Sediment Removal Project

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Feet

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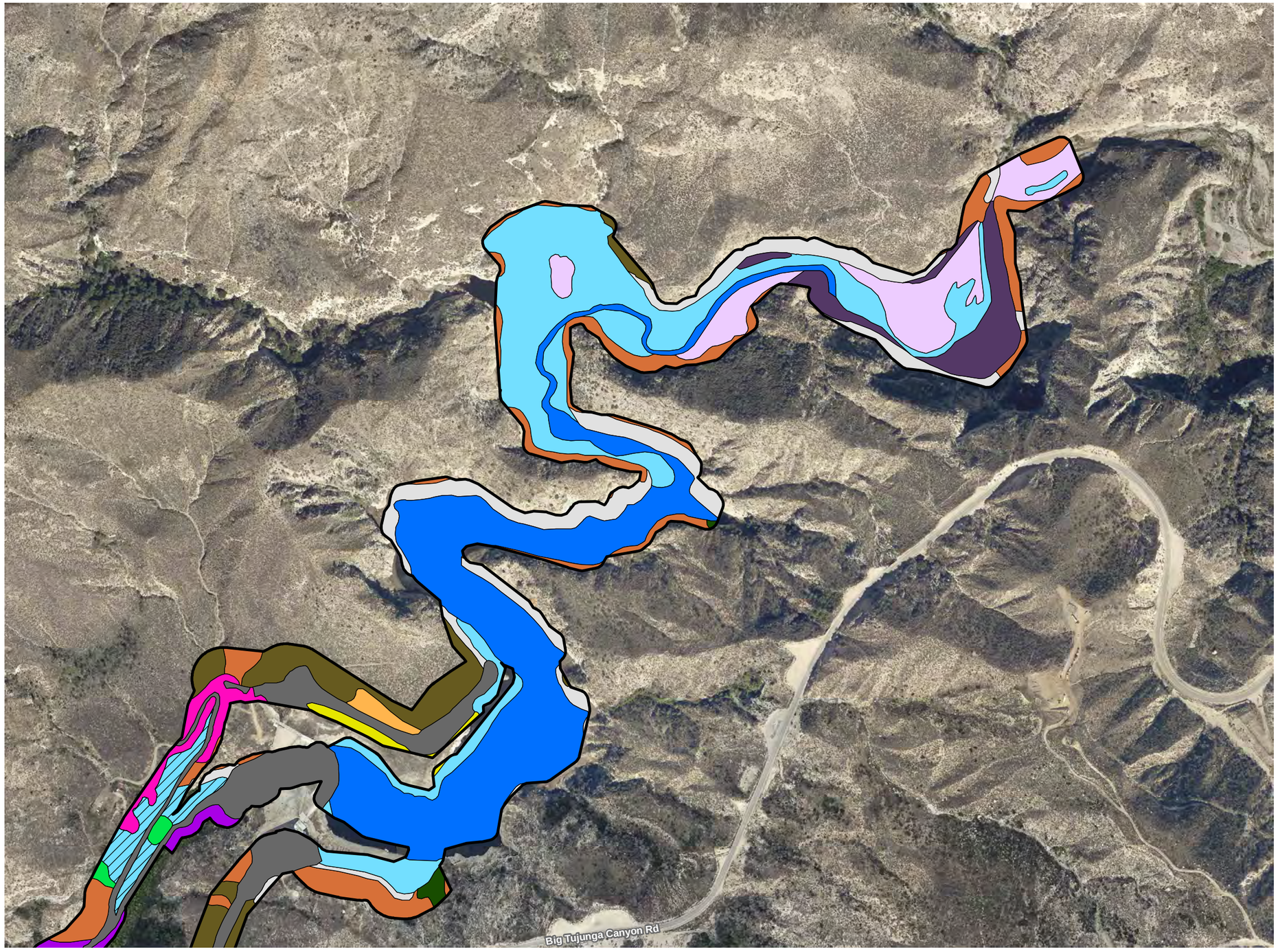

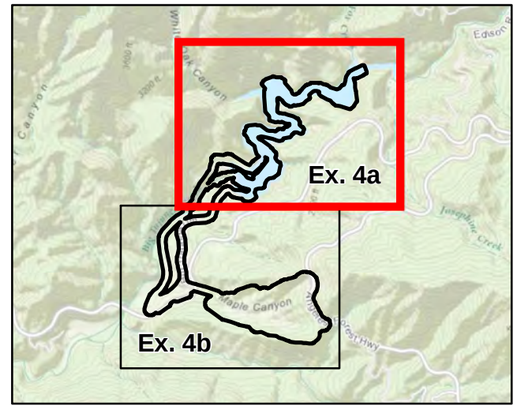

Survey Area

Vegetation Types and Other Areas

- California Sycamore Woodland
- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

Aerial Source: LAR-IAC 2014

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Vegetation Types and Other Areas

Exhibit 4a

Big Tujunga Reservoir Sediment Removal Project

N W E S

500 250 0 500 Feet

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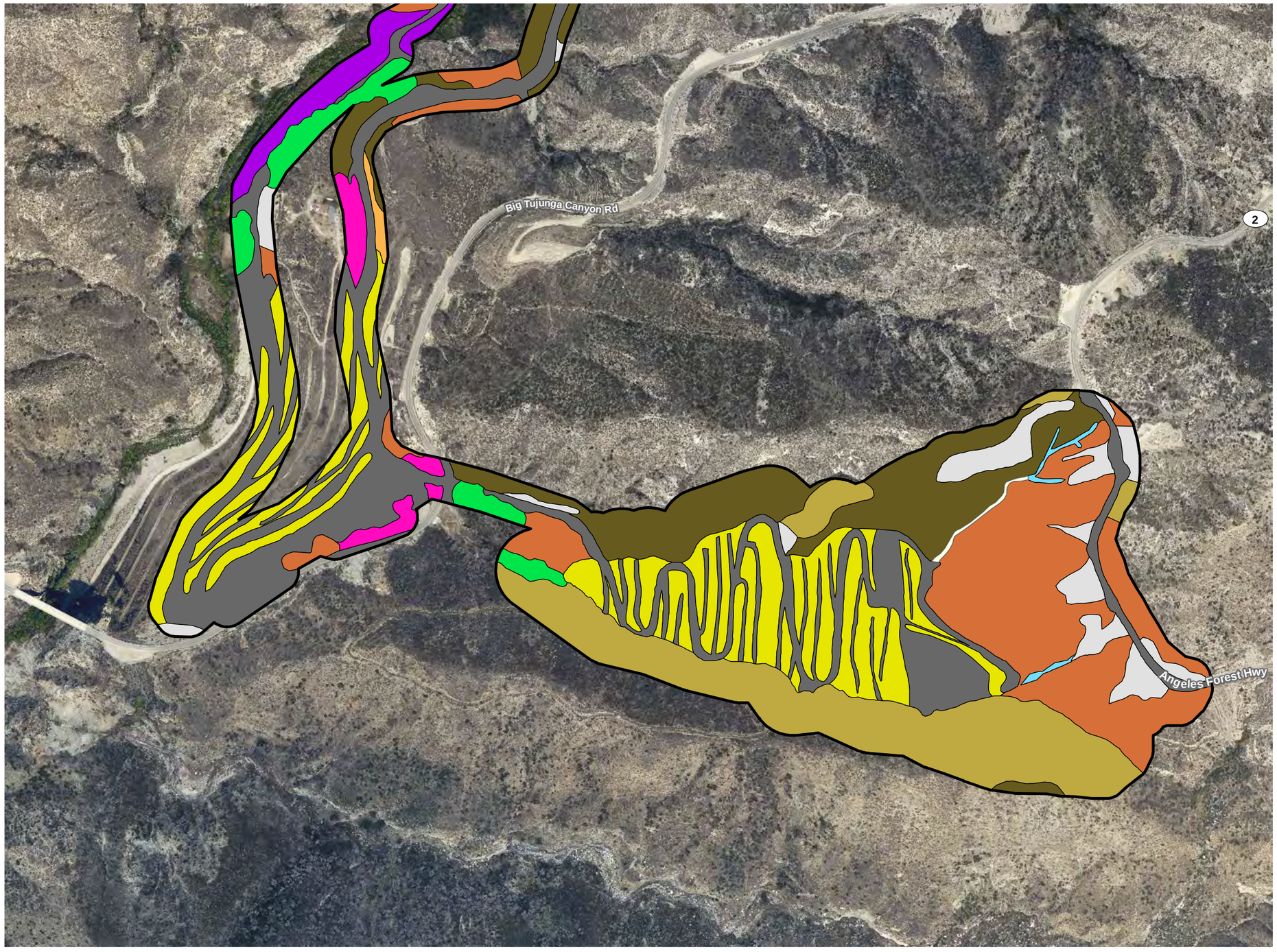

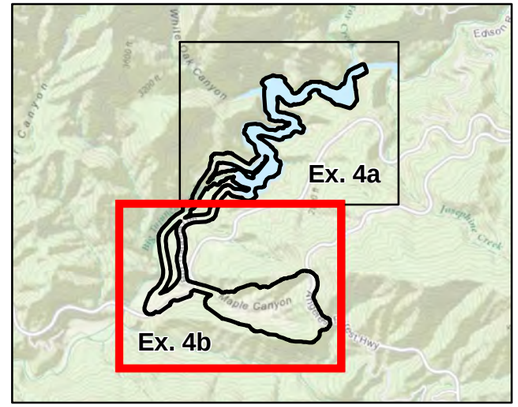

Survey Area

Vegetation Types and Other Areas

- California Sycamore Woodland
- Coastal Sage Scrub
- Chamise Chaparral
- Scrub Oak Chapparal
- Mixed Chaparral
- California Annual Grassland
- Disturbed Freshwater Seep
- Riparian Herb
- Willow Riparian Forest
- Willow Riparian Scrub
- White Alder - Fremont Cottonwood - Willow Riparian Forest
- Coast Live Oak Stands
- Bigcone Douglas Fir - Canyon Live Oak Woodland (Forest)
- Open Water
- Streambed
- Cliff
- Ornamental
- Developed

Aerial Source: LAR-IAC 2014

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Vegetation Types and Other Areas

Exhibit 4b

Big Tujunga Reservoir Sediment Removal Project

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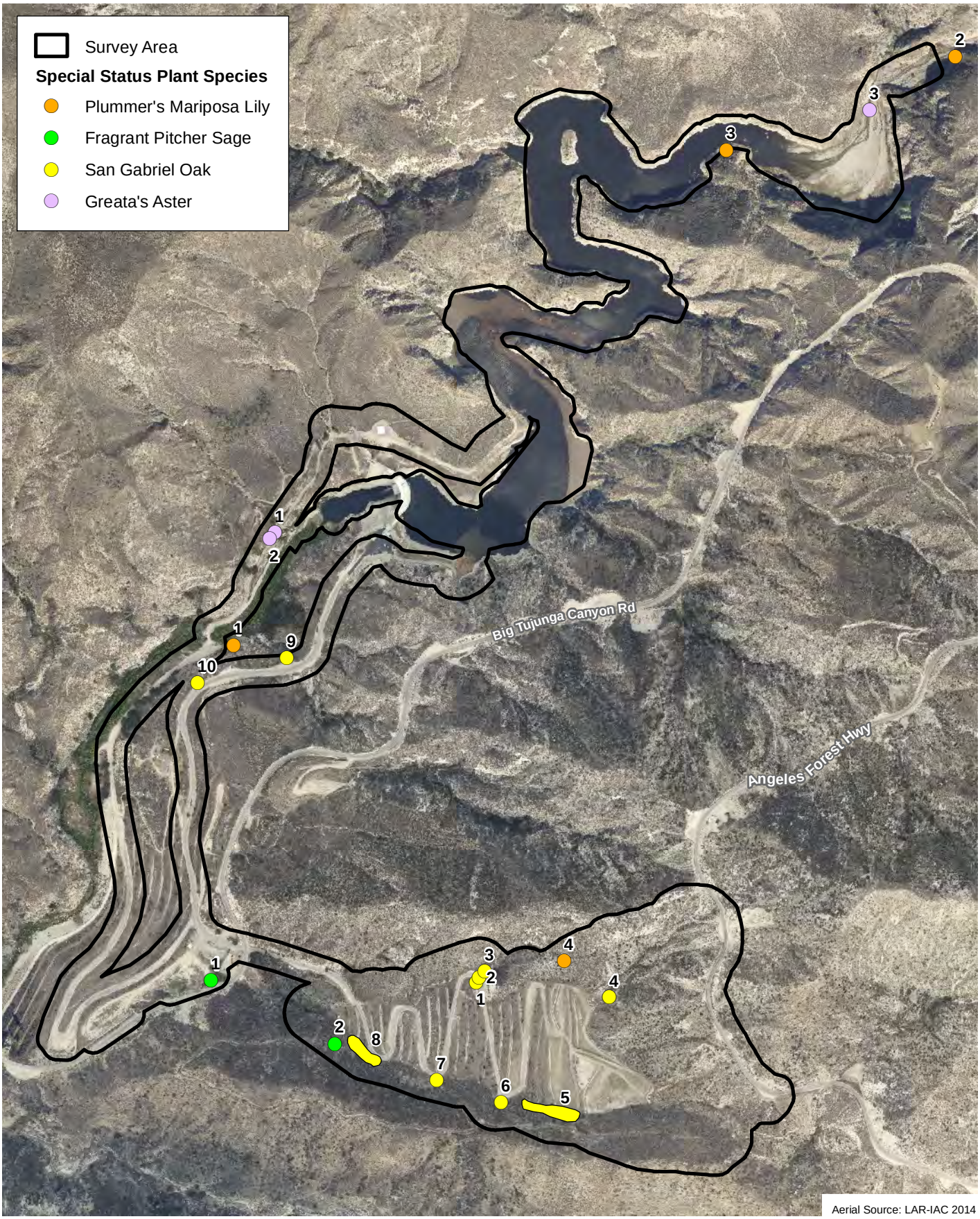

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Special Status Plant Species

Exhibit 5

Big Tujunga Reservoir Sediment Removal Project

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BonTerra PSOMAS

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ATTACHMENT A

PLANT COMPENDIUM

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
*Cedrus deodara**	Deodar cedar
SELAGINELLACEAE - SPIKE-MOSS FAMILY	
Selaginella bigelovii	bushy spike-moss
DRYOPTERIDACEAE - WOOD FERN FAMILY	
Dryopteris arguta	coastal woodfern
POLYPODIACEAE - POLYPODY FAMILY	
Polypodium californicum	California polypody
PTERIDACEAE - BRAKE FAMILY	
Adiantum jordanii	California maidenhair
Pellaea andromedifolia	coffee cliff-brake
Pellaea mucronata	bird's-foot cliff-brake
*Pteris vittata**	ladder brake
PINACEAE - PINE FAMILY	
*Pinus canariensis**	Canary Island pine
Pinus coulteri	Coulter pine
ADOXACEAE - MUSKROOT FAMILY	
Sambucus nigra ssp. *caerulea*	blue elderberry
ANACARDIACEAE - SUMAC FAMILY	
Malosma laurina	laurel sumac
Rhus ovata	sugar bush
Toxicodendron diversilobum	western poison oak
APIACEAE - CARROT FAMILY	
*Anthriscus caucalis**	bur-chervil
APOCYNACEAE - DOGBANE FAMILY	
Asclepias fascicularis	narrow-leaf milkweed
*Nerium oleander**	oleander
ASTERACEAE - SUNFLOWER FAMILY	
*Ageratina adenophora**	crofton weed
Ambrosia acanthicarpa	annual bur-sage
Ambrosia psilostachya	western ragweed
Artemisia californica	California sagebrush
Artemisia douglasiana	mugwort
Baccharis salicifolia ssp. *salicifolia*	mule fat
Brickellia californica	California brickellbush
Brickellia nevinii	Nevin's brickellbush
*Centaurea melitensis**	tocalote
Chaenactis artemisiifolia	white pincushion
Cirsium occidentale var. californicum	California thistle
Corethrogyne filaginifolia	common sand aster
Eclipta prostrata	false daisy
Ericameria cuneata var. cuneata	wedgeleaf goldenbush
Ericameria parishii var. parishii	Parish's goldenbush

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
*Erigeron bonariensis**	flax-leaved horseweed
Erigeron canadensis	horseweed
Eriophyllum confertiflorum var. confertiflorum	golden woolly sunflower
Gnaphalium palustre	western marsh cudweed
Heterotheca grandiflora	telegraph weed
Heterotheca sessiliflora	sessileflower goldenaster
*Hypochaeris glabra**	smooth cat's-ear
*Lactuca serriola**	prickly lettuce
Logfia filaginoides	California cottonrose
*Logfia gallica**	french cottonrose
Malacothrix saxatilis var. *tenuifolia*	slender leaf cliff malacothrix
Pseudognaphalium biolettii	bi-color everlasting
Pseudognaphalium californicum	California everlasting
Pseudognaphalium canescens	hairy everlasting
*Pseudognaphalium luteoalbum**	white lamb everlasting
Rafinesquia californica	California chicory
Senecio flaccidus	threadleaf ragwort
Solidago velutina ssp. *californica*	California goldenrod
Sonchus asper ssp. *asper**	prickly sow thistle
*Sonchus oleraceus**	common sow thistle
Stephanomeria sp.	wire-lettuce
Symphyotrichum greatae	Greata's aster
Tetradymia comosa	tufted cottonthorn
Uropappus lindleyi	Lindley's silverpuffs
Xanthium strumarium	cocklebur
BETULACEAE - BIRCH FAMILY	
Alnus rhombifolia	white alder
BORAGINACEAE - BORAGE FAMILY	
Cryptantha intermedia var. *intermedia*	common cryptantha
Cryptantha microstachys	Tejon cryptantha
Cryptantha muricata var. *jonesii*	Jones' cryptantha
Emmenanthe penduliflora	whispering bells
Eriodictyon crassifolium var. *crassifolium*	thickleaf yerba santa
Eriodictyon parryi	poodle-dog bush
Eucrypta chrysanthemifolia var. *chrysanthemifolia*	spotted hideseed
Phacelia cicutaria var. *hispida*	hairy caterpillar phacelia
Phacelia distans	wild heliotrope phacelia
Phacelia minor	wild canterbury bells
Phacelia ramosissima	branching phacelia
BRASSICACEAE - MUSTARD FAMILY	
Boechera arcuata	arching rockcress
*Hirschfeldia incana**	shortpod mustard

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
Nasturtium officinale	medicinal water cress
*Sisymbrium altissimum**	tumble mustard
*Sisymbrium orientale**	indian hedgemustard
Thysanocarpus curvipes	curvy fringepod
Thysanocarpus laciniatus	notch fringepod
CAPRIFOLIACEAE - HONEYSUCKLE FAMILY	
Lonicera subspicata var. *denudata*	Johnston's honeysuckle
CHENOPODIACEAE - GOOSEFOOT FAMILY	
*Chenopodium album**	lamb's quarters
*Dysphania botrys**	clustered goosefoot
*Salsola tragus**	prickly Russian thistle
CONVOLVULACEAE - MORNING-GLORY FAMILY	
Cuscuta californica var. *californica*	chaparral dodder
CRASSULACEAE - STONECROP FAMILY	
Dudleya cymosa ssp. *pumila*	canyon dwarf dudleya
CUCURBITACEAE - GOURD FAMILY	
Marah macrocarpa	chilicothe
DATISCACEAE - DATISCA FAMILY	
Datisca glomerata	durango root
ERICACEAE - HEATH FAMILY	
Arctostaphylos glauca	big berry manzanita
EUPHORBIACEAE - SPURGE FAMILY	
Euphorbia polycarpa	many seed spurge
*Ricinus communis**	castorbean
FABACEAE - LEGUME FAMILY	
Acmispon americanus var. *americanus*	American deervetch
Acmispon argophyllus var. *argophyllus*	silver-leaved deervetch
Acmispon glaber var. *glaber*	glabrous deerweed
Acmispon strigosus	strigose deervetch
Hosackia oblongifolia var. *oblongifolia*	oblong bird's-foot trefoil
Lathyrus vestitus var. *vestitus*	canyon sweet pea
Lupinus bicolor	miniature lupine
Lupinus concinnus	bajada lupine
Lupinus latifolius var. *latifolius*	broad leaf lupine
Lupinus truncatus	cut leaf lupine
*Medicago polymorpha**	variable burclover
*Melilotus albus**	white sweetclover
*Melilotus indicus**	indian sweetclover
*Robinia pseudoacacia**	black locust
*Spartium junceum**	Spanish broom
Trifolium variegatum var. *major*	large variegated clover

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
FAGACEAE - OAK FAMILY	
Quercus agrifolia var. *agrifolia*	coast live oak
Quercus berberidifolia	scrub oak
Quercus chrysolepis	canyon live oak
Quercus durata var. *gabrielensis*	San Gabriel oak
GERANIACEAE - GERANIUM FAMILY	
*Erodium botrys**	longbeak filaree
*Erodium cicutarium**	redstem filaree
GROSSULARIACEAE - GOOSEBERRY FAMILY	
Ribes indecorum	white flowering currant
LAMIACEAE - MINT FAMILY	
Lepechinia fragrans	fragrant pitcher sage
Mentha sp.	mint
Salvia apiana	white sage
Salvia columbariae	chia
Salvia mellifera	black sage
Stachys albens	whitestem hedgenettle
LOASACEAE - BLAZING STAR FAMILY	
Mentzelia affinis	white blazing star
Mentzelia dispersa	bushy blazing star
LYTHRACEAE - LOOSESTRIFE FAMILY	
*Lythrum hyssopifolia**	grass poly
MALVACEAE - MALLOW FAMILY	
Malacothamnus fremontii	Fremont's bush-mallow
*Malva sylvestris**	high mallow
MONTIACEAE - MINER'S-LETTUCE FAMILY	
Calyptridium monandrum	common pussypaws
Claytonia parviflora ssp. *parviflora*	small flowered miner's-lettuce
MORACEAE - MULBERRY FAMILY	
*Morus sp.**	mulberry
MYRTACEAE - MYRTLE FAMILY	
*Eucalyptus globulus**	blue gum
ONAGRACEAE - EVENING PRIMROSE FAMILY	
Camissoniopsis hirtella	hairy suncup
Camissoniopsis micrantha	miniature suncup
Clarkia dudleyana	Dudley's clarkia
Clarkia unguiculata	elegant clarkia
Epilobium canum ssp. *canum*	California fuchsia
Epilobium ciliatum ssp. *ciliatum*	fringed willowherb
Eulobus californicus	false-mustard
Oenothera elata	great marsh evening primrose

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
OROBANCHACEAE - BROOM-RAPE FAMILY	
Castilleja applegatei	Applegate's indian paintbrush
Castilleja foliolosa	woolly indian paintbrush
Orobanche fasciculata	clustered broom-rape
PAPAVERACEAE - POPPY FAMILY	
Argemone munita	chicalote
Dendromecon rigida	bush poppy
Ehrendorferia chrysantha	golden eardrops
Eschscholzia caespitosa	tufted poppy
Eschscholzia californica	California poppy
PHRYMACEAE - LOPSEED FAMILY	
Mimulus aurantiacus	bush monkeyflower
Mimulus brevipes	widethroat yellow monkeyflower
Mimulus cardinalis	scarlet monkeyflower
Mimulus floribundus	manyflowered monkeyflower
Mimulus guttatus	seep monkeyflower
Mimulus moschatus	musk monkeyflower
Mimulus pilosus	downy monkey flower
Mimulus rubellus	little redstem monkeyflower
PLANTAGINACEAE - PLANTAIN FAMILY	
Antirrhinum coulterianum	Coulter's snapdragon
Antirrhinum multiflorum	many-flowered snapdragon
Keckiella cordifolia	heart-leaved bush penstemon
Penstemon spectabilis var. *spectabilis*	showy beardtongue
*Plantago major**	common plantain
*Veronica anagallis-aquatica**	water speedwell
PLATANACEAE - SYCAMORE FAMILY	
Platanus racemosa	western sycamore
POLEMONIACEAE - PHLOX FAMILY	
Gilia brecciarum ssp. *brecciarum*	break gilia
Linanthus californicus	prickly phlox
POLYGONACEAE - BUCKWHEAT FAMILY	
Eriogonum davidsonii	Davidson's buckwheat
Eriogonum elongatum var. *elongatum*	longstem buckwheat
Eriogonum fasciculatum var. *foliolosum*	leafy California buckwheat
Eriogonum gracile var. *gracile*	slender woolly buckwheat
*Polygonum aviculare**	oval leaf knotweed
Pterostegia drymarioides	granny's hairnet
*Rumex acetosella**	sheep dock
*Rumex crispus**	curly dock
Rumex salicifolius	willow dock

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
RANUNCULACEAE - BUTTERCUP FAMILY	
Aquilegia formosa	handsome columbine
Clematis lasiantha	chaparral virgin's bower
Delphinium cardinale	scarlet larkspur
RHAMNACEAE - BUCKTHORN FAMILY	
Ceanothus crassifolius var. *crassifolius*	thick leaf ceanothus
Ceanothus leucodermis	whitebark ceanothus
Ceanothus oliganthus	hairy ceanothus
Frangula californica ssp. *californica*	California coffeeberry
Rhamnus ilicifolia	hollyleaf redberry
ROSACEAE - ROSE FAMILY	
Adenostoma fasciculatum	chamise
Cercocarpus betuloides var. *betuloides*	birch-leaf mountain mahogany
Heteromeles arbutifolia	toyon
Prunus ilicifolia	holly leaf cherry
Rubus ursinus	California blackberry
RUBIACEAE - COFFEE FAMILY	
Galium angustifolium ssp. *angustifolium*	narrow leaved bedstraw
Galium aparine	common bedstraw
SALICACEAE - WILLOW FAMILY	
Populus fremontii ssp. *fremontii*	Fremont cottonwood
Salix exigua	sandbar willow
Salix gooddingii	Goodding's black willow
Salix laevigata	red willow
Salix lasiandra var. *lasiandra*	shining willow
Salix lasiolepis	arroyo willow
SAXIFRAGACEAE - SAXIFRAGE FAMILY	
Boykinia rotundifolia	roundleaf brookfoam
SCROPHULARIACEAE - FIGWORT FAMILY	
*Verbascum thapsus**	woolly mullein
*Verbascum virgatum**	wand mullein
SOLANACEAE - NIGHTSHADE FAMILY	
*Nicotiana glauca**	tree tobacco
Solanum douglasii	Douglas' nightshade
Solanum xanti	chaparral nightshade
TAMARICACEAE - TAMARISK FAMILY	
*Tamarix ramosissima**	saltcedar
ULMACEAE - ELM FAMILY	
*Ulmus parvifolia**	Chinese elm
URTICACEAE - NETTLE FAMILY	
Urtica dioica ssp. *holosericea*	hoary nettle

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
ZYGOPHYLLACEAE - CALTROP FAMILY	
*Tribulus terrestris**	puncture vine
AGAVACEAE - AGAVE FAMILY	
Hesperoyucca whipplei	chaparral yucca
ARACEAE - ARUM FAMILY	
Lemna sp.	duckweed
CYPERACEAE - SEDGE FAMILY	
Carex alma	sturdy sedge
Carex aurea	golden sedge
Carex barbarae	Santa Barbara sedge
Carex praegracilis	slender sedge
Eleocharis acicularis var. *acicularis*	needle spikerush
Eleocharis parishii	Parish's spikerush
HYDROCHARITACEAE - WATERWEED FAMILY	
Najas sp.	water-nymph
IRIDACEAE - IRIS FAMILY	
*Iris germanica**	german iris
Sisyrinchium bellum	western blue-eyed-grass
JUNCACEAE - RUSH FAMILY	
Juncus bufonius var. *bufonius*	toad rush
Juncus effusus	soft rush
Juncus macrophyllus	long leaf rush
Juncus mexicanus	Mexican rush
Juncus oxymeris	pointed rush
LILIACEAE - LILY FAMILY	
Calochortus plummerae	Plummer's mariposa lily
ORCHIDACEAE - ORCHID FAMILY	
Epipactis gigantea	giant stream orchid
POACEAE - GRASS FAMILY	
Agrostis sp.	bentgrass
Andropogon glomeratus var. *scabriglumis*	southwestern bushy bluestem
*Avena barbata**	slender wild oat
*Bromus diandrus**	ripgut brome
Bromus madritensis ssp. *rubens**	red brome
*Bromus sterilis**	poverty brome
*Bromus tectorum**	cheat grass
*Cortaderia selloana**	Selloa pampas grass
*Cynodon dactylon**	bermuda grass
Elymus condensatus	giant wildrye
Elymus glaucus	western wildrye
*Festuca myuros**	rattail fescue
*Festuca perennis**	rye grass

PLANTS SPECIES OBSERVED IN THE SURVEY AREA DURING FOCUSED SURVEY

Species	
Scientific Name	**Common Name**
*Hordeum murinum**	wall barley
Melica imperfecta	coast range onion grass
Muhlenbergia rigens	deer grass
Panicum acuminatum var. *fasciculatum*	narrow tip panic grass
*Polypogon monspeliensis**	rabbit foot beard grass
*Polypogon viridis**	water beard grass
*Schismus arabicus**	Arabian schismus
Stipa coronata	crested needle grass
Stipa miliacea var. *miliacea**	smilo grass
THEMIDACEAE - BRODIAEA FAMILY	
Dichelostemma capitatum	blue dicks
TYPHACEAE - CATTAIL FAMILY	
Typha latifolia	broad-leaved cattail
* non-native species	

ATTACHMENT B

REPRESENTATIVE PHOTOGRAPHS



Plummer's mariposa lily habitat; the species was observed at this location on June 8, 2016.



San Gabriel Oak observed on May 18, 2016, in Maple Canyon.

D:\Projects\COLADPWJ293\Graphics\PlantEx_SP1_20160714.ai

Special Status Plant Photographs

Attachment B-1

Big Tujunga Reservoir Sediment Removal Project

BonTerra PSOMAS

(07/14/2016 LEW) H:\Projects\CoLADPW (DPW)\J293\Graphics\Plants\ExB_SP_20160714.pdf



Greata's aster observed on May 18, 2016, at the upstream end of the reservoir.



Greata's aster habitat at the upstream end of the reservoir; Greata's aster is visible in the bottom center.

D:\Projects\COLADPWJ293\Graphics\PlantEx_SP2_20160714.ai

Special Status Plant Photographs

Attachment B-2

Big Tujunga Reservoir Sediment Removal Project

BonTerra PSOMAS

(07/14/2016 LEW) H:\Projects\CoLADPW (DPW)\J293\Graphics\Plants\ExB_SP_20160714.pdf



Fragrant pitcher sage observed on May 4, 2016, adjacent to Big Tujunga Canyon Road.



Fragrant pitcher sage observed on June 7, 2016, adjacent to Big Tujunga Canyon Road.

D:\Projects\COLADPWJ293\Graphics\PlantEx_SP3_20160714.ai

Special Status Plant Photographs

Attachment B-3

Big Tujunga Reservoir Sediment Removal Project

BonTerra PSOMAS

(07/14/2016 LEW) H:\Projects\CoLADPW (DPW)\J293\Graphics\Plants\ExB_SP_20160714.pdf

ATTACHMENT C

CALIFORNIA NATURAL DIVERSITY DATABASE FORMS

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@wildlife.ca.gov

Date of Field Work (mm/dd/yyyy): 05/18/2016

For Office Use Only
Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Symphyotrichum greatae*

Common Name: Greata's aster

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 10 Subsequent Visit? (●) Yes ( ) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [ ] No [X] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Allison Rudalevige
Address: Psomas 3 Hutton Centre Drive, STE 200
Santa Ana, CA 92707-8794
E-mail Address: allison.rudalevige@psomas.com
Phone: 714-481-8024

Plant Information

Phenology:
25 % vegetative | 62 % flowering | 13 % fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

[ ] wintering [ ] breeding [ ] nesting [ ] rookery [ ] burrow site [ ] lek [ ] other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Big Tujunga Dam Reservoir, Angeles National Forest

County: Los Angeles Landowner / Mgr: Angeles National Forest
Quad Name: Condor Peak Elevation: 2,200 feet
T 2N R 13W Sec 1 , ___ 1/4 of ___ 1/4, Meridian: H ( ) M ( ) S (●) Source of Coordinates (GPS, topo. map & type): GPS
T 3N R 12W Sec 31 , ___ 1/4 of ___ 1/4, Meridian: H ( ) M ( ) S (●) GPS Make & Model: Garmin eTrex Vista
DATUM: NAD27 ( ) NAD83 (●) WGS84 ( ) Horizontal Accuracy: 15 feet meters/feet
Coordinate System: UTM Zone 10 ( ) UTM Zone 11 (●) *OR* Geographic (Latitude & Longitude) ( )
Coordinates: Population 1: 0390456mE, 3795277mN; Population 2: 0390445mE, 3795265mN; Population 3: 0391681mE, 3796149mN

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Five individuals observed at two location on rocky cliff face of freshwater seep with slope of 150% and aspect east. Associated species are Ageratina adenophora, Agrostis sp., Epipactis gigantea, Mimulus cardinalis, Sisyrinchium bellum, Adiantum jordanii, Stipa miliacea var. miliacea, Epilobium canum ssp. canum, and Populus fremontii ssp. fremontii. Five individuals observed in sandy alluvium of the active floodplain of Big Tujunga Creek. Associated species are Salix lasiolepis, Baccharis salicifolia ssp. salicifolia, Typha latifolia, Xanthium strumarium, and Ageratina adenophora.

Please fill out separate form for other rare taxa seen at this site.

Site Information

Overall site/occurrence quality/viability (site + population): ( ) Excellent ( ) Good (●) Fair ( ) Poor
Immediate AND surrounding land use: Big Tujunga Dam and access road; open space
Visible disturbances: adjacent access road to Big Tujunga Dam
Threats: sediment removal and transport from above Big Tujunga Dam to the Maple Canyon sediment placement site.
Comments:

Determination: *(check one or more, and fill in blanks)*

[ ] Keyed (cite reference): _____
[ ] Compared with specimen housed at: _____
[ ] Compared with photo / drawing in: _____
[X] By another person (name): Katie Gallagher
[ ] Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	[ ]	[ ]	[X]
Habitat	[ ]	[ ]	[X]
Diagnostic feature	[ ]	[ ]	[ ]

May we obtain duplicates at our expense? (●) yes ( ) no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@wildlife.ca.gov

Date of Field Work (mm/dd/yyyy): 06/08/2016

For Office Use Only
Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Phrynosoma blainvillii*

Common Name: coast horned lizard

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 1 Subsequent Visit? (●) Yes ( ) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [ ] No [X] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Allison Rudalevige
Address: Psomas 3 Hutton Centre Drive, STE 200
Santa Ana, CA 92707-8794
E-mail Address: allison.rudalevige@psomas.com
Phone: 714-481-8024

Plant Information

Phenology:

_____ % vegetative _____ % flowering _____ % fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

[ ] wintering [ ] breeding [ ] nesting [ ] rookery [ ] burrow site [ ] lek [ ] other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Maple Canyon near Big Tujunga Dam Reservoir, Angeles National Forest

County: Los Angeles Landowner / Mgr: Angeles National Forest

Quad Name: Condor Peak Elevation: 2,485 feet

T 3N R 12W Sec 31 , ____ 1/4 of ____ 1/4, Meridian: H ( ) M ( ) S (●) Source of Coordinates (GPS, topo. map & type): iPhone

T ____ R ____ Sec ____ , ____ 1/4 of ____ 1/4, Meridian: H ( ) M ( ) S (●) GPS Make & Model: iPhone 5S

DATUM: **NAD27** ( ) **NAD83** (●) **WGS84** ( ) Horizontal Accuracy: 20 feet meters/feet

Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) ***OR*** Geographic (Latitude & Longitude) (●)

Coordinates: 34°16'59.93", -118°11'17.25"

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

One individual observed basking in sandy substrate of graded area next to access road for Maple Canyon sediment placement site. Proceeded to bury itself in the substrate.

Please fill out separate form for other rare taxa seen at this site.

Site Information

Overall site/occurrence quality/viability (site + population): ( ) Excellent ( ) Good (●) Fair ( ) Poor

Immediate AND surrounding land use: Maple Canyon sediment placement site and access road; open space

Visible disturbances: adjacent access road to Maple Canyon sediment placement site

Threats: sediment removal and transport from above Big Tujunga Dam to the Maple Canyon sediment placement site.

Comments:

Determination: *(check one or more, and fill in blanks)*

[ ] Keyed (cite reference): _____
[ ] Compared with specimen housed at: _____
[X] Compared with photo / drawing in: http://www.californiaherps.com/index.html
[ ] By another person (name): _____
[ ] Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	[ ]	[ ]	[X]
Habitat	[ ]	[ ]	[ ]
Diagnostic feature	[ ]	[ ]	[ ]

May we obtain duplicates at our expense? (●) yes ( ) no

APPENDIX B-8

LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER LETTER REPORT

BonTerra CONSULTING
2 Executive Circle, Suite 175 Irvine, CA 92614
T: (714) 444-9199 F: (714) 444-9599 | www.BonTerraConsulting.com

October 3, 2012

Ms. Susie Tharratt
Recovery Permit Coordinator
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011

VIA EMAIL AND MAIL
Susie_Tharratt@fws.gov

Subject: Results of Focused Presence/Absence Least Bell's Vireo and Southwestern Willow Flycatcher Surveys for the Big Tujunga Dam and Reservoir Sediment Removal Project, Los Angeles County, California

Dear Ms. Tharratt:

This Letter Report presents the results of focused surveys to determine the presence or absence of the least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*) on the Big Tujunga Dam and Reservoir Sediment Removal Project, located in Los Angeles County, California. A Biologist with the necessary experience and the Federal Endangered Species Act 10(a) survey permit conducted the surveys according to U.S. Fish and Wildlife Service (USFWS) protocol for these species.

Project Location and Description

Big Tujunga Canyon is located on the southern edge of the San Gabriel Mountains, within the Angeles National Forest, and is located on the U.S. Geological Survey (USGS) Condor Peak 7.5-minute topographic quadrangle (Exhibit 1). The survey area for the southwestern willow flycatcher and least Bell's vireo surveys included Big Tujunga Creek extending approximately 2 river miles upstream of Big Tujunga Reservoir, and Big Tujunga Wash from Big Tujunga Dam to approximately 1.5 river miles downstream of the dam (Exhibit 2). Because of the length of the two sections of stream to be surveyed, the upper and lower sections were surveyed on separate days. The upper section survey area includes Big Tujunga Creek upstream of Big Tujunga Reservoir to approximately Fall Creek Campground. The lower section survey area includes the area downstream of Big Tujunga Dam to the Big Tujunga Canyon Road Bridge. The survey area and surrounding vicinity consist of open space in the Angeles National Forest.

Habitat in the upper section of Big Tujunga Creek is characterized by open sections of rocky stream with isolated patches of riparian vegetation. Big Tujunga Canyon burned during the 2009 Station Fire; thus, the riparian canopy is sparse through much of the creek. Dominant species in this portion of the survey area include mule fat (*Baccharis salicifolia*), arroyo willow (*Salix lasiolepis*), and red willow (*Salix laevigata*). Stands of white alder (*Alnus rhombifolia*) and occasional western sycamore (*Platanus racemosa*) and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) trees occurred throughout the reach with rough sedge (*Carex senta*) and California blackberry (*Rubus ursinus*) in the understory.

Riparian habitat in the lower section is characterized by relatively dense and continuous willow riparian forest dominated by mule fat, arroyo willow, and red willow with an overstory of white alder and Fremont cottonwood. Emergent vegetation, dominated by cattails (*Typha latifolia*), occurred as patches throughout this lower section. Common understory species include hoary nettle (*Urtica dioica* ssp. *holosericea*) and mugwort (*Artemisia douglasiana*). The riparian habitat in this lower section is considered higher quality for the flycatcher and vireo than the habitat in the upper section because it is more dense, mature, and contiguous.

Representative site photos are included in Attachment A.

Background

Southwestern Willow Flycatcher

The willow flycatcher (*Empidonax traillii*) is a State-listed Endangered species, whereas only the southwestern subspecies (*E.t. extimus*) is federally listed as Endangered (USFWS 1995). This survey focused on the southwestern willow flycatcher because it is the only subspecies that nests in Southern California. However, migrants of all the subspecies may occur in the area during spring and fall migration, so multiple visits to the survey area are required to determine if individuals observed during the first surveys are nesting birds.

The willow flycatcher was formerly a common summer resident in suitable habitat throughout California (Grinnell and Miller 1944). It has now been extirpated as a breeding bird from most of its California range, and is seriously threatened in Southern California primarily because of habitat loss and degradation, and brood parasitism by brown-headed cowbirds (*Molothrus ater*) (Garrett and Dunn 1981; USFWS 1995). The population of southwestern willow flycatcher in California is estimated to be about 172 territories at 96 sites (Durst et al. 2008). Within the Coastal California Recovery Unit, the population is estimated at 120 territories at 73 sites (Durst et. al. 2008). The southwestern willow flycatcher population has not shown the same recovery that the least Bell's vireo has shown in response to riparian habitat restoration and cowbird control (Kus 2011).

The willow flycatcher closely resembles other *Empidonax* flycatcher species in California, but the indistinct (or completely lacking) eye ring, broader and longer bill, and generally lighter appearance through the breast and throat help to distinguish it from other species. Although it cannot be used to formally identify the species, identification of the species' vocalizations is the best form of identification in the field. The southwestern willow flycatcher is a migratory bird, occurring in this region only during the breeding season (late May to early August). The male arrives later in the spring than most migrants, usually in mid- to late May or early June. Nests are constructed in thickets of trees and shrubs in a fork or horizontal branch between 3 and 15 feet above the ground.

The southwestern willow flycatcher breeds in riparian habitats along rivers, streams, or other wetlands in floodplains and broader canyons, preferring dense riparian thickets near surface water (Sogge et al. 2010), often with adjacent open areas for foraging. Vegetation structure, composition, and extent vary widely, but generally include extensive areas dominated by dense stands of willows (*Salix* spp.), mule fat, or other tree species (including tamarisk [*Tamarix* sp.] in some areas), usually with a scattered cottonwood (*Populus* sp.) overstory (USFWS 1995). These riparian areas provide both nesting and foraging habitat. Southwestern willow flycatchers will nest in areas with suitable habitat regardless of the elevation (from sea level to high mountains).

On October 19, 2005, the USFWS published a Final Rule designating critical habitat for the southwestern willow flycatcher (USFWS 2005). This Final Rule designates 120,824 acres in Arizona, California, Nevada, New Mexico, and Utah as critical habitat. Of that, 17,212 acres were designated in Kern, Santa Barbara, San Bernardino, and San Diego Counties, California. Following lawsuits, the USFWS recently proposed a revised critical habitat designation on August 15, 2011. This revised critical habitat covers 2,090 stream miles in California, Nevada, Utah, Colorado, Arizona, and New Mexico (USFWS 2011). The proposed rule used a slightly different methodology to designate critical habitat. For example, it includes areas that are considered essential for the recovery of the species even if they were not occupied at the time of the species' listing. The survey area is not located within designated critical habitat.

Least Bell's Vireo

The least Bell's vireo is a State and federally listed Endangered species. This subspecies was once widespread throughout the Central Valley and other low elevation riverine areas of California (Grinnell and Miller 1986). The widespread loss of riparian habitat and brood parasitism by the brown-headed cowbird are the major causes of the decline of this species (Garrett and Dunn 1981). About 76 percent of the U. S. population is found in just 5 localities. The breeding population in California has increased dramatically because of brown-headed cowbird trapping efforts in breeding areas, and they are thought to be expanding their current range (USFWS 1998). Continued cowbird control and exotic plant removal in riparian areas are considered necessary for the foreseeable future in order to continue this increasing trend (USFWS 2006).

The least Bell's vireo is a small grayish songbird with indistinct wing bars and facial markings. It is a very vocal species, and can be easily detected from some distance by its unique song, which is given repeatedly. The least Bell's vireo is migratory and only occurs in this region during the breeding season. The males arrive sometime in late March to April and establish breeding territories, and the females arrive shortly thereafter. Nests are constructed (usually in willow trees) only about three to four feet off the ground where the female will lay typically three to four eggs. The least Bell's vireo usually returns to the wintering grounds sometime in August to September. Preferred habitat is willow riparian woodland that supports dense understory thickets of scrubby willows and mule fat, especially within three to six feet of the ground (USFWS 1998).

On February 2, 1994, the USFWS issued their final determination of critical habitat for the least Bell's vireo (USFWS 1994), identifying approximately 37,560 acres as critical habitat in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego Counties. The survey area is located outside designated critical habitat for this species.

Survey Methodology

Prior to conducting the focused survey, the California Department of Fish and Game's (CDFG's) California Natural Diversity Database (CNDDB, CDFG 2012) and other references were reviewed to determine if and to what extent the southwestern willow flycatcher and least Bell's vireo are known to occur in the project region.

All focused surveys were conducted by Brian Leatherman (USFWS permit No. TE 827493-6; CDFG Memorandum of Understanding [MOU]) accompanied by either James Huelsman or Adam DeLuna, with the exception of the May 3, 2012, survey visit, which was conducted by Amber Oneal (USFWS permit No. TE 148554-2). Survey methods followed the guidelines developed by the U. S. Fish and Wildlife Service (USFWS), as described below. Observations

of special status species were recorded in the field and waypoints were taken using Global Positioning System (GPS) technology for reporting purposes. The focus of the surveys was on the detection and identification of the target species, but all wildlife incidentally observed or detected was documented. A list of the species observed during the surveys is provided in Attachment B.

The USFWS protocol for the southwestern willow flycatcher requires a total of five surveys, with the first survey conducted between May 15 and May 31; the second and third surveys between June 1 and June 24; and the fourth and fifth surveys between June 25 and July 17 (Sogge et. al. 2010; USFWS 2000). The USFWS protocol for the least Bell's vireo requires that at least eight surveys be conducted from April 10 to July 31 with a ten-day interval between each site visit (USFWS 2001). Dates, times, and weather data for the focused surveys conducted on the upper section are shown in Table 1. Dates, times and weather data for the focused surveys conducted on the lower section are shown in Table 2.

TABLE 1
UPPER SECTION SURVEY DATES, TIMES, AND WEATHER CONDITIONS

				Weather Conditions*					
		Time		Temp (°F)		Winds (mph)		Cloud Cover	
Date	Survey No.	Start	End	Start	End	Start	End	Start	End
April 17	LBV1	7:00AM	11:30AM	55	79	2–4	0–2	clear	clear
April 27	LBV2	6:30AM	12:15PM	51	65	0–2	4–7	clear	clear
May 17	LBV3, WIFL1	6:30AM	11:30AM	63	79	0–2	2–4	clear	clear
June 7	LBV4, WIFL2	5:45AM	12:00PM	62	85	2–4	4–7	clear	clear
June 14	WILF3	6:00AM	12:00PM	62	76	0–2	4–7	clear	clear
June 28	LBV5, WIFL4	5:30AM	12:15PM	60	71	0–2	0–2	clear	clear
July 9	LBV6, WIFL5	7:00AM	11:30AM	68	96	0–2	2–4	clear	clear
July 19	LBV7	5:30AM	11:45AM	60	90	0–2	2–4	40%	5%
July 30	LBV8	6:00AM	10:45AM	65	85	0–1	2–4	clear	clear

°F: degrees Fahrenheit; mph: miles per hour; LBV: least Bell's vireo; WIFL: southwestern willow flycatcher.
* Temperature and wind speed measured with Kestrel 2000.

TABLE 2
LOWER SECTION SURVEY DATES, TIMES, AND WEATHER CONDITIONS

				Weather Conditions*					
		Time		Temp (°F)		Winds (mph)		Cloud Cover	
Date	Survey No.	Start	End	Start	End	Start	End	Start	End
April 19	LBV1	7:30AM	11:45AM	59	74	0–2	4–7	clear	clear
May 3	LBV2	6:45AM	10:05AM	60	65	0–5	0–5	75%	80%
May 16	LBV3, WIFL1	6:00AM	11:00AM	51	84	0–2	0–2	clear	clear
June 8	LBV4, WIFL2	6:00AM	11:00AM	53	73	0–2	2–4	clear	clear
June 15	WILF3	6:00AM	11:00AM	58	71	0–2	2–4	100%	clear
June 29	LBV5, WIFL4	6:00AM	11:15AM	61	74	0–2	0–2	clear	clear
July 10	LBV6, WIFL5	7:00AM	11:45AM	67	97	0–2	4–6	clear	clear
July 20	LBV7	7:00AM	10:30AM	65	78	1–2	2–3	clear	clear
July 31	LBV8	5:00AM	10:30AM	59	90	0–2	4–7	clear	clear

°F: degrees Fahrenheit; mph: miles per hour; LBV: least Bell's vireo; WIFL: southwestern willow flycatcher.
* Temperature and wind speed measured with Kestrel 2000

Survey Results

One willow flycatcher was observed in the lower section during the first focused survey on May 16. The bird did not respond to tape playback, did not exhibit territorial behavior, and flew off downstream. No willow flycatchers were observed during the subsequent four focused surveys. Interpretation of the survey results, based on the guidelines provided in Sogge et. al (2010), leads to the conclusion that the observed willow flycatcher was a migrant. The first two survey periods (May 15–31 and June 1–24) are conducted during a time when migrant willow flycatchers of all three California subspecies might occur in the region. Unless nesting behavior is observed during these first two periods, it is the final survey period (June 25 to July 17) in which detected birds are likely either breeding birds or non-breeding resident floaters (non-paired birds).

No southwestern willow flycatchers or least Bell's vireos were observed during the focused surveys. In addition, no nesting flycatchers or vireos have been reported in the CNDDB for the project vicinity (CDFG 2012), and none were observed in 2007 and 2008 during focused surveys for another project in the lower section (EDAW 2009a, 2009b). Based on the lack of records for the region, negative survey results in prior years, and the negative survey results reported here, the southwestern willow flycatcher and least Bell's vireo appear to be absent as breeders at this time. The Willow Flycatcher Survey and Detection Forms required by the protocol are included in Attachment C.

Other Observations

Four California Species of Special Concern[1] and one CDFG Watch List Species[2] were observed in the survey area: western pond turtle (*Emys marmorata*), two-striped garter snake (*Thamnophis hammondii*), loggerhead shrike (*Lanius ludovicianus*), yellow warbler (*Dendroica petechia*), and Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*). CNDDB forms will be submitted to the CDFG for these species (Attachment D).

Brown-headed cowbirds were observed in the riparian habitat in the upper and lower sections during most surveys. The most observed on any one day was three males and two females in the lower section on April 19. The most observed in the upper section was one male and one female on May 17.

BonTerra Consulting appreciates the opportunity to assist on this project. If you have any comments or questions, please call Amber Oneal at (714) 444-9199.

Sincerely,

BONTERRA CONSULTING

Ann M. Johnston
Principal, Biological Services

Amber S. Oneal
Senior Project Manager, Biological Services

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1 California Species of Special Concern are considered special status due to declining population levels, limited ranges, and/or continuing threats, which have made them vulnerable to extinction. Not all Species of Special Concern have declined equally; some species may be just starting to decline, while others may have already reached the point where they meet the criteria for listing.

2 CDFG Watch List Species are not on the current Special Concern list but (1) were on previous lists and they have not been State listed under California Endangered Species Act; (2) were previously State or federally listed and now are on neither list; or (3) are on the list of "Fully Protected" species.

I certify that the information in this survey report and enclosed exhibits fully and accurately presents my work.

Brian Leatherman
Senior Biologist
Permit No. TE827493-6

Enclosures: Exhibits 1, 2
Attachment A – Site Photos
Attachment B – Wildlife Compendium
Attachment C – Willow Flycatcher Survey and Detection Form
Attachment D – CNDDB Forms

cc: Eric Lim, Los Angeles County Department of Public Works

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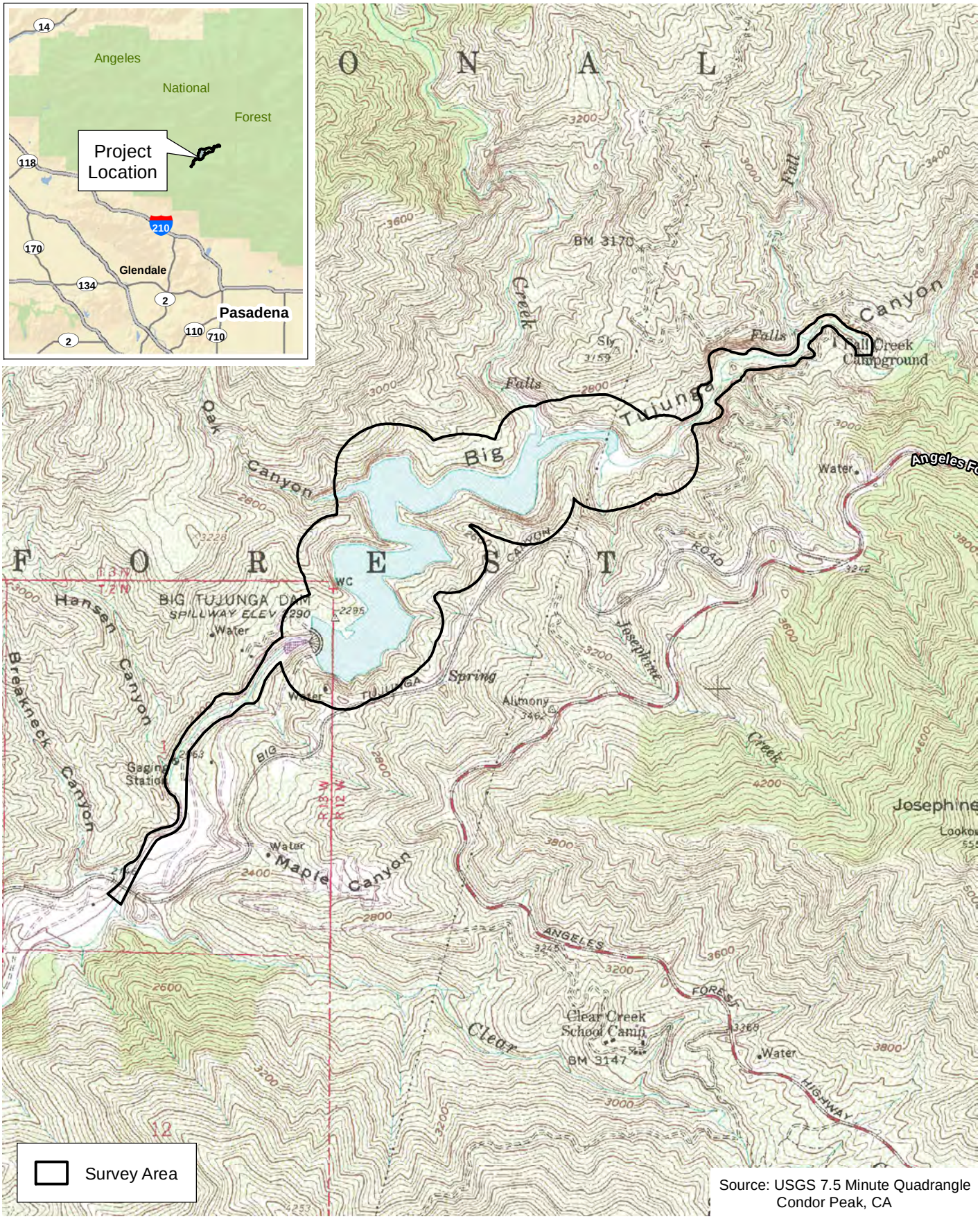

Source: USGS 7.5 Minute Quadrangle
Condor Peak, CA

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Survey Area

Exhibit 1

Big Tujunga Dam Sediment Removal Project

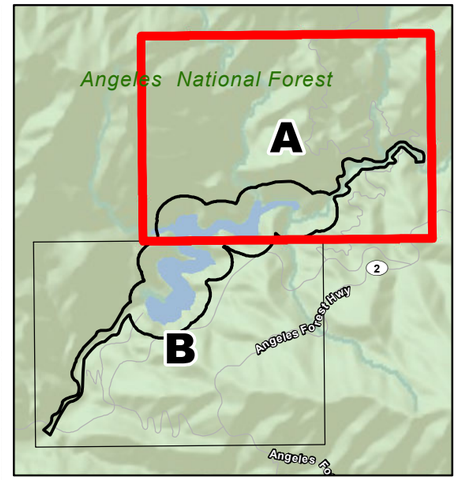
N W E S

2,000 1,000 0 2,000 Feet

BonTerra CONSULTING

(Rev: 5-04-2012 CJS) \PAS\Projects\CoLADPW\J187\Graphics\Ex_LBV_WIFL_notice.pdf





Survey Area

Aerial Source: LAR-IAC 2011

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Aerial View

Exhibit 2A

Big Tujunga Dam Sediment Removal Project

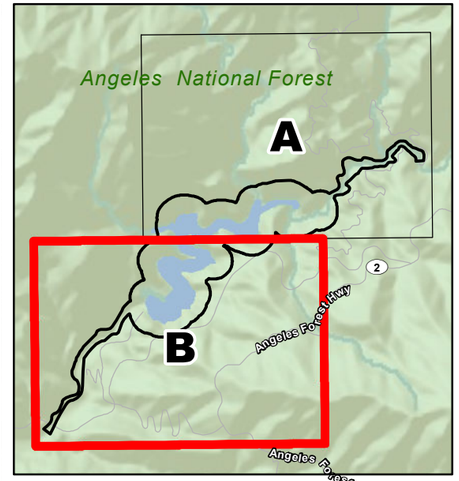
N W E S

800 400 0 800 Feet

BonTerra CONSULTING

(Rev: 9-27-2012 CJS) Projects\CoLADPWJ167\Graphics\IMND\Ex_Ex_bio_veg_impacts.pdf





Survey Area

Aerial Source: LAR-IAC 2011

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Aerial View

Exhibit 2B

Big Tujunga Dam Sediment Removal Project

N W E S

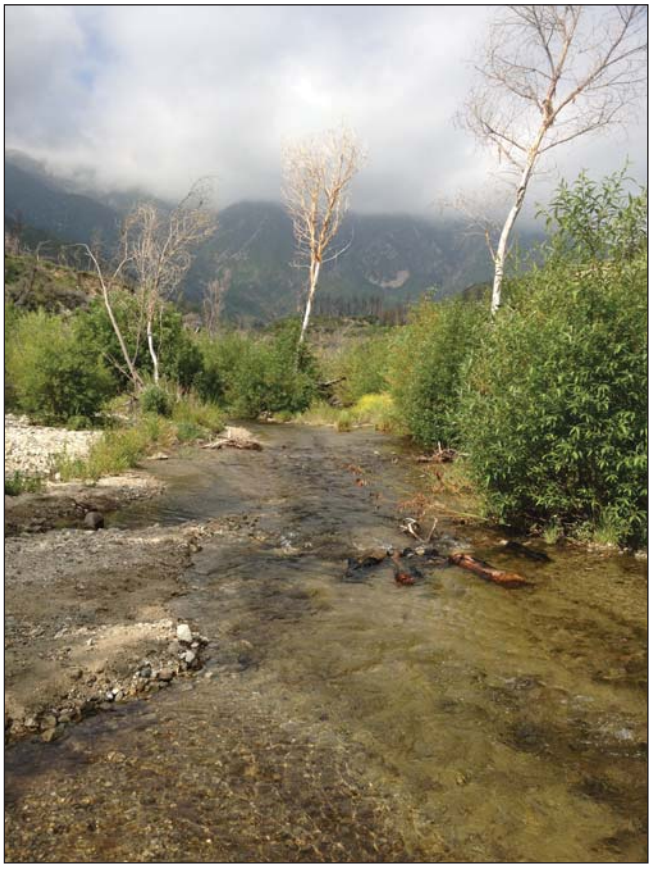
800 400 0 800 Feet

Bonterra CONSULTING

(Rev: 9-27-2012 CJS) Projects\CoLADPW\J167\Graphics\MND\Ex_Ex_bio_veg_impacts.pdf

ATTACHMENT A

SITE PHOTOS



View of willow scrub habitat along Big Tujunga Wash located downstream of the Dam.



View of willow scrub habitat along Big Tujunga Wash located downstream of the Dam.

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Site Photographs

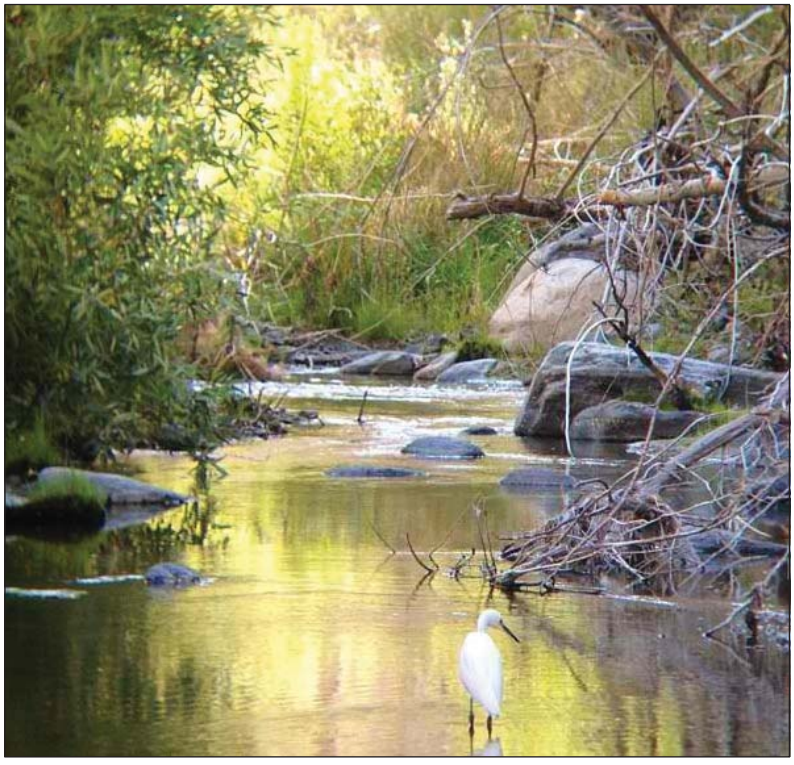
Attachment A-1

Big Tujunga Dam Sediment Removal Project

BonTerra CONSULTING



View of willow scrub habitat along Big Tujunga Creek located upstream of the Reservoir.



View of willow scrub habitat along Big Tujunga Creek located upstream of the Reservoir.

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Site Photographs

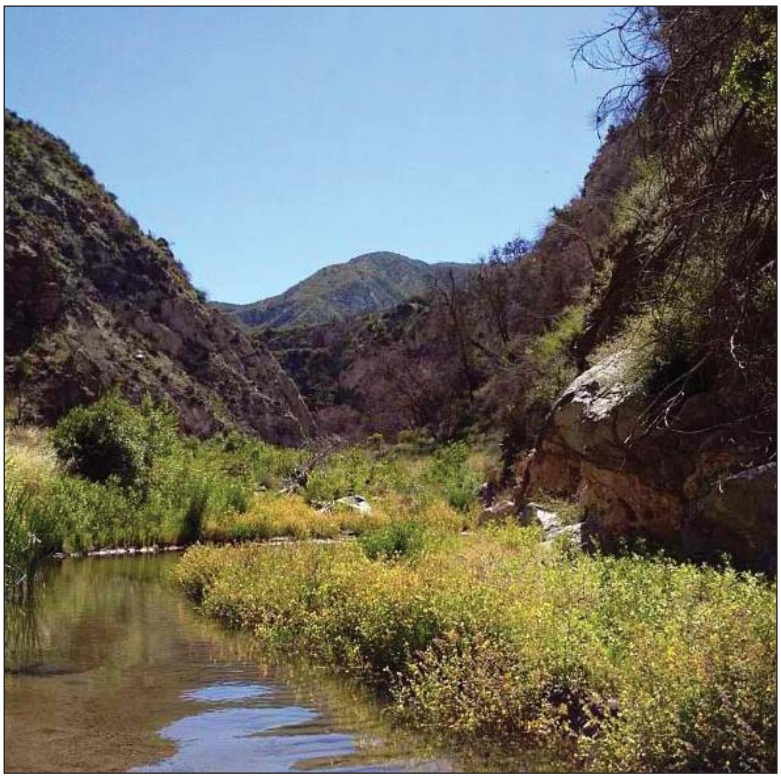
Attachment A-2

Big Tujunga Dam Sediment Removal Project

BonTerra CONSULTING



View of willow scrub habitat along Big Tujunga Creek located upstream of the Reservoir.



View of willow scrub habitat along Big Tujunga Creek located upstream of the Reservoir.

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Site Photographs

Attachment A-3

Big Tujunga Dam Sediment Removal Project

BonTerra CONSULTING

ATTACHMENT B

WILDLIFE COMPENDIUM

WILDLIFE SPECIES OBSERVED DURING LEAST BELL'S VIREO/SOUTHWESTERN WILLOW FLYCATCHER SURVEYS SPRING/SUMMER 2012

COMMON NAME	SCIENTIFIC NAME
AMPHIBIANS	**AMPHIBIA**
Treefrogs and Allies	**Hylidae**
California treefrog	*Hyla cadaverina*
Pacific treefrog	*Hyla regilla*
True Frogs	**Ranidae**
* Bullfrog	*Rana catesbeiana*
REPTILES	**REPTILIA**
Box and Water Turtles	**Emydidae**
** Western pond turtle	*Emys marmorata*
Spiny Lizards, Horned Lizards, etc.	**Phrynosomatidae**
Western fence lizard	*Sceloporus occidentalis biseriatus*
Side-blotched lizard	*Uta stansburiana*
Whiptail Lizards	**Teiidae**
** Western whiptail	*Cnemidophorus tigris*
Colubrids	**Colubridae**
California whipsnake	*Masticophus lateralis*
** Two-striped garter snake	*Thamnophis hammondii*
BIRDS	**AVES**
Geese and Ducks	**Anatidae**
Mallard	*Anas platyrhynchos*
Hawks, Eagles and Kites	**Accipitridae**
** Cooper's hawk	*Accipiter cooperii*
Red-tailed hawk	*Buteo jamaicensis*
Falcons	**Falconidae**
American kestrel	*Falco sparverius*
** Peregrine falcon	*Falco peregrinus*
Quail	**Odontophoridae**
Mountain quail	*Oreortyx pictus*
California quail	*Callipepla californica*
Sandpipers	**Scolopacidae**
Spotted sandpiper	*Actitus macularia*
Pidgeons and Doves	**Columbidae**
Band-tailed pidgeon	*Columba fasciata*
Mourning dove	*Zenaida macroura*
Swifts	**Apodidae**
White-throated swift	*Aeronautes saxatalis*
Hummingbirds	**Trochilidae**
Black-chinned hummingbird	*Archilochus alexandri*
Anna's hummingbird	*Calypte anna*
** Costa's hummingbird	*Calypte costae*
** Allen's hummingbird	*Selasphorus sasin*
Woodpeckers	**Picidae**
Acorn woodpecker	*Melanerpes formicivorus*
** Nuttall's woodpecker	*Picoides nuttallii*
Hairy woodpecker	*Picoides villosus*

WILDLIFE SPECIES OBSERVED DURING LEAST BELL'S VIREO/SOUTHWESTERN WILLOW FLYCATCHER SURVEYS SPRING/SUMMER 2012 (Continued)

COMMON NAME	SCIENTIFIC NAME
Northern flicker	*Colaptes auratus*
Tyrant Flycatchers	**Tyrannidae**
Western wood-pewee	*Contopus sordidulus*
Hammond's flycatcher	*Empidonax hammondii*
Pacific-slope flycatcher	*Empidonax difficilis*
Black phoebe	*Sayornis nigricans*
Say's phoebe	*Sayornis saya*
Ash-throated flycatcher	*Myiarchus cinerascens*
Western kingbird	*Tyrannus verticalis*
Shrikes	**Laniidae**
** Loggerhead shrike	*Lanius ludovicianus*
Vireos	**Vireonidae**
Warbling vireo	*Vireo gilvus*
Jays and Crows	**Corvidae**
Western scrub-jay	*Aphelocoma californica*
Common raven	*Corvus corax*
Swallows	**Hirundinidae**
Violet-green swallow	*Tachycineta thalassina*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Cliff swallow	*Petrochelidon pyrrhonota*
Titmice and Chickadees	**Paridae**
** Oak (Plain) titmouse	*Baeolophus inornatus*
Bushtits	**Aegithalidae**
Bushtit	*Psaltriparus minimus*
Wrens	**Troglodytidae**
Rock wren	*Salpinctes obsoletus*
Canyon wren	*Catherpes mexicanus*
Bewick's wren	*Thryomanes bewickii*
House wren	*Troglodytes aedon*
Dippers	**Cinclidae**
American dipper	*Cinclus mexicanus*
Gnatcatchers	**Silviidae**
Blue-gray gnatcatcher	*Polioptila caerula*
Bluebirds and Thrushes	**Turdidae**
Western bluebird	*Sialia mexicana*
American robin	*Turdus migratorius*
Wrentits	**Timaliidae**
Wrentit	*Chamaea fasciata*
Mockingbirds and Thrashers	**Mimidae**
Northern mockingbird	*Mimus polyglottis*
California thrasher	*Toxostoma redivivum*
Starlings	**Sturnidae**
* European starling	*Sturnus vulgaris*

WILDLIFE SPECIES OBSERVED DURING LEAST BELL'S VIREO/SOUTHWESTERN WILLOW FLYCATCHER SURVEYS SPRING/SUMMER 2012 (Continued)

COMMON NAME	SCIENTIFIC NAME
Silky Flycatchers	**Ptilogonatidae**
Phainopepla	*Phainopepla nitens*
Wood Warblers	**Parulidae**
Orange-crowned warbler	*Vermivora celata*
** Yellow warbler	*Dendroica petechia*
Yellow-rumped warbler	*Dendroica coronata*
Common yellowthroat	*Geothlypis trichas*
Wilson's warbler	*Wilsonia pusilla*
Tanagers	**Thraupidae**
Western tanager	*Piranga ludoviciana*
Towhees and Sparrows	**Emberizidae**
Spotted towhee	*Pipilo maculatus*
California towhee	*Pipilo crissalis*
** Rufous-crowned sparrow	*Aimophila ruficeps*
** Chipping sparrow	*Spizella passerina*
** Black-chinned sparrow	*Spizella atrogularis*
Lark sparrow	*Chondestes grammacus*
Song sparrow	*Melospiza melodia*
Lincoln's sparrow	*Melospiza lincolnii*
White-crowned sparrow	*Zonotrichia leucophrys*
Golden-crowned sparrow	*Zonotrichia atricapilla*
Dark-eyed junco	*Junco hyemalis*
Grosbeaks and Buntings	**Cardinalidae**
Black-headed grosbeak	*Pheucticus melanocephalus*
Blue grosbeak	*Guiraca caerulea*
Lazuli bunting	*Passerina amoena*
Blackbirds and Orioles	**Icteridae**
Red-winged blackbird	*Agelaius phoeniceus*
* Brown-headed cowbird	*Molothrus ater*
Hooded oriole	*Icterus cucullatus*
Bullock's oriole	*Icterus bullockii*
Finches	**Fringillidae**
House finch	*Carpodacus mexicanus*
Lesser goldfinch	*Carduelis psaltria*
** Lawrence's goldfinch	*Carduelis lawrencei*
American goldfinch	*Carduelis tristis*
MAMMALS	**MAMMALIA**
Squirrels	**Sciuridae**
California ground squirrel	*Spermophilus beecheyi*
Pocket Gophers	**Geomyidae**
Botta's pocket gopher (burrows)	*Thomomys bottae*

WILDLIFE SPECIES OBSERVED DURING LEAST BELL'S VIREO/SOUTHWESTERN WILLOW FLYCATCHER SURVEYS SPRING/SUMMER 2012 (Continued)

COMMON NAME	SCIENTIFIC NAME
Old World Rats and Mice	**Muridae**
Dusky-footed woodrat (nest)	*Neotoma fuscipes*
Dogs, Wolves and Foxes	**Canidae**
Coyote (scat, tracks)	*Canis latrans*
Raccoons	**Procyonidae**
Common raccoon (tracks)	*Procyon lotor*
Weasels and Allies	**Mustelidae**
Striped skunk (odor)	*Mephitis mephitis*
Deer	**Cervidae**
Mule deer	*Odocoileus hemionus*

* non-native species
** CDFG's Special Animals

Note: Other species may have been overlooked or inactive/absent because of the season (amphibians are active during rains, reptiles during summer, some birds (and bats) migrate out of the area for summer or winter, some mammals hibernate etc.). Taxonomy and nomenclature generally follow NABA (2002) for butterflies, Stebbins (2003) for amphibians and reptiles, AOU (1998) for birds, and Jones et al. (1992) for mammals.

ATTACHMENT C

WILLOW FLYCATCHER SURVEY AND DETECTION FORM

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: **Big Tujunga (Upper Section)** State: **CA** County: **LA**

USGS Quad Name: **Condor Peak** Elevation: **714** (meters)

Creek, River, or Lake Name: **Big Tujunga Creek**

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? ***Yes*** **X** ***No*** ____

Survey Coordinates: Start: E **0393234m** N **3796611m** UTM Datum: **NAD83** (See instructions)

Stop: E **392043m** N **3796273m** UTM Zone: **11S**

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1 Observer(s): Brian Leatherman	Date: 5/17/2012 Start: 6:30 Stop: 11:30 Total hrs: 5.0	0					# Birds	Sex	UTM E	UTM N
Survey # 2 Observer(s): Brian Leatherman	Date: 6/7/2012 Start: 5:45 Stop: 12:00 Total hrs: 6.2	0					# Birds	Sex	UTM E	UTM N
Survey # 3 Observer(s): Brian Leatherman	Date: 6/14/2012 Start: 6:00 Stop: 12:00 Total hrs: 5.0	0					# Birds	Sex	UTM E	UTM N
Survey # 4 Observer(s): Brian Leatherman	Date: 6/28/2012 Start: 5:30 Stop: 12:15 Total hrs: 6.8	0					# Birds	Sex	UTM E	UTM N
Survey # 5 Observer(s): Brian Leatherman	Date: 7/9/2012 Start: 7:00 Stop: 11:30 Total hrs: 4.5	0					# Birds	Sex	UTM E	UTM N
Overall Site Summary Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total survey hrs: 27.5		Total Adult Residents: 0	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes ____ No **N/A** ____ If yes, report color combination(s) in the comments section on back of form and report to USFWS.				

Reporting Individual: **Brian Leatherman** Date Report Completed: **8/1/2012**

US Fish & Wildlife Service Permit #: **TE827493-7** State Wildlife Agency Permit #: **SC-001562**

Submit form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual **Brian Leatherman** Phone # **(714)701-0863**

Affiliation **Leatherman BioConsulting Inc.** E-mail bleathermanwlb@aol.com

Site Name **Big Tujunga Reservoir** Date report Completed **8/1/2012**

Was this site surveyed in a previous year? Yes____ No__X__ Unknown____

Did you verify that this site name is consistent with that used in previous yrs? Yes____ No____ Not Applicable **X**

If name is different, what name(s) was used in the past? ____

If site was surveyed last year, did you survey the same general area this year? Yes____ No____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes **X** No____ If no, summarize below.

Management Authority for Survey Area: Federal **X** Municipal/County **X** State____ Tribal____ Private____

Name of Management Entity or Owner (e.g., Tonto National Forest) **LADPW, ANF**

Length of area surveyed: **2.2** (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

X Native broadleaf plants (entirely or almost entirely, > 90% native)

____ Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.

Alnus rhombifolia, Populus fremontii, Salix spp

Average height of canopy (Do not include a range): **4.5** (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Habitat consist of rocky stream with patches of alders and willows. Occassional cottonwoods and willows. Generally considered marginal habitat for WIFL because of the small isolated patches of riparian habitat.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: **Big Tujunga Dam (Lower Section)** State: **CA** County: **LA**

USGS Quad Name: **Condor Peak** Elevation: **629** (meters)

Creek, River, or Lake Name: **Big Tujunga Creek**

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* **X** *No* ____

Survey Coordinates: Start: E **0390563m** N **3795314m** UTM Datum: **NAD83** (See instructions)

Stop: E **0389819m** N **3794239m** UTM Zone: **11S**

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	5/16/2012									
Brian	Start:									
Leatherman	6:00	1	0	0	N	One individual observed considered a migrant (not observed during subsequent surveys)				
	Stop: 11:00									
	Total hrs: 5.0									
Survey # 2	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/8/2012									
Brian	Start:									
Leatherman	6:00	0								
	Stop: 11:00									
	Total hrs: 5.0									
Survey # 3	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/15/2012									
Brian	Start:									
Leatherman	6:00	0								
	Stop: 11:00									
	Total hrs: 5.0									
Survey # 4	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/29/2012									
Brian	Start:									
Leatherman	6:00	0								
	Stop: 11:15									
	Total hrs: 5.2									
Survey # 5	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	7/10/2012									
Brian	Start:									
Leatherman	7:00	0								
	Stop: 11:45									
	Total hrs: 4.8									

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes ____ No X
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.	0	0	0	0	If yes, report color combination(s) in the comments section on back of form and report to USFWS.
Total survey hrs: 25.0					

Reporting Individual: **Brian Leatherman** Date Report Completed: **8/1/2012**

US Fish & Wildlife Service Permit #: **TE827493-7** State Wildlife Agency Permit #: **SC-001562**

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual **Brian Leatherman** Phone # **(714)701-0863**

Affiliation **Leatherman BioConsulting Inc.** E-mail bleathermanwlb@aol.com

Site Name **Big Tujunga Reservoir** Date report Completed _____

Was this site surveyed in a previous year? Yes____ No__X__ Unknown____

Did you verify that this site name is consistent with that used in previous yrs? Yes____ No_____ Not Applicable **X**

If name is different, what name(s) was used in the past? _____

If site was surveyed last year, did you survey the same general area this year? Yes____ No **X** If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes **X** No_____ If no, summarize below.

Management Authority for Survey Area: Federal **X** Municipal/County **X** State_____ Tribal____ Private_____

Name of Management Entity or Owner (e.g., Tonto National Forest) **LADPW, ANF**

Length of area surveyed: **1.8** (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

X Native broadleaf plants (entirely or almost entirely, > 90% native)

_____ Mixed native and exotic plants (mostly native, 50 - 90% native)

_____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

_____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.

Alnus rhombifolia, Populus fremontii, Salix spp

Average height of canopy (Do not include a range): 7 (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

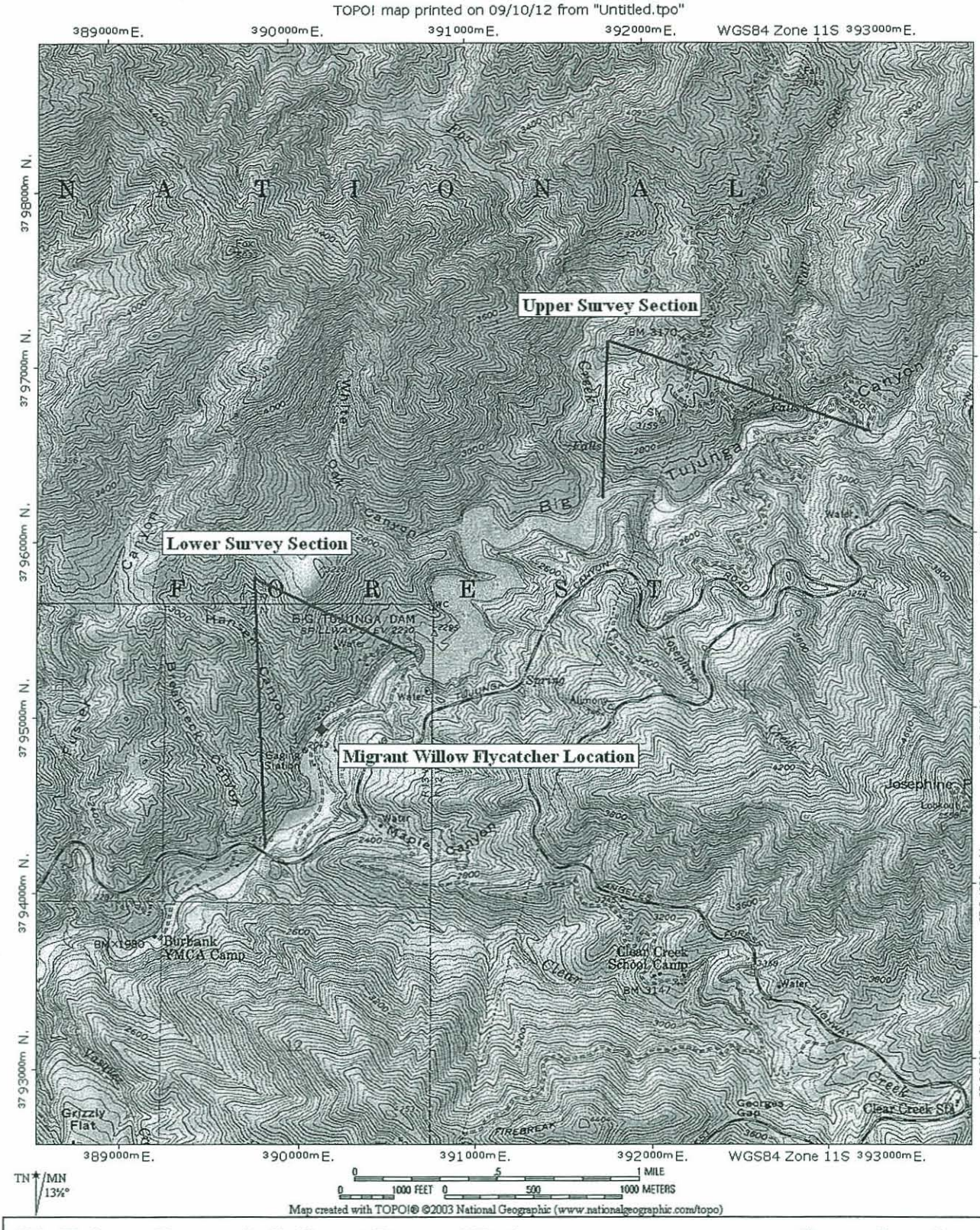
Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Habitat consists of nearly continuous but narrow strip of willows along rocky stream with patches of alders and occassional cottonwoods. Generally considered marginal habitat for WIFL. Surveyed in 2007 and 2008 by EDAW, negative LBVI and WIFL.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary



Big Tujunga Reservoir Sediment Removal Project

Survey Locations
Figure 1

LEATHERMAN BIOCONSULTING, INC.
Biological Surveys, Management & Monit.

Source: TOPO! Condor Peak USGS quadrangle

ATTACHMENT D

CNDDB FORMS

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/16/2012

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

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California Native Species Field Survey Form

Send Form

Scientific Name: *Emys marmorata*

Common Name: Western Pond Turtle

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 4 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Brian Leatherman
Address: 5622 Amberdale Drive
Yorba Linda, CA 92886
E-mail Address: bleathermanwlb@aol.com
Phone: (714) 701-0863

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

4 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☑ other

***Location Description* (please attach map AND/OR fill out your choice of coordinates, below)**

Turtles observed downstream of the Big Tujunga Dam (within the LADPW dam operations area), and upstream of the Big Tujunga Dam Reservoir in the Angeles National Forest.

County: Los Angeles Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: _____

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: HD MD SD Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: HD MD SD GPS Make & Model Garmin Oregon 400t

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: 0390069mE, 3794749mN

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Open rocky montane stream. All four pond turtles were observed basking on rocks along the edge of the stream.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Big Tujunga Dam management area.

Visible disturbances:

Threats: Dam maintenance activities.

Comments: One individual upstream of Big Tujunga Dam observed on 4/27/2012 and three individuals downstream of Big Tujunga Dam on 5/16/2012.

Determination: *(check one or more, and fill in blanks)*

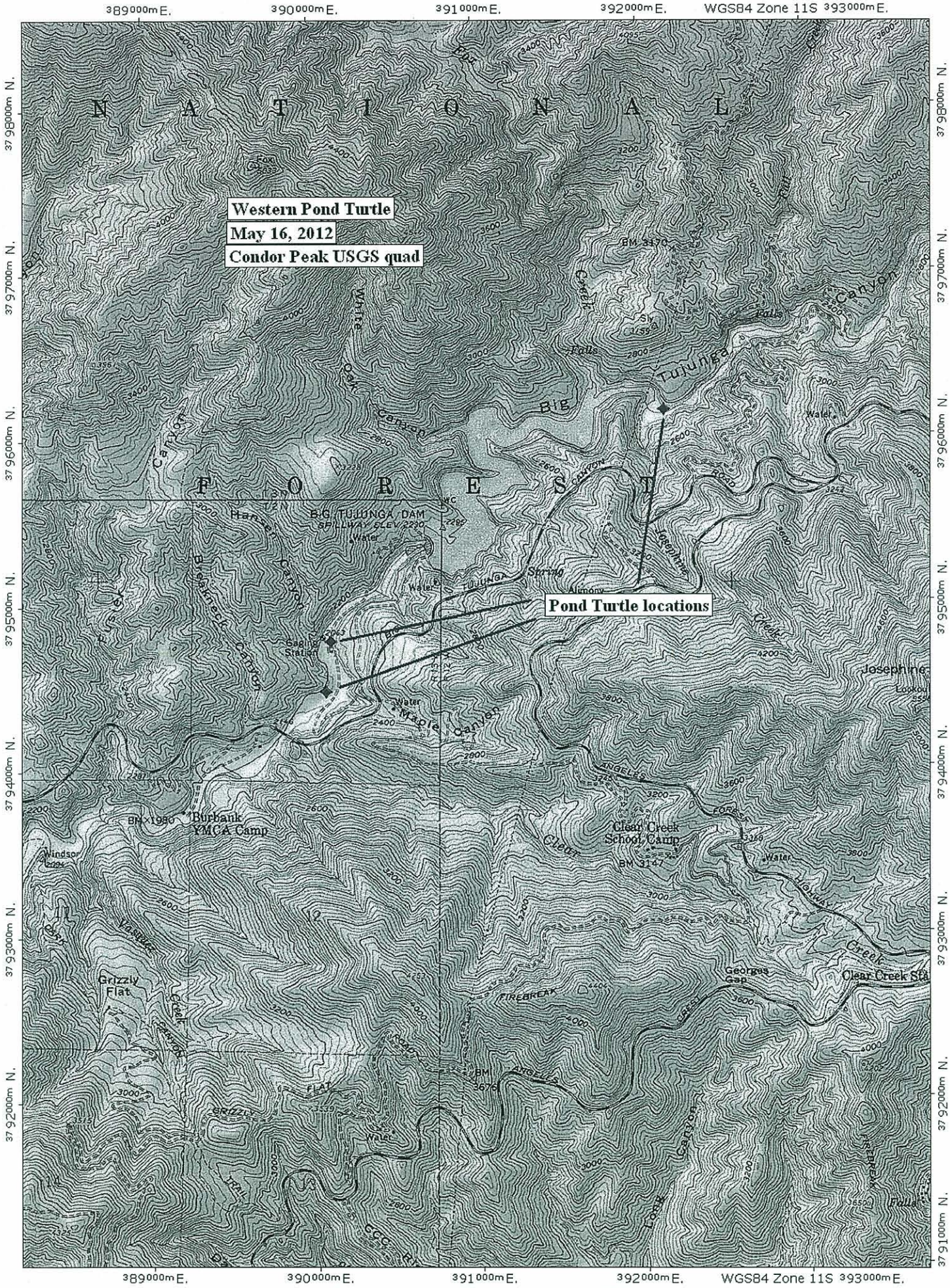
- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☐ Other: Experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

TOPO! map printed on 09/18/12 from "Untitled.tpo"



TN MN 13½°

0 .5 1 MILE

0 1000 FEET 0 500 1000 METERS

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Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 07/09/2012

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Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Thamnophis hammondii*

Common Name: Two-striped garter snake

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 5 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Brian Leatherman
Address: 5622 Amberdale Drive
Yorba Linda, CA 92886
E-mail Address: bleathermanwlb@aol.com
Phone: (714) 701-0863

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

4	1			
# adults	# juveniles	# larvae	# egg masses	# unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Five snakes observed upstream of the Big Tujunga Dam Reservoir in the Angeles National Forest.

County: Los Angeles Landowner / Mgr.: Angeles National Forest, LADPW
Quad Name: Condor Peak Elevation: 2355 feet
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Oregon 400t
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 0392935mE, 3796642mN

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Open rocky montane stream. All five two-striped garter snakes were observed foraging within the stream.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Big Tujunga Dam management area.

Visible disturbances:

Threats: Dam maintenance activities.

Comments: One juvenile observed on 6/7, one adult on 6/14, and three adults on 7/9/2012.

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

DFG/BDB/1747 Rev. 6/16/09

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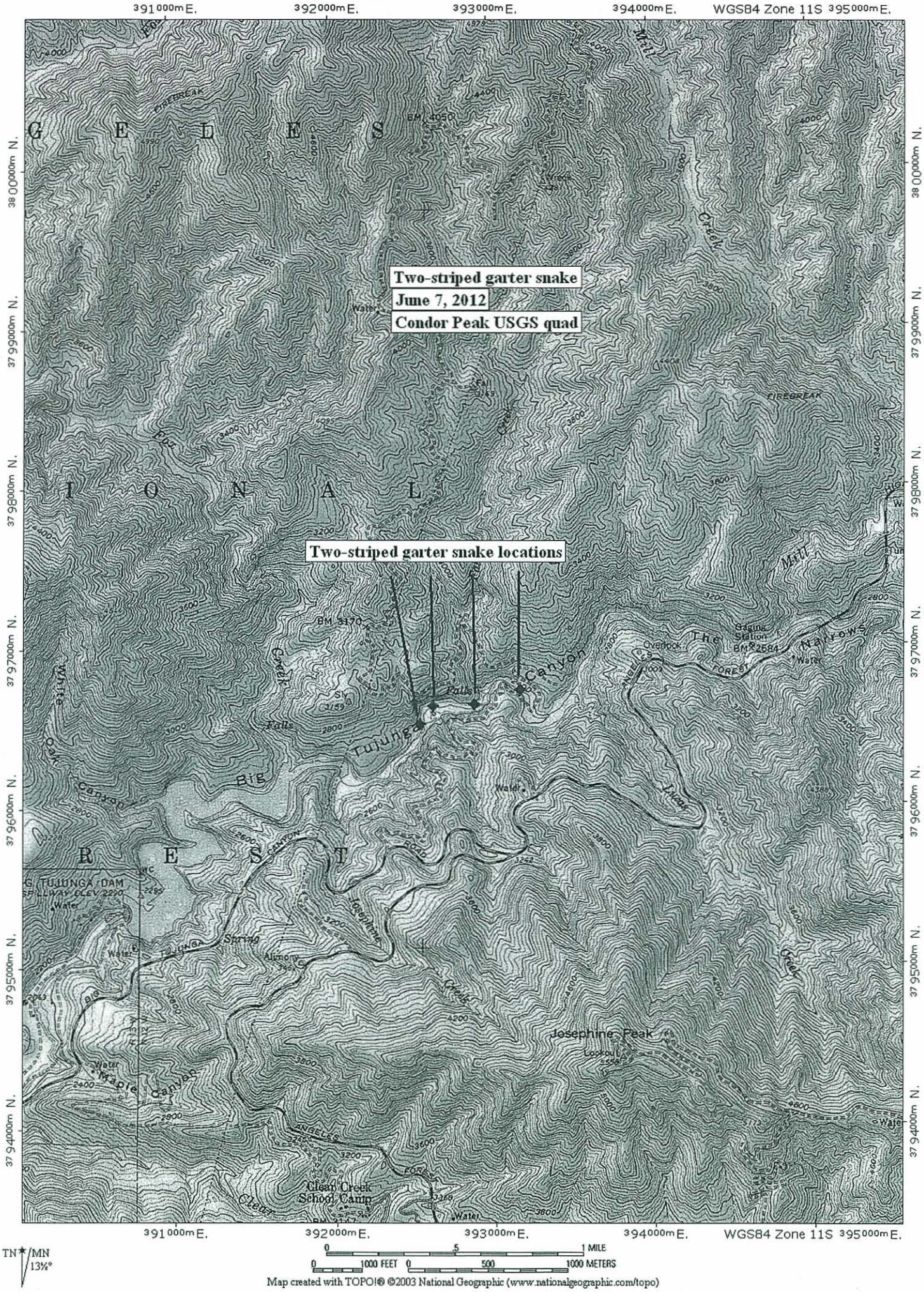

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Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/08/2012

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EO Index No. _____ Map Index No. _____

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California Native Species Field Survey Form

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Scientific Name: *Lanius ludovicianus*

Common Name: Loggerhead shrike

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Brian Leatherman
Address: 5622 Amberdale Drive
Yorba Linda, CA 92886
E-mail Address: bleathermanwlb@aol.com
Phone: (714) 701-0863

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

***Location Description* (please attach map AND/OR fill out your choice of coordinates, below)**

Downstream of the Big Tujunga Dam within the fenced LADPW dam management area.

County: Los Angeles Landowner / Mgr.: Angeles National Forest, LADPW
Quad Name: Condor Peak Elevation: 2135 feet
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Oregon 400t
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 0390040mE, 3794388mN

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Cut slope with ruderal non-native annual grassland and scattered native shrubs above stream.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Big Tujunga Dam management area.

Visible disturbances:

Threats: Dam maintenance activities.

Comments: Observed one bird on 6/8/2012.

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Experience with species

Photographs: *(check one or more)* Slide Print Digital
Plant / animal ☐ ☐ ☐
Habitat ☐ ☐ ☐
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☐ no ☐

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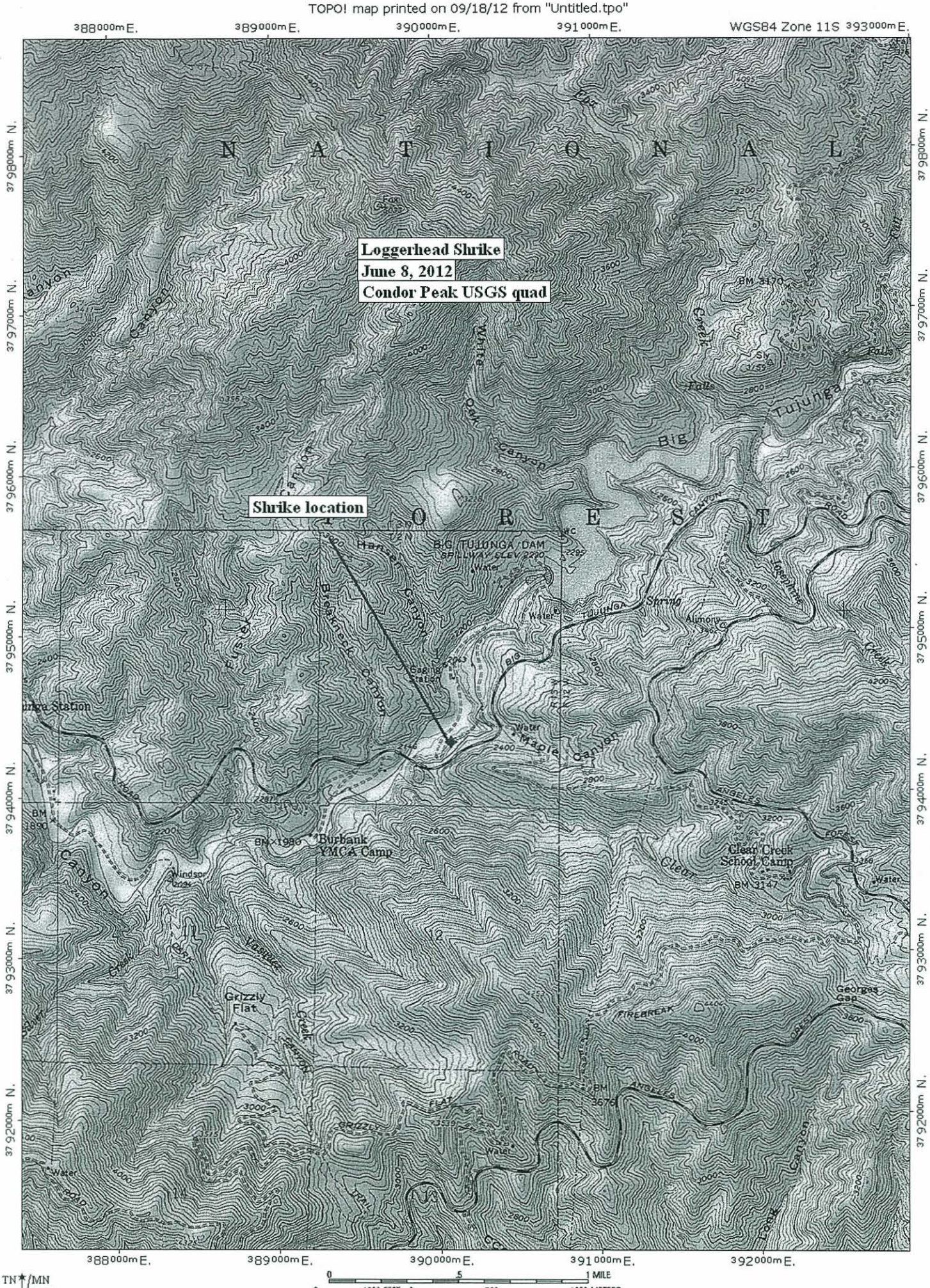

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Department of Fish and Game
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Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/07/2012

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EO Index No. _____ Map Index No. _____

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California Native Species Field Survey Form

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Scientific Name: *Dendroica petechia*

Common Name: Yellow warbler

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 9 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Brian Leatherman
Address: 5622 Amberdale Drive
Yorba Linda, CA 92886
E-mail Address: bleathermanwlb@aol.com
Phone: (714) 701-0863

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

9 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Upstream of the Big Tujunga Dam Reservoir, and downstream of the Big Tujunga Dam.

County: Los Angeles Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2080 feet

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Oregon 400t

DATUM: **NAD27** ☐ **NAD83** ☑ **WGS84** ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates: 0390070mE, 3794650mN

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Mostly open rocky stream with cottonwood willow riparian forest. Several territorial males singing along the two reaches, although nesting not observed directly.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest

Visible disturbances:

Threats:

Comments: 4-6 singing males along habitat downstream of dam, 3-5 territorial males upstream of reservoir. These birds likely represent breeding pairs.

Determination: *(check one or more, and fill in blanks)*

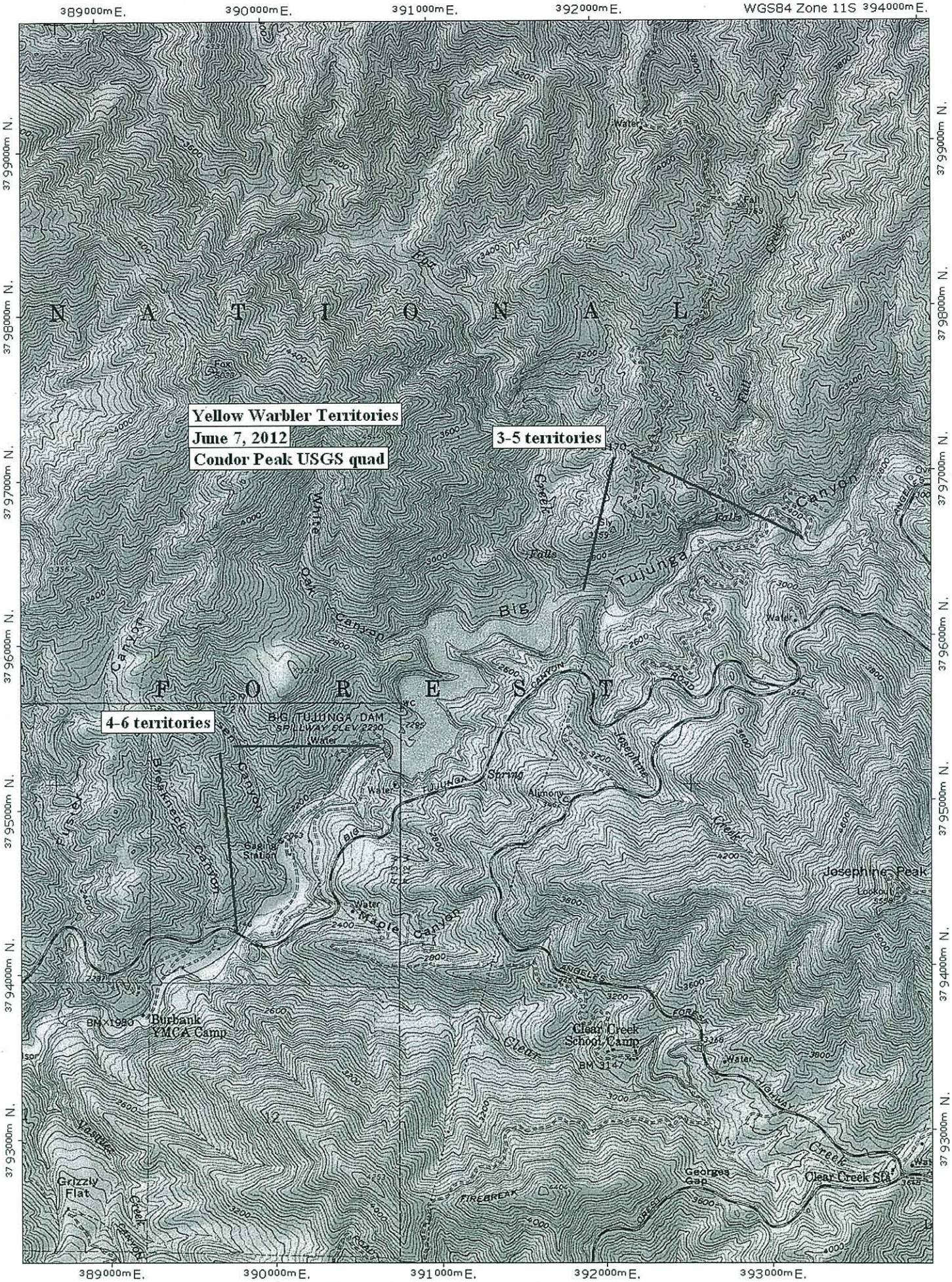
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Experience with species

Photographs: *(check one or more)* Slide Print Digital

Plant / animal ☐ ☐ ☐
Habitat ☐ ☐ ☐
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☐ no ☐

TOPO! map printed on 09/18/12 from "Untitled.tpo"



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Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/07/2012

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Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

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California Native Species Field Survey Form

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Scientific Name: *Aimophila ruficeps*

Common Name: Rufous-crowned sparrow

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Brian Leatherman
Address: 5622 Amberdale Drive
Yorba Linda, CA 92886
E-mail Address: bleathermanwlb@aol.com
Phone: (714) 701-0863

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

***Location Description* (please attach map AND/OR fill out your choice of coordinates, below)**

Upstream of the Big Tujunga Dam Reservoir, half way down old access road (now closed) to Fall Creek Campground in Angeles National Forest.

County: Los Angeles Landowner / Mgr.: Angeles National Forest, LADPW

Quad Name: Condor Peak Elevation: 2900 feet

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Oregon 400t

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: 0392550mE, 3795910mN

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Rugged mountain slope along road cut, recently burned chaparral on predominantly north facing slope.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest

Visible disturbances:

Threats:

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

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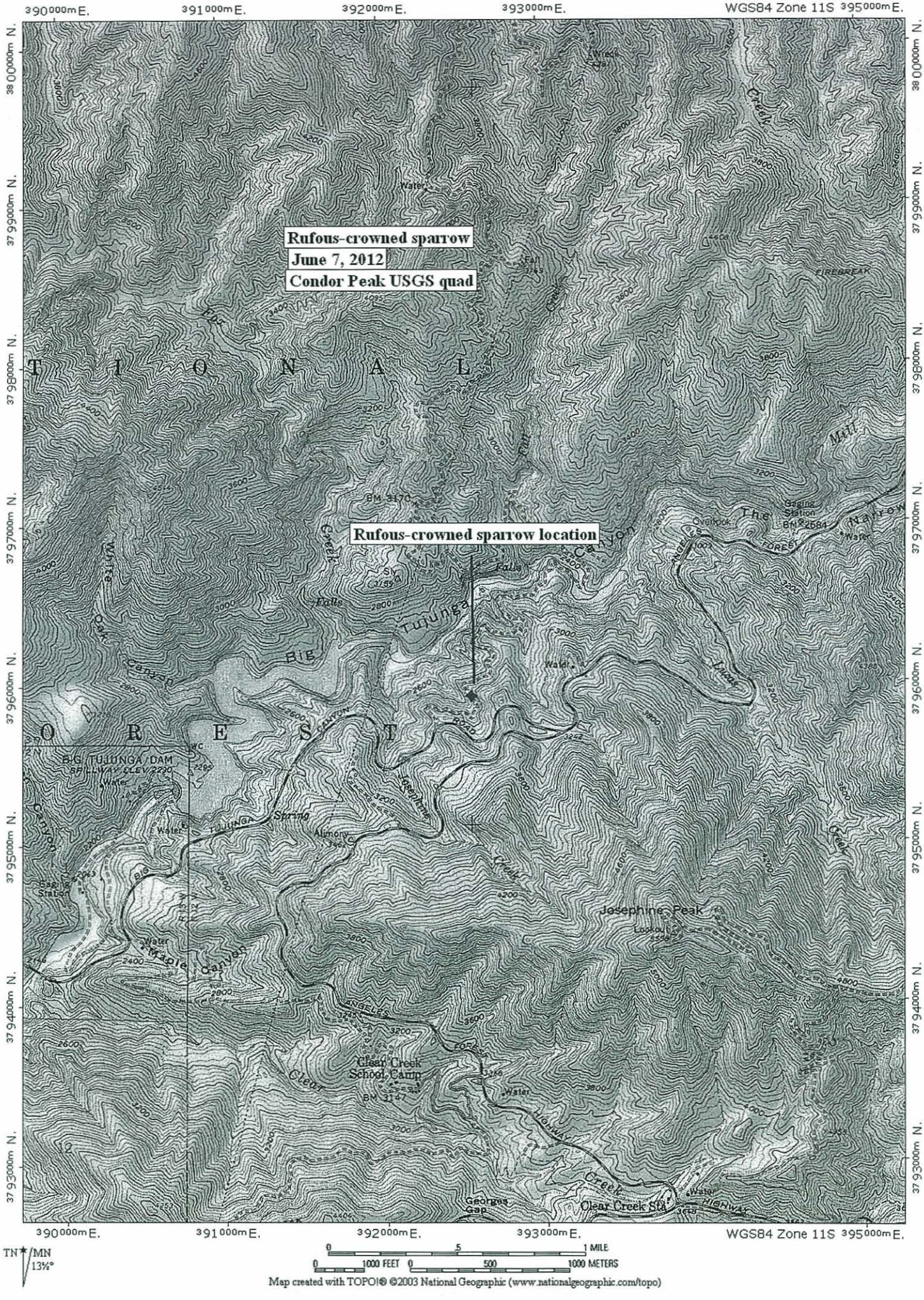

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October 10, 2016

Stacey Love
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

VIA EMAIL AND MAIL
Stacey_Love@fws.gov

Subject: Results of the Least Bell's Vireo and Southwestern Willow Flycatcher Surveys for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles, California

Dear Ms. Love:

This Letter Report presents the results of focused surveys to determine the presence or absence of the least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*) for the Big Tujunga Reservoir Sediment Removal Project (hereinafter referred to as the "proposed project"), located in Los Angeles County, California (Exhibit 1). A Biologist with the necessary experience and the Federal Endangered Species Act 10(a) survey permit conducted the surveys according to U.S. Fish and Wildlife Service (USFWS) protocol for these species.

PROJECT DESCRIPTION AND LOCATION

The proposed project involves the dewatering of the Big Tujunga Reservoir and the removal of sediment to the nearby Maple Canyon Sediment Placement Site. The proposed project is located on the southern edge of the San Gabriel Mountains in the Angeles National Forest (ANF) and is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute topographic quadrangle (Exhibit 1).

The survey area for the southwestern willow flycatcher and least Bell's vireo surveys included all riparian habitat along Big Tujunga Creek extending approximately 500 feet upstream of the sediment removal area, upstream of Big Tujunga Reservoir, and from Big Tujunga Dam to 500 feet downstream of Big Tujunga Canyon Road (Exhibit 2). Because of the length of the two sections to be surveyed, the upper and lower sections were surveyed on separate days. The survey area and surrounding vicinity consist of open space in the ANF.

Habitat in the survey area's upper section consists primarily of riparian vegetation along Big Tujunga Creek that is dominated by a young, emergent growth of willows (*Salix* spp.) with scattered mature willows and white alder (*Alnus rhombifolia*). The understory vegetation includes, but is not limited to, mule fat (*Baccharis salicifolia*), cocklebur (*Xanthium strumarium*), and broad-leaved cattail (*Typha latifolia*). A few western sycamore (*Platanus racemosa*) and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) are also present. The riparian habitat in this upper section is considered to be of marginal quality for both the southwestern willow flycatcher and least Bell's vireo. The lack of contiguous mature trees and/or dense canopy is not typical of southwestern willow flycatcher habitat. Although low scrubby riparian vegetation is often used by the least Bell's vireo, it generally occupies lowland riparian habitats and not mountain drainages that are often steep and narrow.

Riparian habitat in the survey area's lower section is characterized by relatively dense and continuous willow riparian forest dominated by arroyo willow (*Salix lasiolepsis*) and red willow (*Salix laevigata*), with an overstory of white alder and Fremont cottonwood. Common understory species include mule fat, hoary nettle (*Urtica dioica* ssp. *holosericea*), and mugwort (*Artemisia douglasiana*). Compared to the riparian habitat upstream of the reservoir, the riparian habitat in this lower section is considered to be of a higher quality for the southwestern willow flycatcher because it is more dense, mature, and contiguous. The riparian habitat in this lower section would also provide more potential for the least Bell's vireo if it wasn't located in a mountain drainage that is steep and narrow. Representative site photos are included in Attachment A.

SPECIES BACKGROUND

The least Bell's vireo and southwestern willow flycatcher were formerly more common and widespread but are now rare, local summer residents of Southern California's lowland riparian woodlands (Grinnell and Miller 1986; Garrett and Dunn 1981). The substantial population declines of these two avian species over the latter half of the 20th century is attributable to the loss and degradation of riparian habitats and brood parasitism by the brown-headed cowbird (*Molothrus ater*). As a result, the State of California listed the least Bell's vireo as Endangered on October 2, 1980; it became federally listed as Endangered on May 2, 1986. All three subspecies of willow flycatcher that breed in California (*E. t. brewsteri*, *E. t. extimus*, and *E. t. adastus*) were listed by the State as Endangered on January 2, 1991 (CDFW 2013). The southwestern subspecies of willow flycatcher ("southwestern willow flycatcher", *E. t. extimus*) was listed as federally Endangered on February 7, 1995, with an effective list date of March 29, 1995 (USFWS 1995; CDFW 2013).

Least Bell's Vireo

Bell's vireo is a Neotropical migrant that breeds in central and southwestern North America from northern Mexico to Southern California, Nevada, and Utah; east to Louisiana; and north to North Dakota, Wisconsin, and Indiana in the central United States (AOU 1998). Although not well known, the winter range of the least Bell's vireo is believed to be the west coast of Central America from southern Sonora, Mexico south to northwestern Nicaragua, including the cape region of Baja California, Mexico (Brown 1993). Of the four Bell's vireo subspecies, only two breed in California: the least Bell's vireo and the Arizona Bell's vireo (*V. b. arizonae*); the latter breeds in the Colorado River Valley (Garrett and Dunn 1981; Rosenberg et al. 1991). Though the least Bell's vireo was formerly considered a common breeder in riparian habitats throughout the Central Valley and other low-elevation riverine systems in California and Baja California, Mexico, it had been eliminated from much of its historical range at the time of listing (Franzreb 1989; Brown 1993). The least Bell's vireo has increased tenfold to 2,968 territories since its listing, and it has begun to recolonize portions of its former range where it had been extirpated. The increase is credited to improvements in habitat abundance and quality and effective cowbird control. Continued cowbird control and exotic plant removal in riparian areas are considered necessary for the foreseeable future in order to continue this trend (USFWS 2006).

The breeding habitat of the least Bell's vireo is primarily riparian dominated by willows, with dense understory vegetation; shrubs such as mule fat and California rose (*Rosa californica*) are often a component of the understory (Goldwasser 1981). The least Bell's vireo is often found in areas that include trees such as willow, western sycamore, or cottonwood (*Populus* sp.), particularly where the canopy is within or immediately adjacent to an understory layer of vegetation (Salata 1983). The least Bell's vireo generally nests in early successional stages of riparian habitats, with nest sites frequently located in willows that are between four and ten years of age (RECON 1988; Franzreb 1989). The most critical factor in habitat structure is the presence of a dense understory shrub layer from approximately two to ten feet above ground (Goldwasser 1981; Salata 1983; Franzreb 1989).

On February 2, 1994, the USFWS issued their final determination of critical habitat for the least Bell's vireo, identifying approximately 37,560 acres as critical habitat in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego Counties (USFWS 1994). The proposed project is not located in designated critical habitat for this species.

Southwestern Willow Flycatcher

The willow flycatcher is a Neotropical migrant that breeds in the west from northern Baja California, Mexico to central British Columbia and generally east through the northern half of the United States to the Atlantic coast (AOU 1998). Depending on the authority, there are four or five recognized subspecies of willow flycatcher (Sedgwick 2000). The breeding range of the southwestern willow flycatcher includes Southern California, Arizona, New Mexico, western Texas, and the extreme southern parts of Nevada and Utah (USFWS 1993). In California, the southwestern willow flycatcher breeds along the coast north to the Santa Ynez River in Santa Barbara County, and north in the interior to about Independence in Inyo County (USFWS 2002; Unitt 1987). The largest breeding populations of southwestern willow flycatcher in California are located at the South Fork of the Kern River in Kern County and on the Santa Margarita River in Camp Pendleton in San Diego County (Unitt 1987). The range-wide population of southwestern willow flycatcher is estimated at 1,299 territories at 288 sites. The population of southwestern willow flycatcher in California is estimated to be about 172 territories at 96 sites. Within the Coastal California Recovery Unit, the population is estimated at 120 territories at 73 sites (Durst et al. 2008). The southwestern willow flycatcher population has not shown the same recovery as the least Bell's vireo in response to riparian habitat restoration and cowbird control (Kus 2011).

The southwestern willow flycatcher breeds in willow-dominated riparian habitats that are similar to least Bell's vireo nesting habitats. The southwestern willow flycatcher differs from least Bell's vireo in that it shows a stronger dependency on willow thickets for all its requirements (Grinnell and Miller 1986). In addition, the southwestern willow flycatcher appears to have a preference for sites with surface water in the vicinity, such as along streams, on the margins of a pond or lake, and at wet mountain meadows (Grinnell and Miller 1986; Flett and Sanders 1987; Harris et al. 1987). In Arizona, the southwestern willow flycatcher invariably nests near surface water (Phillips et al. 1964). Recently, the southwestern willow flycatcher has adapted to introduced vegetation present in riparian communities, such as tamarisk (*Tamarix* sp.) and Russian olive (*Elaeagnus angustifolia*) (USFWS 1993).

The willow flycatcher is a common migrant in the interior of California and a rare-to-uncommon migrant along the coastal slope, with most birds moving through Southern California between May 15 and June 20 (Garrett and Dunn 1981; Unitt 1987). The spring migration of southwestern willow flycatcher is earlier than that of the northern subspecies (Unitt 1984; USFWS 1993). As a result, the presence of more abundant subspecies that migrate through the range of the southwestern willow flycatcher during its breeding season complicates surveys for nesting southwestern willow flycatchers.

On January 3, 2013, the USFWS published a final rule designating critical habitat for the southwestern willow flycatcher (USFWS 2013). This final rule designated 208,973 acres on a combination of federal, State, tribal, and private lands in California, Nevada, Utah, Arizona, and New Mexico. In California, critical habitat was designated in Inyo, Kern, Los Angeles, Riverside, Santa Barbara, San Bernardino, San Diego, and Ventura Counties. The proposed project is not located within the designated critical habitat for this species.

SURVEY METHODS

The USFWS protocol for the least Bell's vireo requires that at least eight surveys be conducted from April 10 to July 31 with a ten-day interval between each site visit. The USFWS protocol for the southwestern willow flycatcher requires a total of five surveys, with the first survey conducted between May 15 and May 31, the second and third surveys between June 1 and June 24, and the fourth and fifth

surveys between June 25 and July 17. BonTerra Psomas Biologist Jonathan Aguayo and Senior Biologists Lindsay Messett and Brian Daniels (USFWS Permit No. TE-821401-5) conducted the focused surveys in all riparian habitats of the survey area, including both the lower and upper sections, for occupation by least Bell's vireo and southwestern willow flycatcher (Tables 1 and 2). Due to red flag warning restrictions in the ANF and access issues associated with access to the survey area's upper section, BonTerra Psomas was unable to conduct all five southwestern willow flycatcher surveys and all eight least Bell's vireo surveys in that section.

Mr. Aguayo, Ms. Messett, and Mr. Daniels systematically surveyed the riparian habitats by walking slowly and methodically along the margins of riparian habitat and by using meandering transects through riparian habitat. Following the southwestern willow flycatcher protocol, recorded vocalizations were used to elicit a response from any potentially territorial southwestern willow flycatchers. If no southwestern willow flycatchers were detected after the initial playing of the recorded vocalization, Mr. Daniels occasionally replayed the recording once more depending on site conditions. As the least Bell's vireo survey protocol does not require the playback of least Bell's vireo vocalizations, recorded least Bell's vireo vocalizations were not used during the surveys. When surveying for both species, surveys were done sequentially with surveyors focusing on the detection of the southwestern willow flycatcher in one direction (e.g., downstream to upstream) and least Bell's vireo on the return (e.g., upstream to downstream). Any least Bell's vireos or southwestern willow flycatchers would have been recorded with a Global Positioning System (GPS) unit (Garmin Vista); territories recorded would have been numbered chronologically as they were detected.

All surveys were conducted under optimal weather conditions and during early morning hours when bird activity is at its peak (Tables 1 and 2). All bird species detected during the surveys were recorded, including notable observations of special status species or other notable birds (e.g., brown-headed cowbird). A complete list of wildlife species observed during the surveys is included in Attachment B.

TABLE 1
SUMMARY OF SURVEY DATA AND CONDITIONS FOR LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER SURVEYS FOR UPPER SECTION SURVEY AREA

Survey Dates	Surveyors	Survey for Flycatcher (F)/ Vireo (V)	Time	Air Temperature (°F)		Cloud Cover	Wind (mph)
				Start	End		
May 10	Aguayo, Messett	V	9:10 AM–10:00 AM	72	73	0%	0–5
June 8	Aguayo, Daniels	F/V	8:45 AM–09:35 AM	70s	70s	0%	0–5
June 24	Aguayo, Daniels	F/V	8:20 AM–9:20 AM	71	73	0%	0–2
July 6	Aguayo, Daniels	F/V	8:30 AM–9:30 AM	68	72	0%	0–2
July 15	Aguayo, Daniels	F/V	7:30 AM–8:30 AM	68	70	0%	0–5
July 21	Aguayo, Messett	V	8:15 AM–9:00 AM	75	76	0%	0–5
July 31	Aguayo, Messett	V	8:00 AM–8:50 AM	73	75	0%	0–5

°F: degrees Fahrenheit; mph: miles per hour; %: percent.

TABLE 2
SUMMARY OF SURVEY DATA AND CONDITIONS FOR LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER SURVEYS FOR LOWER SECTION SURVEY AREA

Survey Dates	Surveyors	Survey for Flycatcher (F)/ Vireo (V)	Time	Air Temperature (°F)		Cloud Cover	Wind (mph)
				Start	End		
May 3	Aguayo	V	6:40 AM–10:50 AM	55	65	0% → 20%	1–3
May 16	Aguayo	V	6:40 AM–10:20 AM	55	66	100% → 40%	0–3
May 26	Daniels	F/V	6:15 AM–10:00 AM	46	61	0%	5–10
June 6	Daniels	F/V	6:15 AM–10:00 AM	59	70s	0%	5–10
June 16	Daniels	F/V	7:00 AM–10:15 AM	52	72	0%	0–9
June 30	Daniels	F/V	5:50 AM–9:00 PM	66	72	0%	0–5
July 13	Aguayo, Daniels	F/V	6:40 AM–10:05 AM	61	82	0%	0–10
July 29	Aguayo	V	7:00 AM–10:30 AM	69	84	0%	0–10

°F: degrees Fahrenheit; mph: miles per hour; %: percent.

SURVEY RESULTS

No least Bell's vireos or southwestern willow flycatchers were detected during these surveys. Two migrant willow flycatchers were present on May 16, 2016, and one migrant willow flycatcher was present on May 26, 2016. These two (or three) willow flycatchers of undetermined subspecies were singing birds in the willow dominated riparian habitat just downstream of the dam in the survey area's lower section.

The required Least Bell's Vireo Survey Data Summary Form is included in Attachment C. Per USFWS protocol requirements, the Willow Flycatcher Survey and Detection Form (showing negative survey results) is included in Attachment D.

In addition, no nesting willow flycatchers or vireos have been reported in the California Natural Diversity Database (CNDDB) for the project vicinity (CDFW 2016), and none were observed in 2007 and 2008 during focused surveys for another project in the survey area's lower section (EDAW 2009a, 2009b) or the 2012 focused surveys for this project (BonTerra Consulting 2012). The results of previous surveys, combined with this year's survey results, indicate that both species are absent from the survey area.

OTHER OBSERVATIONS

Three California Species of Special Concern were observed during the surveys: western pond turtle (*Emys marmorata*), two-striped garter snake (*Thamnophis hammondii*), and yellow warbler (*Setophaga petechia*). Observations of the western pond turtle and two-striped garter snake will be reported to the CNDDB in the Arroyo Toad Survey Report for the proposed project and will be submitted to the CDFW with that report. Yellow warbler was observed in the same general locations during multiple visits and likely nested in or near the survey area. CNDDB forms for yellow warbler are included in Attachment E and will be submitted to the CDFW.

Brown-headed cowbirds were not common in the riparian areas but were consistently observed during the late May and June surveys. One to four cowbirds were observed on each of these survey visits. A complete list of all wildlife species observed during the surveys is provided in Attachment B.

BonTerra Psomas appreciates the opportunity to assist on this project. If you have any comments or questions, please call Amber Heredia at (714) 751-7373.

Sincerely,
BonTerra Psomas

Amber O. Heredia
Senior Project Manager

Jonathan Aguayo
Biologist

I certify that the information in this Survey Report and enclosed exhibits fully and accurately represents my work.

Jonathan Aguayo
Biologist

Lindsay Messett
Senior Biologist

Brian Daniels
Senior Biologist
Permit No. TE-821401-5

Enclosures: Exhibit 1 – Regional Location and Local Vicinity
Exhibit 2 – Survey Area
Attachment A – Site Photographs
Attachment B – Wildlife Compendium
Attachment C – Least Bell's Vireo Survey Data Summary Form
Attachment D – Willow Flycatcher Survey and Detection Form
Attachment E – CNDDB Forms

cc: Alex Ho, Los Angeles County Department of Public Works, alho@dpw.lacounty.gov

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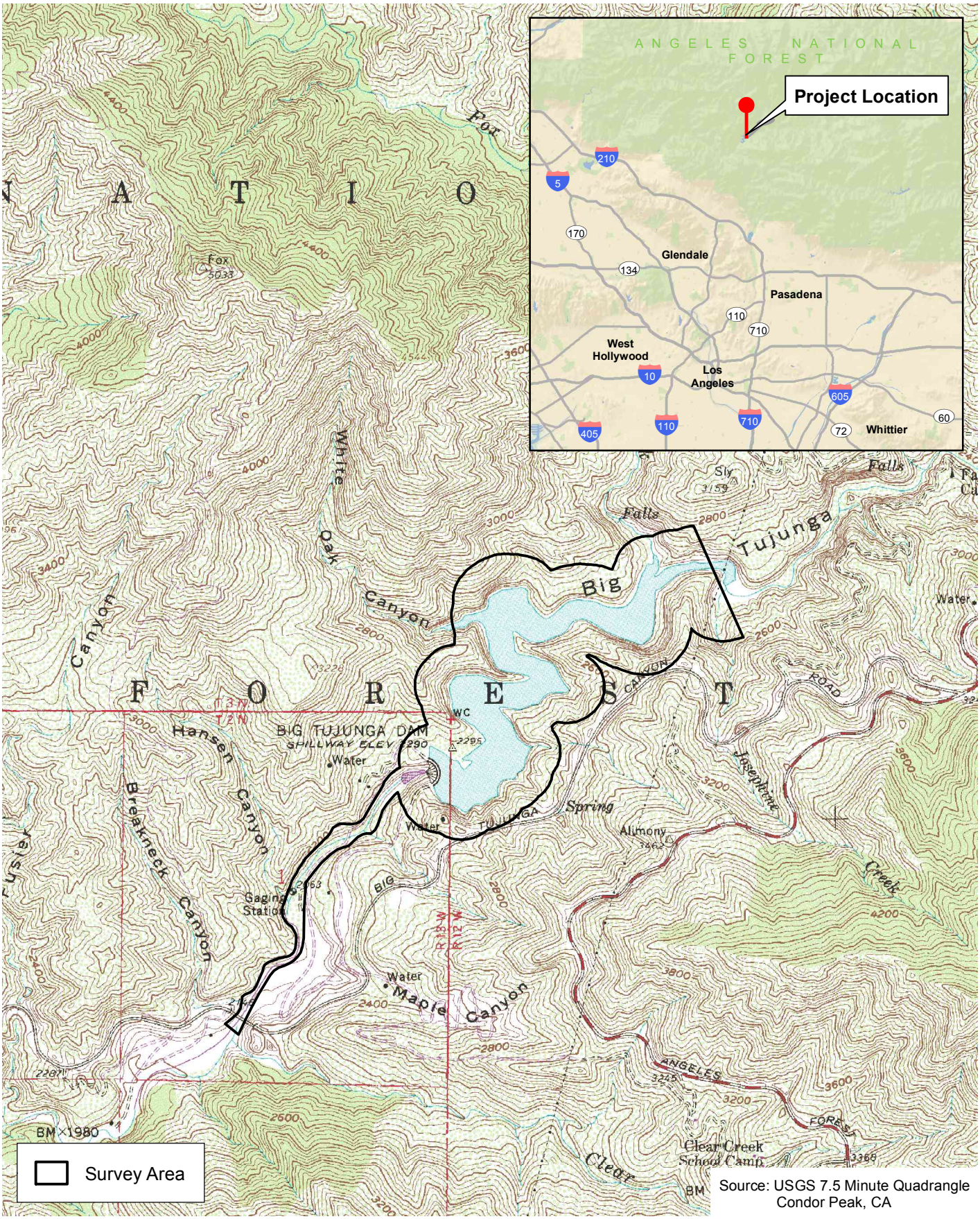

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Regional Location and Local Vicinity

Exhibit 1

Big Tujunga Reservoir Sediment Removal Project

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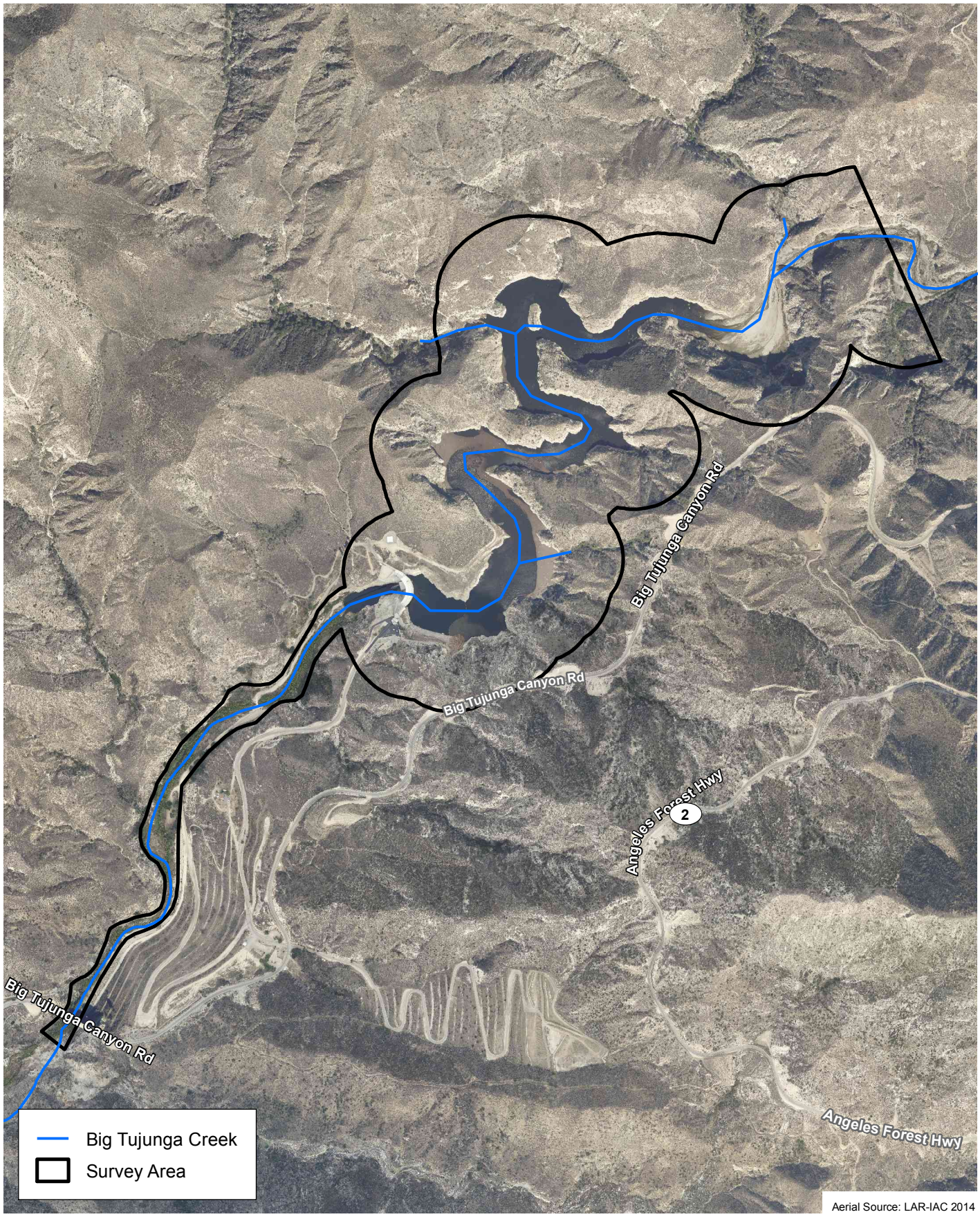

Aerial Source: LAR-IAC 2014

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Survey Area

Exhibit 2

Big Tujunga Reservoir Sediment Removal Project

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ATTACHMENT A

SITE PHOTOGRAPHS



Representative view of upper section survey area. View of riparian habitat along Big Tujunga Creek located upstream of the Big Tujunga Reservoir.



View of riparian habitat along Big Tujunga Creek located downstream of the Big Tujunga Dam.

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Site Photographs

Attachment A-1

Big Tujunga Reservoir Sediment Removal Project

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View of lower section survey area from Big Tujunga Canyon Road Bridge. Photo taken facing northeast.



View of lower section survey area from Big Tujunga Dam. Photo taken facing southwest.

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Site Photographs

Attachment A-2

Big Tujunga Reservoir Sediment Removal Project

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ATTACHMENT B

WILDLIFE COMPENDIUM

WILDLIFE COMPENDIUM

Scientific Name	Common Name
AMPHIBIANS	
RANIDAE - TRUE FROG FAMILY	
*Lithobates catesbeianus**	American bullfrog
HYLIDAE - TREEFROG FAMILY	
Pseudacris cadaverina	California treefrog
Pseudacris hypochondriaca	Baja California treefrog
TURTLES	
EMYDIDAE - BOX AND BASKING TURTLE FAMILY	
Emys marmorata	western pond turtle
LIZARDS	
PHRYNOSOMATIDAE - SPINY LIZARD FAMILY	
Sceloporus occidentalis	western fence lizard
Uta stansburiana	common side-blotched lizard
SNAKES	
COLUBRIDAE - COLUBRID SNAKE FAMILY	
Coluber lateralis	California striped racer
NATRICIDAE - HARMLESS LIVE-BEARING SNAKE FAMILY	
Thamnophis hammondii	two-striped garter snake
BIRDS	
ANATIDAE - SWAN, GOOSE, AND DUCK FAMILY	
Anas platyrhynchos	mallard
ODONTOPHORIDAE - NEW WORLD QUAIL FAMILY	
Oreortyx pictus	mountain quail
Callipepla californica	California quail
PHALACROCORACIDAE - CORMORANT FAMILY	
Phalacrocorax auritus	double-crested cormorant
ARDEIDAE - HERON FAMILY	
Ardea herodias	great blue heron
Butorides virescens	green heron
Nycticorax	black-crowned night-heron
CATHARTIDAE - NEW WORLD VULTURE FAMILY	
Cathartes aura	turkey vulture
ACCIPITRIDAE - HAWK FAMILY	
Buteo jamaicensis	red-tailed hawk
SCOLOPACIDAE - SANDPIPER FAMILY	
Actitis macularius	spotted sandpiper
COLUMBIDAE - PIGEON AND DOVE FAMILY	
Patagioenas fasciata	band-tailed pigeon
Zenaida macroura	mourning dove
STRIGIDAE - TYPICAL OWL FAMILY	
Bubo virginianus	great horned owl
APODIDAE - SWIFT FAMILY	
Aeronautes saxatalis	white-throated swift

WILDLIFE COMPENDIUM

Scientific Name	Common Name
TROCHILIDAE - HUMMINGBIRD FAMILY	
Archilochus alexandri	black-chinned hummingbird
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird
PICIDAE - WOODPECKER FAMILY	
Melanerpes formicivorus	acorn woodpecker
Picoides nuttallii	Nuttall's woodpecker
Picoides villosus	hairy woodpecker
Colaptes auratus	northern flicker
TYRANNIDAE - TYRANT FLYCATCHER FAMILY	
Contopus sordidulus	western wood-pewee
Empidonax traillii	willow flycatcher
Empidonax difficilis	Pacific-slope flycatcher
Sayornis nigricans	black phoebe
Myiarchus cinerascens	ash-throated flycatcher
Tyrannus verticalis	western kingbird
VIREONIDAE - VIREO FAMILY	
Vireo huttoni	Hutton's vireo
Vireo gilvus	warbling vireo
CORVIDAE - JAY AND CROW FAMILY	
Aphelocoma californica	California scrub-jay
Corvus corax	common raven
HIRUNDINIDAE - SWALLOW FAMILY	
Tachycineta thalassina	violet-green swallow
Stelgidopteryx serripennis	northern rough-winged swallow
Petrochelidon pyrrhonota	cliff swallow
PARIDAE - TITMOUSE FAMILY	
Baeolophus inornatus	oak titmouse
AEGITHALIDAE - BUSHTIT FAMILY	
Psaltriparus minimus	bushtit
TROGLODYTIDAE - WREN FAMILY	
Salpinctes obsoletus	rock wren
Catherpes mexicanus	canyon wren
Troglodytes aedon	house wren
Thryomanes bewickii	Bewick's wren
TURDIDAE - THRUSH FAMILY	
Catharus ustulatus	Swainson's thrush
Turdus migratorius	American robin
BOMBYCILLIDAE - WAXWING FAMILY	
Bombycilla cedrorum	cedar waxwing
PTILOGONATIDAE - SILKY-FLYCATCHER FAMILY	
Phainopepla nitens	phainopepla

WILDLIFE COMPENDIUM

Scientific Name	Common Name
PARULIDAE - WOOD-WARBLER FAMILY	
Geothlypis trichas	common yellowthroat
Setophaga petechia	yellow warbler
Cardellina pusilla	Wilson's warbler
EMBERIZIDAE - SPARROW FAMILY	
Pipilo maculatus	spotted towhee
Aimophila ruficeps	rufous-crowned sparrow
Melozone crissalis	California towhee
Melospiza melodia	song sparrow
CARDINALIDAE - CARDINALS, GROSBEAKS AND ALLIES FAMILY	
Piranga ludoviciana	western tanager
Pheucticus melanocephalus	black-headed grosbeak
Passerina amoena	lazuli bunting
ICTERIDAE - BLACKBIRD, COWBIRD AND ORIOLE FAMILY	
Agelaius phoeniceus	red-winged blackbird
*Molothrus ater**	brown-headed cowbird
Icterus cucullatus	hooded oriole
Icterus bullockii	Bullock's oriole
FRINGILLIDAE - FINCH FAMILY	
Haemorhous mexicanus	house finch
Spinus psaltria	lesser goldfinch
Spinus lawrencei	Lawrence's goldfinch
MAMMALS	
SCIURIDAE - SQUIRREL FAMILY	
Sciurus griseus	western gray squirrel
Otospermophilus beecheyi	California ground squirrel
CANIDAE - CANID FAMILY	
Canis latrans	coyote
Urocyon cinereoargenteus	common gray fox (scat)
URSIDAE - BEAR FAMILY	
*Ursus americanus**	black bear (scat)
CERVIDAE - CERVID FAMILY	
Odocoileus hemionus	southern mule deer
* Non-native species	

ATTACHMENT C

LEAST BELL'S VIREO SURVEY DATA SUMMARY FORM

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information

Project Title:	Big Tujunga Reservoir Sediment Removal Project
Landowner:	Angeles National Forest; Department of Public Works, Los Angeles County

Survey Information

Surveyors:	Jonathan Aguayo	Year:	2016

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3724278	Northing:	3723782	NAD83
Easting:	421633	Easting:	419610	NAD83

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
2 km	8	40

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	0	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	0	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	0	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)

ATTACHMENT D

WILLOW FLYCATCHER SURVEY AND DETECTION FORM

Willow Flycatcher (WIFL) Survey and Detection Form (revised April 2010)

Site Name Big Tujunga Dam - Lower State CA County Los Angeles
USGS Quad Name Condor Peak Elevation 619-638 (meters)
Creek, River, Wetland, or Lake Name Big Tujunga Creek
Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* ✓ *No* ___

Survey Coordinates: Start: E 389770 N 3794191 UTM Datum NAD83 (See instructions)
Stop: E 390543 N 3795320 UTM Zone 11
If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

***** Fill in additional site information on back of this page *****

Survey # / Observer(s) (Full Name)	Date (m/d/y) Survey time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N / If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding; potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
							# Birds	Sex	UTM E	UTM N
Survey # 1 Observer(s) B. Daniels	Date 5/26/16 Start 0615 Stop 1000 Total hrs 3.8	1	0	0	N	migrant				
Survey # 2 Observer(s) B. Daniels	Date 6/6/16 Start 0615 Stop 1000 Total hrs 3.8	0					# Birds	Sex	UTM E	UTM N
Survey # 3 Observer(s) B. Daniels	Date 6/16/16 Start 0700 Stop 1015 Total hrs 3.3	0					# Birds	Sex	UTM E	UTM N
Survey # 4 Observer(s) B. Daniels	Date 6/30/16 Start 0550 Stop 0900 Total hrs 3.2	0					# Birds	Sex	UTM E	UTM N
Survey # 5 Observer(s) B. Daniels J. Aguayo	Date 7/13/16 Start 0640 Stop 1005 Total hrs 3.4	0					# Birds	Sex	UTM E	UTM N

Overall Site Summary Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total Survey Hrs 17.5	Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any Willow Flycatchers color-banded? Yes ___ No ✓ If yes, report color combination(s) in the comments section on back of form and report to USFWS.
	0	0	0	0	

Reporting Individual Brian E. Daniels Date Report Completed 9/20/16
US Fish and Wildlife Service Permit # TE-821401.5 State Wildlife Agency Permit # SC-4535

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual Brian Daniels Phone #(626)351-2000
Affiliation BonTerra Psomas E-mail brian.daniels@psomas.com
Site Name Big Tujunga Dam Date Report Completed 9/20/16
Was this site surveyed in a previous year? Yes ✓ No ___ Unknown ___
Did you verify that this site name is consistent with that used in previous years? Yes ✓ No ___ Not Applicable ___
If site name is different, what name(s) was used in the past? ___
If site was surveyed last year, did you survey the same general area this year? Yes ✓ No ___ If no, summarize below.
Did you survey the same general area during each visit to this site this year? Yes ✓ No ___ If no, summarize below.
4 yrs ago
Management Authority for Survey Area: Federal ✓ Municipal/County ✓ State ___ Tribal ___ Private ___
Name of Management Entity or Owner (e.g., Tonto National Forest) Angeles Nat. Forest / L.A. Co. DPW

Length of area surveyed: 1.5 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

✓ Native broadleaf plants (entirely or almost entirely, > 90% native)

___ Mixed native and exotic plants (mostly native, 50 - 90% native)

___ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

___ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific names.
white alder (Alnus rhombifolia), willows (Salix spp.), Fremont Cottonwood (Populus fremontii)

Average height of canopy (Do not include a range): 10 (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections; 2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests; 3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April 2010)

Site Name Big Tujunga Dam - upper State CA County Los Angeles
USGS Quad Name Condor Peak Elevation 637 - 692 (meters)
Creek, River, Wetland, or Lake Name Big Tujunga Creek
Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* ✓ *No* ___

Survey Coordinates: Start: E 391678 N 3796078 UTM Datum NAD83 (See instructions)
Stop: E 392032 N 3796295 UTM Zone 11
If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

***** Fill in additional site information on back of this page *****

Survey # / Observer(s) (Full Name)	Date (m/d/y) Survey time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N / If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding; potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.
Survey # 1 Observer(s)	Date Start Stop Total hrs ___						# Birds / Sex / UTM E / UTM N
Survey # 2 Observer(s) B. Daniels J. Aguayo	Date 6/8/16 Start 0845 Stop 0935 Total hrs .83	0					# Birds / Sex / UTM E / UTM N
Survey # 3 Observer(s) B. Daniels J. Aguayo	Date 6/24/16 Start 0820 Stop 0920 Total hrs 1	0					# Birds / Sex / UTM E / UTM N
Survey # 4 Observer(s) B. Daniels J. Aguayo	Date 7/6/16 Start 0830 Stop 0930 Total hrs 1	0					# Birds / Sex / UTM E / UTM N
Survey # 5 Observer(s) B. Daniels J. Aguayo	Date 7/15/16 Start 0730 Stop 0830 Total hrs 1	0					# Birds / Sex / UTM E / UTM N

Overall Site Summary Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total Survey Hrs 3.8	Total Adult Residents	Total Pairs	Total Territories	Total Nests
	0	0	0	0

Were any Willow Flycatchers color-banded? Yes___ No ___
If yes, report color combination(s) in the comments section on back of form and report to USFWS.

Reporting Individual Brian D. Daniels Date Report Completed 9/20/16
US Fish and Wildlife Service Permit # TE-821401-5 State Wildlife Agency Permit # SC-4535

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual Brian Daniels Phone # (626) 351-2000
Affiliation BonTerra Psomas E-mail brian.daniels@psomas.com
Site Name Big Tujunga Dam Date Report Completed 9/20/16
Was this site surveyed in a previous year? Yes ✓ No ___ Unknown ___
Did you verify that this site name is consistent with that used in previous years? Yes ✓ No ___ Not Applicable ___
If site name is different, what name(s) was used in the past? ___
If site was surveyed last year, did you survey the same general area this year? Yes ✓ No ___ If no, summarize below.
Did you survey the same general area during each visit to this site this year? Yes ✓ No ___ If no, summarize below.
4 yrs. ago
Management Authority for Survey Area: Federal ✓ Municipal/County ✓ State ___ Tribal ___ Private ___
Name of Management Entity or Owner (e.g., Tonto National Forest) Angeles Nat. Forest / L.A. Co. DPW

Length of area surveyed: 0.5 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

✓ Native broadleaf plants (entirely or almost entirely, > 90% native)

___ Mixed native and exotic plants (mostly native, 50 - 90% native)

___ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

___ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific names.
willows (Salix spp.), cattails (Typha sp.), mule fat (Baccharis salicifolia)

Average height of canopy (Do not include a range): 2 (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections; 2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests; 3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.
This "upper" survey area is affected by changing reservoir levels. It currently provides habitat that is not suitable for occupation by SWF. Even if not affected by periodic inundation, its a very narrow, steep canyon that is probably not suitable for SWF. We had to walk some distance d/s thru the mature riparian habitat to reach survey area, and no WIFLs detected there either.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

ATTACHMENT E

CNDDB FORMS

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/30/2016

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Setophaga petechia*

Common Name: yellow warbler

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 10 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, BonTerra Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707-8794
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown
10				

breeding	wintering	burrow site	rookery	nesting	other
☑	☐	☐	☐	☑	☐

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Upstream of the Big Tujunga Reservoir (upper section), and downstream of the Big Tujunga Dam to 500 feet downstream of Big Tujunga Canyon Road (lower section).

County: Los Angeles County Landowner / Mgr.: Angeles National Forest, LADPW
Quad Name: Condor Peak Elevation: 2029-2270 ft
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy ~ 15 ft meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: Upper section: from 11s 391695m E, 3796195m N to 11s 392036m E, 3796285m N. Lower section: from 11s 390558m E, 3795302m N to 11s 389762m E, 3794188m N

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

Upper section - open sections of rocky stream with isolated patches of riparian vegetation. Dominant species include mule fat, arroyo willow, and red willow. Stands of white alder and occasional western sycamore and Fremont cottonwood trees occurred throughout the reach with rough sedge and California blackberry in the understory.
Lower section - dense and continuous willow riparian forest dominated by mule fat, arroyo willow, and red willow with an overstory of white alder and Fremont cottonwood. Common understory species include hoary nettle and mugwort.

Other rare taxa seen at THIS site on THIS date: western pond turtle and two-striped garter snake
(separate form preferred)

Site Information

Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Angeles National Forest, open space

Visible disturbances:

Threats: Brown-headed cowbirds were observed on survey visits

Comments: 1-2 singing males along Big Tujunga Creek upstream of Big Tujuga Reservoir. 7-8 singing males downstream of Big Tujunga Dam. These birds likely represented breeding pairs.

Determination: *(check one or more, and fill in blanks)*
- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Familiarity with species, visually and aurally

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

September 24, 2018

Stacey Love
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

VIA EMAIL
Stacey_Love@fws.gov

Subject: Results of the 2018 Least Bell's Vireo and Southwestern Willow Flycatcher Surveys for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles, California

Dear Ms. Love:

This Letter Report presents the results of focused surveys to determine the presence or absence of the least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*) for the Big Tujunga Reservoir Sediment Removal Project (hereinafter referred to as the "proposed project"), located in Los Angeles County, California (Exhibit 1). A Biologist with the necessary experience and the Federal Endangered Species Act 10(a) survey permit conducted the surveys according to U.S. Fish and Wildlife Service (USFWS) protocol for these species.

PROJECT DESCRIPTION AND LOCATION

The proposed project involves the dewatering of the Big Tujunga Reservoir and the removal of sediment to the nearby Maple Canyon Sediment Placement Site. The proposed project is located on the southern edge of the San Gabriel Mountains in the Angeles National Forest (ANF) and is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute topographic quadrangle (Exhibit 1).

The survey area for the southwestern willow flycatcher and least Bell's vireo surveys included all riparian habitat along Big Tujunga Creek extending upstream to Fall Creek (approximately 0.6 mile upstream of the sediment removal area) and 500 feet downstream of Big Tujunga Canyon Road bridge over Big Tujunga Creek (Exhibit 2). Because of the length of the two sections to be surveyed, the upper and lower sections were surveyed on separate days. The survey area and surrounding vicinity consist of open space in the ANF.

Habitat in the survey area's upper section (i.e., Big Tujunga Reservoir to Fall Creek) consists primarily of riparian forest and riparian scrub vegetation including white alder grove–California sycamore woodland, white alder grove–willow thicket, arroyo willow thicket, and mulefat thicket. The vegetation in these habitat types is dominated by mature white alder (*Alnus rhombifolia*), western sycamore (*Platanus racemosa*), Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), red willow (*Salix laevigata*), Pacific willow (*S. lasiandra* var. *lasiandra*), Goodding's black willow (*S. gooddingii*), arroyo willow (*S. lasiolepis*), and mule fat (*Baccharis salicifolia*). Understory species include southern cattail (*Typha domingensis*), California blackberry (*Rubus ursinus*), mugwort (*Artemisia douglasiana*), hoary nettle (*Urtica dioica* ssp. *holosericea*), western poison oak (*Toxicodendron diversilobum*), water cress (*Nasturtium officinale*), branching

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phacelia (*Phacelia ramosissima*), white sweetclover (*Melilotus albus*), and various monkeyflowers (*Mimulus* spp.).

Riparian habitat in the survey area's lower section (i.e., Big Tujunga Dam to 500 feet downstream of the Big Tujunga Canyon Road bridge) is characterized by riparian forest vegetation dominated by white alder grove-willow thicket. The habitat in this area is relatively dense and continuous and is dominated by white alder, Fremont cottonwood, arroyo willow, and red willow. Common understory species include mule fat, hoary nettle, and mugwort.

Representative photos of the habitat in the survey area are included in Attachment A.

SPECIES BACKGROUND

Least Bell's Vireo

Least Bell's vireo is a federally and State listed Endangered species. It is one of four subspecies of the Bell's vireo (*Vireo bellii*); this subspecies is the westernmost of the four subspecies, breeding entirely in southwestern California and northwestern Baja California, Mexico. Although not well known, the winter range of the least Bell's vireo is believed to be the west coast of Central America from southern Sonora, Mexico, south to northwestern Nicaragua, including the cape region of Baja California, Mexico (Brown 1993). The least Bell's vireo arrives in southern California from mid-March to early April and departs for its wintering grounds in August to mid-September.

The least Bell's vireo is a small, gray migratory songbird that is about 4.5 to 5 inches long. It has short, rounded wings and a short, straight bill for catching insects. Feathers are gray above and pale below. "The least Bell's vireo is easily recognized on the breeding grounds by its distinctive song" (Coues 1903). Males establish and defend territories through counter-singing, chasing, and sometimes physically confronting neighboring males (USFWS 1998).

Least Bell's vireos consume a "wide variety of insects including bugs, beetles, grasshoppers, moths, and particularly caterpillars" (Chapin 1925; Bent 1950). They obtain prey through foliage gleaning (picking prey from leaves or bark) and through hovering (removing prey from vegetation surfaces while fluttering in the air) (Salata 1983; Miner 1989). Vireos will forage in all layers of the canopy but tend to concentrate their foraging in the lower to mid-strata from 9 to 18 feet in height (Miner 1989). Vireos forage in both riparian and adjacent upland habitat (Salata 1983; Kus and Miner 1987).

The least Bell's vireo is an obligate riparian species (i.e., nests exclusively in riparian habitat) and prefers early-successional habitat. On its breeding grounds, it typically inhabits structurally diverse woodlands along watercourses. In California, least Bell's vireo habitat consists of southern willow scrub, mule fat scrub, sycamore alluvial woodland, coast live oak riparian forest, arroyo willow riparian forest, and cottonwood bottomland forest (Faber et al. 1989). Although least Bell's vireos typically nest in willow-dominated areas, plant species composition does not appear to be as important in nest site selection as habitat structure (USFWS 1998). The most critical factor in habitat structure is the presence of a dense understory shrub layer from approximately 3 to 6 feet above ground, where nests are typically placed, and a dense stratified canopy for foraging (Goldwasser 1981; Gray and Greaves 1981; Salata 1981, 1983; RECON 1989). This structure is typically met by willows that are between four and ten years of age (RECON 1988; Franzreb 1989). As stands mature, the tall canopy tends to shade out the shrub layer, making the sites less suitable for nesting; however, least Bell's vireos will continue to use such areas if patches of understory exist (USFWS 1998). Vireo nest placement tends to occur in openings and along the riparian edge, where exposure to sunlight allows the development of shrubs (USFWS 1998). The

riparian ecosystems required by the vireo are dynamic systems; and the scouring of vegetation during periodic floods is required to create the low, dense vegetation favored by the bird (USFWS 1986).

Males arrive on the breeding grounds about one week prior to females, and older birds arrive before first-year birds. Pair formation occurs within a few days, and pairs build a nest together over the next four to five days. The typical clutch size for least Bell's vireo is four eggs, which are incubated for approximately 14 days. The young remain in the nest for approximately 10 to 12 days. Adults continue to care for the young for at least two weeks post-fledging, as the family groups forage over larger areas. The largest causes of least Bell's vireo nest failure are nest parasitism by brown-headed cowbird (*Molothrus ater*) and egg predation; nests also fail due to vegetation clearing, trampling by humans and cattle, ant infestations, and rainstorms. Least Bell's vireo will make up to five nesting attempts per season, assuming adequate energy resources; typically a pair will successfully fledge young from one to two nests per season. Few nests are initiated after mid-July (USFWS 1998).

The least Bell's vireo often shows a strong site fidelity, returning not just to the same drainage and the same territory, but even to the same tree where it previously nested. However, vireos may move locations due to habitat loss or lack of being able to attract a mate (USFWS 1998).

The least Bell's vireo was formerly considered a common breeder in riparian habitats throughout the Central Valley and other low-elevation riverine systems throughout California and Baja California, Mexico (USFWS 1998). At the time of its listing, the least Bell's vireo had been eliminated from 95 percent of its former range (USFWS 1986). The decline of least Bell's vireo is attributed to the widespread loss of riparian woodlands coupled with the increase in brown-headed cowbirds (USFWS 1986). Loss of riparian habitat has been attributed to flood control and water development projects, agricultural development, livestock grazing, spread of invasive exotic plant species, degradation of habitat by off-road vehicles, and urban development. With the implementation of intensive brown-headed cowbird management programs, the least Bell's vireo numbers have dramatically increased (USFWS 1998). Vireos have also expanded their range into areas where they were formerly extirpated.

On February 2, 1994, the USFWS issued their final determination of Critical Habitat for the least Bell's vireo, identifying approximately 37,560 acres as Critical Habitat in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego Counties (USFWS 1994). The project site is not located in designated Critical Habitat for this species.

Southwestern Willow Flycatcher

Southwestern willow flycatcher is a federally and State listed Endangered species. It is one of four subspecies of the willow flycatcher (*Empidonax traillii*) (Sedgwick 2000); the breeding range of the southwestern willow flycatcher includes southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, and extreme northwestern Mexico (i.e., Baja California del Norte, Sonora, and Chihuahua) (USFWS 2002). The winter range of the southwestern willow flycatcher includes the tropical regions of southern Mexico, Central America, and northern South America (Sogge et al. 2010).

The southwestern willow flycatcher arrives in southern California in mid-May and departs for its wintering grounds in late July to mid-September. The spring migration of southwestern willow flycatcher is earlier than that of the northern subspecies of willow flycatchers (Unitt 1984; USFWS 1993). As a result, the presence of more abundant subspecies that migrate through the range of the southwestern willow flycatcher during its breeding season complicates surveys for nesting southwestern willow flycatchers. Similarly, the other subspecies may pass through southern California during their fall migration in July and August while the southwestern willow flycatcher is still breeding; therefore, there is

only a short period from June 15 to July 20 when the presence of a willow flycatcher in southern California can be determined to be southwestern subspecies of the willow flycatcher (USFWS 2002).

The southwestern willow flycatcher occurs in dense riparian habitat along rivers, streams, and other wetlands. Typically, southwestern willow flycatchers nest in thickets of trees and shrubs 13 to 23 feet or greater in height, with a dense understory and a high percentage of canopy cover (USFWS 1995). The dense patches are often interspersed with small openings, open water, or small areas of shorter/sparse vegetation that create a mosaic of habitat that is not uniformly dense (USFWS 2002). In almost all cases, slow-moving or still surface water and/or saturated soil is present during wet or non-drought years (UFSWS 2002). Plant species composition of low to mid-elevation sites ranges from monotypic stands to mixtures of broadleaf trees and shrubs including willows (*Salix* sp.), cottonwoods (*Populus* sp.), coast live oak (*Quercus agrifolia*), ash (*Fraxinus* sp.), alder (*Alnus* sp.), blackberry (*Rubus* sp.), and nettle (*Urtica* sp.) (USFWS 2002). They can also nest in riparian habitats dominated by a mix of native and introduced species, such as Russian olive (*Elaeagnus angustifolia*) and tamarisk (*Tamarix* sp.) or in monotypic stands of these introduced species; however, southwestern willow flycatchers rarely nest in giant reed (USFWS 2002). Overall, nest site selection appears to be driven more by plant structure than species composition (Sogge et al. 2010).

In California, the southwestern willow flycatcher was once considered common in all lower elevation riparian areas in the southern third of the state including the Los Angeles Basin, Riverside/San Bernardino area, and San Diego County (Wheelock 1912; Willett 1912; Grinnell and Miller 1944; Unitt 1984, 1987). The primary cause of the southwestern willow flycatcher's decline is the loss and modification of riparian habitat (USFWS 2002). With the increase in urbanization and agricultural development, these systems have declined or have been further degraded by reduction in water flow, interruption of the natural hydrogeological events or cycles, physical modifications to streams, removal of riparian vegetation, invasion by non-native invasive plant species, livestock grazing, and recreation (USFWS 2002). Additionally, agriculture and certain other types of development can increase foraging habitat for brown-headed cowbirds in proximity to southwestern willow flycatcher breeding habitat (USFWS 2002). Flycatcher habitat and their populations are threatened further with additional stressors such as introductions of tamarisk leaf beetle (*Diorahbda carninulata*), which defoliates tamarisk, and shot hole borer beetle (*Euwallacea* sp.)/Fusarium (*Fusarium euwallaceae*), a beetle/fungi complex that causes tree die off (USFWS 2017). All of these threats to the flycatcher and its habitat vary in severity over the southwest; and, at any given location, multiple stressors are likely to be at work, with cumulative and synergistic effects (USFWS 2017).

On January 3, 2013, the USFWS published a Revised Final Critical Habitat for the southwestern willow flycatcher (USFWS 2013). This final rule designated 208,973 acres (1,227 stream miles) in 24 Management Units on a combination of federal, State, tribal, and private lands in California, Nevada, Utah, Arizona, and New Mexico. In California, critical habitat was designated in Inyo, Kern, Los Angeles, Riverside, Santa Barbara, San Bernardino, San Diego, and Ventura Counties. The project site is not located within the 2013 Revised Critical Habitat for the southwestern willow flycatcher; however, designated Critical Habitat is located downstream of the project site at Hansen Dam.

SURVEY METHODS

The USFWS protocol for the least Bell's vireo requires that at least eight surveys be conducted from April 10 to July 31 with a ten-day interval between each site visit. The USFWS protocol for the southwestern willow flycatcher requires a total of five surveys, with the first survey conducted between May 15 and May 31, the second and third surveys between June 1 and June 24, and the fourth and fifth surveys between June 25 and July 17. Psomas Senior Biologists Lindsay Messett (USFWS Permit No. TE-067064-3) and Jonathan Aguayo conducted the focused surveys in all riparian habitats of the survey

area, including both the lower and upper sections, for occupation by least Bell's vireo and southwestern willow flycatcher (Tables 1 and 2). Ms. Messett conducted all surveys for the southwestern willow flycatcher.

Ms. Messett and Mr. Aguayo systematically surveyed the riparian habitats by walking slowly and methodically along the margins of riparian habitat and by using meandering transects through riparian habitat. Following the southwestern willow flycatcher protocol, recorded vocalizations were used to elicit a response from any potentially territorial southwestern willow flycatchers. If no southwestern willow flycatchers were detected after the initial playing of the recorded vocalization, Ms. Messett occasionally replayed the recording once more depending on site conditions. As the least Bell's vireo survey protocol does not require the playback of least Bell's vireo vocalizations, recorded least Bell's vireo vocalizations were not used during the surveys. When surveying for both species, surveys were done sequentially with surveyors focusing on the detection of the southwestern willow flycatcher in one direction (e.g., downstream to upstream) and least Bell's vireo on the return (e.g., upstream to downstream). Any least Bell's vireos or southwestern willow flycatchers would have been recorded with a Global Positioning System (GPS) unit (Garmin Vista); territories recorded would have been numbered chronologically as they were detected.

All surveys were conducted under optimal weather conditions and during early morning hours when bird activity is at its peak (Tables 1 and 2). All bird species detected during the surveys were recorded, including notable observations of special status species or other notable birds (e.g., brown-headed cowbird). A complete list of wildlife species observed during the surveys is included in Attachment B.

TABLE 1
SUMMARY OF SURVEY DATA AND CONDITIONS FOR LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER SURVEYS FOR UPPER SECTION SURVEY AREA

Survey Dates	Surveyors	Survey for Flycatcher (F)/ Vireo (V)	Time	Air Temperature (°F)		Cloud Cover	Wind (mph)
				Start	End		
May 2	Aguayo, Messett	V	8:15 AM–10:55 AM	56	55	50% → 100%	0–2
May 16	Aguayo, Messett	F/V	8:25 AM–10:35 AM	60	67	0%	0–3
June 4	Aguayo, Messett	F/V	7:55 AM–10:15 AM	71	83	0% → 5%	0–1
June 14	Aguayo, Messett	F/V	7:15 AM–9:30 AM	66	79	0%	2–4
June 26	Aguayo, Messett	F/V	7:30 AM–9:45 AM	65	74	0%	0–2
July 9	Aguayo, Messett	F/V	8:00 AM–10:00 AM	78	81	50% → 20%	0–2
July 19	Aguayo, Messett	V	7:50 AM–9:20 AM	73	79	0%	0–1
July 30	Aguayo, Messett	V	7:30 AM–8:45 AM	73	79	30% → 90%	0–1

°F: degrees Fahrenheit; mph: miles per hour; %: percent.

TABLE 2
SUMMARY OF SURVEY DATA AND CONDITIONS FOR LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER SURVEYS FOR LOWER SECTION SURVEY AREA

Survey Dates	Surveyors	Survey for Flycatcher (F)/ Vireo (V)	Time	Air Temperature (°F)		Cloud Cover	Wind (mph)
				Start	End		
May 1	Messett	V	8:30 AM–11:00 AM	55	56	100%	0–4
May 15	Messett	F/V	7:00 AM–10:30 AM	55	66	0%	0–6
June 5	Messett	F/V	7:45 AM–10:30 AM	61	70	5% → 0%	1–3
June 15	Messett	F/V	7:00 AM–9:30 AM	59	74	60% → 85%	0–1
June 29	Messett	F/V	7:15 AM–10:15 AM	63	69	70% → 50%	0–5
July 11	Messett	F/V	7:10 AM–9:50 PM	72	85	10% → 30%	0–1
July 20	Messett	V	7:05 AM–9:55 AM	68	83	0%	0–2
July 31	Messett	V	6:45 AM–10:00 AM	70	83	10% → 0%	0–1

°F: degrees Fahrenheit; mph: miles per hour; %: percent.

SURVEY RESULTS

No least Bell's vireos were observed or detected in the survey area during the 2018 focused surveys. The required Least Bell's Vireo Survey Data Summary Form is included in Attachment C.

No southwestern willow flycatchers were detected during the 2018 focused surveys. A total of four migrant willow flycatchers were present on May 15, 2018, and two migrant willow flycatchers were present on June 5, 2018. These willow flycatchers of undetermined subspecies were singing birds in the willow-dominated riparian habitat downstream of Big Tujunga Dam in the lower portion of the survey area. Because the willow flycatchers were observed only in the first two survey windows and none were present during the third survey window, the willow flycatchers observed were presumed to be migrants. Per USFWS protocol requirements, the Willow Flycatcher Survey and Detection Form is included in Attachment D. A California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) form for the migrant willow flycatchers is included in Attachment E.

OTHER OBSERVATIONS

Nine special status species were observed during the surveys: western pond turtle (*Emys marmorata*; State Species of Special Concern), two-striped garter snake (*Thamnophis hammondii*; State Species of Special Concern), coast horned lizard (*Phrynosoma blainvillii*; State Species of Special Concern), coastal whiptail (*Aspidoscelis tigris stejnegeri*; State Species of Special Concern), black swift (*Cypseloides niger*; State Species of Special Concern), Vaux's swift (*Chaetura vauxi*; State Species of Special Concern), American peregrine falcon (*Falco peregrinus anatum*; State Fully Protected Species), yellow warbler (*Setophaga petechia*; State Species of Special Concern), and southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*; State Watch List Species) (Exhibit 3). These species are tracked by the CDFW CNDDB. Observations of the western pond turtle, two-striped garter snake, coast horned lizard, and coastal whiptail will be reported to the CNDDB in the *Results of 2018 Focused Surveys for Special Status Amphibian Species for the Big Tujunga Reservoir Sediment Removal Project* and will be submitted to the CDFW with that report. Black swift and Vaux's swift were observed on only one visit and do not nest in the project region; therefore, no CNDDB form will be submitted for these species. CNDDB forms

for American peregrine falcon, yellow warbler, and southern California rufous-crowned sparrow are included in Attachment E and will be submitted to the CDFW.

No brown-headed cowbirds were observed or detected during the 2018 focused surveys.

Psomas appreciates the opportunity to assist on this project. If you have any comments or questions, please call Amber Heredia at (714) 751-7373.

Sincerely,
PSOMAS

Amber O. Heredia
Senior Project Manager

Lindsay A. Messett, CWB®
Senior Biologist

I certify that the information in this Survey Report and enclosed exhibits fully and accurately represents my work.

Lindsay A. Messett, CWB®
Senior Biologist
(TE067064-3)

Jonathan Aguayo
Senior Biologist

Enclosures:
Exhibit 1 – Regional Location and Local Vicinity
Exhibit 2 – Survey Area
Attachment A – Site Photographs
Attachment B – Wildlife Compendium
Attachment C – Least Bell's Vireo Survey Data Summary Form
Attachment D – Willow Flycatcher Survey and Detection Form
Attachment E – CNDDB Forms

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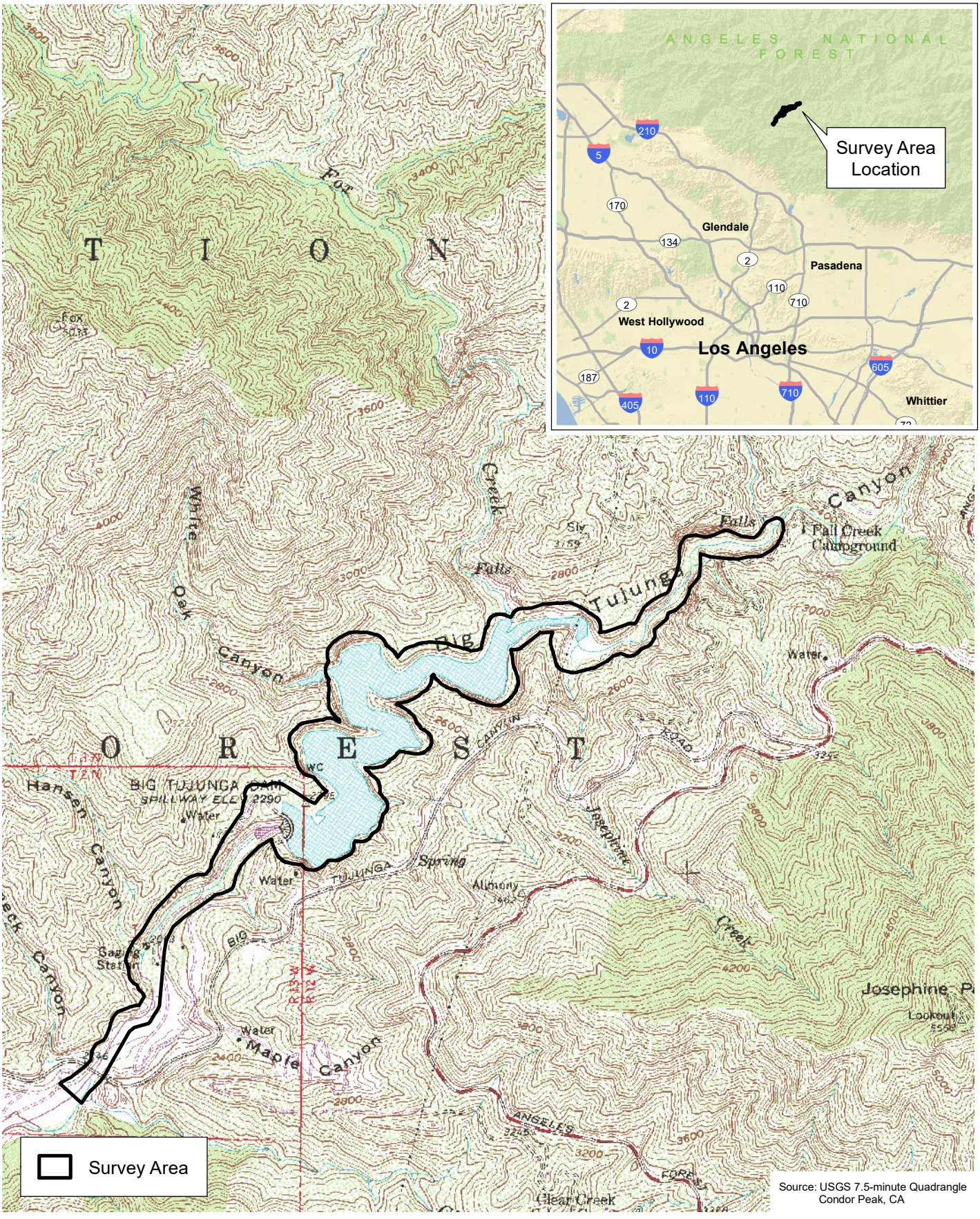

Source: USGS 7.5-minute Quadrangle
Condor Peak, CA

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Regional Location and Local Vicinity

Exhibit 1

Big Tujunga Reservoir Sediment Removal Project Site

N W E S

2,000 1,000 0 2,000 Feet

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Survey Area

Exhibit 2

Big Tujunga Reservoir Sediment Removal Project Site

N
W E
S

2,000 1,000 0 2,000

Feet

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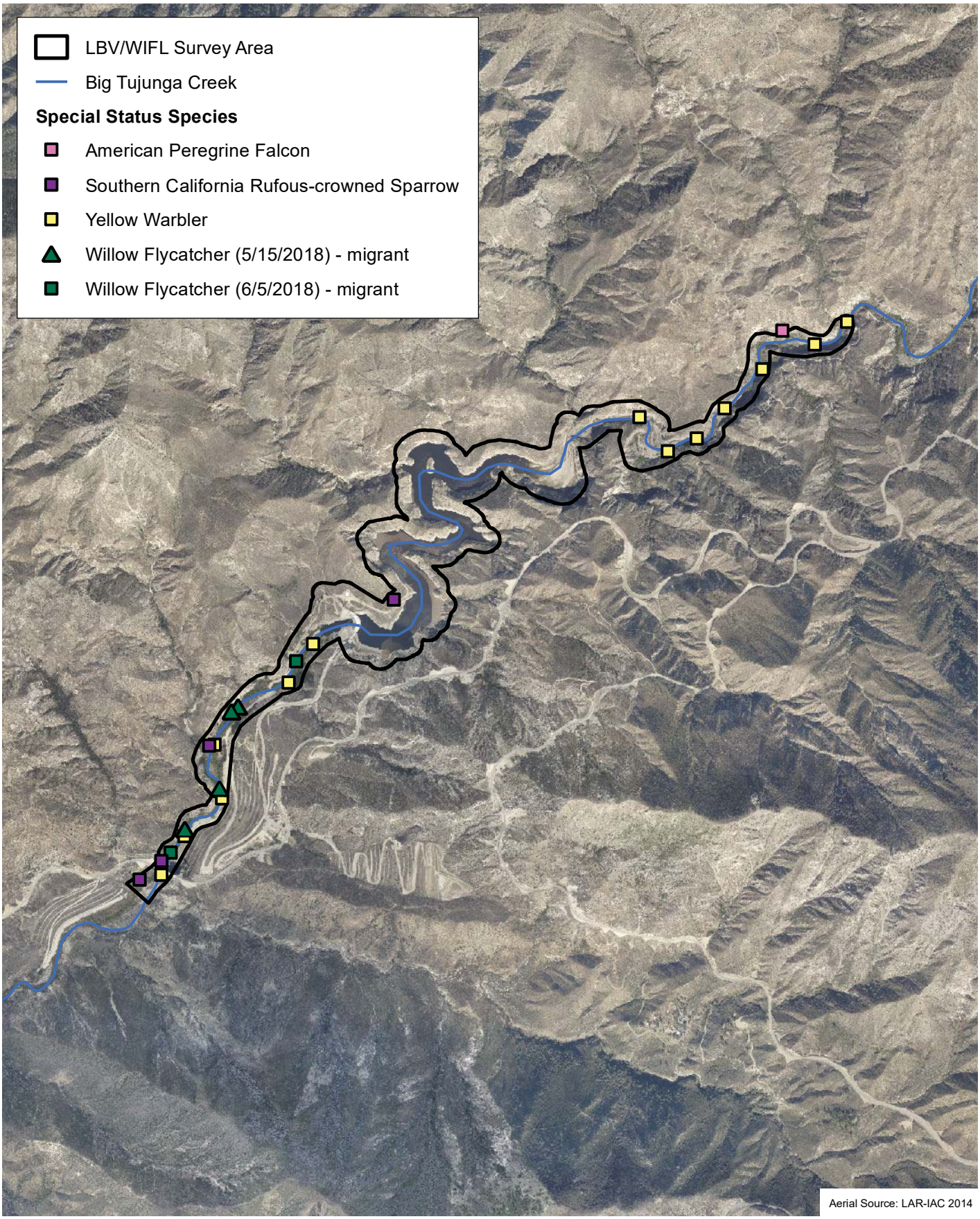

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Special Status Species Observed

Exhibit 3

Big Tujunga Reservoir Sediment Removal Project Site

N W E S

2,000 1,000 0 2,000 Feet

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ATTACHMENT A

SITE PHOTOGRAPHS



Representative site photograph depicting riparian forest habitat located in the upper portion of the survey area. Photo taken looking southwest.



Representative site photograph depicting riparian scrub habitat located in the upper portion of the survey area. Photo taken looking northeast.

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Site Photographs

Attachment A-1

Big Tujunga Reservoir Sediment Removal Project Site

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Overview site photograph depicting riparian forest habitat located in the lower portion of the survey area. Photo taken from Big Tujunga Canyon Road bridge looking north.



Representative site photograph depicting riparian forest habitat located in the lower portion of the survey area. Photo taken looking south.

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Site Photographs

Attachment A-2

Big Tujunga Reservoir Sediment Removal Project Site

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Overview site photograph depicting riparian forest habitat located in the lower portion of the survey area. Photo taken from Big Tujunga Canyon Road bridge looking southwest.



Representative site photograph depicting riparian forest habitat located in the lower portion of the survey area. Photo taken looking north.

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Site Photographs

Attachment A-3

Big Tujunga Reservoir Sediment Removal Project Site

PSOMAS

ATTACHMENT B

WILDLIFE COMPENDIUM

WILDLIFE SPECIES OBSERVED DURING SURVEYS

Species		Special Status
Scientific Name	**Common Name**	
AMPHIBIANS		
HYLIDAE - TREEFROG FAMILY		
Pseudacris cadaverina	California treefrog	
TURTLES		
EMYDIDAE - BOX AND BASKING TURTLE FAMILY		
Emys marmorata	western pond turtle	SSC
LIZARDS		
PHRYNOSOMATIDAE - SPINY LIZARD FAMILY		
Phrynosoma blainvillii	coast horned lizard	SSC
Sceloporus occidentalis	western fence lizard	
Uta stansburiana	common side-blotched lizard	
TEIIDAE - WHIPTAIL LIZARD FAMILY		
Aspidoscelis tigris stejnegeri	coastal whiptail	SSC
SNAKES		
NATRICIDAE - HARMLESS LIVE-BEARING SNAKE FAMILY		
Thamnophis hammondii	two-striped garter snake	SSC
VIPERIDAE - VIPER AND PITVIPER FAMILY		
Crotalus atrox	western diamond-backed rattlesnake	
BIRDS		
ANATIDAE - SWAN, GOOSE, AND DUCK FAMILY		
Anas platyrhynchos	mallard	
ODONTOPHORIDAE - NEW WORLD QUAIL FAMILY		
Oreortyx pictus	mountain quail	
Callipepla californica	California quail	
COLUMBIDAE - PIGEON AND DOVE FAMILY		
Patagioenas fasciata	band-tailed pigeon	
Zenaida macroura	mourning dove	
APODIDAE - SWIFT FAMILY		
Cypseloides niger	black swift	SSC
Chaetura vauxi	Vaux's swift	SSC
Aeronautes saxatalis	white-throated swift	
TROCHILIDAE - HUMMINGBIRD FAMILY		
Calypte anna	Anna's hummingbird	
Selasphorus sasin	Allen's hummingbird	
PHALACROCORACIDAE - CORMORANT FAMILY		
Phalacrocorax auritus	double-crested cormorant	
ARDEIDAE - HERON FAMILY		
Ardea herodias	great blue heron	
Ardea alba	great egret	
Nycticorax nycticorax	black-crowned night-heron	
CATHARTIDAE - NEW WORLD VULTURE FAMILY		
Cathartes aura	turkey vulture	
ACCIPITRIDAE - HAWK FAMILY		
Buteo jamaicensis	red-tailed hawk	

WILDLIFE SPECIES OBSERVED DURING SURVEYS

Species		Special Status
Scientific Name	**Common Name**	
PICIDAE - WOODPECKER FAMILY		
Melanerpes formicivorus	acorn woodpecker	
Picoides nuttallii	Nuttall's woodpecker	
Picoides villosus	hairy woodpecker	
FALCONIDAE - FALCON FAMILY		
Falco sparverius	American kestrel	
Falco peregrinus	peregrine falcon	FP
TYRANNIDAE - TYRANT FLYCATCHER FAMILY		
Contopus sordidulus	western wood-pewee	
Empidonax traillii	willow flycatcher	SE
Empidonax difficilis	Pacific-slope flycatcher	
Sayornis nigricans	black phoebe	
Myiarchus cinerascens	ash-throated flycatcher	
Tyrannus verticalis	western kingbird	
VIREONIDAE - VIREO FAMILY		
Vireo gilvus	warbling vireo	
CORVIDAE - JAY AND CROW FAMILY		
Aphelocoma californica	California scrub-jay	
Corvus corax	common raven	
HIRUNDINIDAE - SWALLOW FAMILY		
Tachycineta thalassina	violet-green swallow	
Stelgidopteryx serripennis	northern rough-winged swallow	
Petrochelidon pyrrhonota	cliff swallow	
PARIDAE - TITMOUSE FAMILY		
Baeolophus inornatus	oak titmouse	
AEGITHALIDAE - BUSHTIT FAMILY		
Psaltriparus minimus	bushtit	
TROGLODYTIDAE - WREN FAMILY		
Salpinctes obsoletus	rock wren	
Catherpes mexicanus	canyon wren	
Troglodytes aedon	house wren	
Thryomanes bewickii	Bewick's wren	
SYLVIIDAE - SILVIID WARBLERS FAMILY		
Chamaea fasciata	wrentit	
TURDIDAE - THRUSH FAMILY		
Sialia mexicana	western bluebird	
Catharus guttatus	hermit thrush	
Turdus migratorius	American robin	
MIMIDAE - MOCKINGBIRD AND THRASHER FAMILY		
Toxostoma redivivum	California thrasher	
PTILOGONATIDAE - SILKY-FLYCATCHER FAMILY		
Phainopepla nitens	phainopepla	

WILDLIFE SPECIES OBSERVED DURING SURVEYS

Species		Special Status
Scientific Name	**Common Name**	
FRINGILLIDAE - FINCH FAMILY		
Haemorhous mexicanus	house finch	
Spinus psaltria	lesser goldfinch	
Spinus lawrencei	Lawrence's goldfinch	
PASSERELLIDAE - NEW WORLD SPARROW FAMILY		
Pipilo maculatus	spotted towhee	
Aimophila ruficeps	rufous-crowned sparrow	
Melozone crissalis	California towhee	
Melospiza melodia	song sparrow	
ICTERIDAE - BLACKBIRDS AND ORIOLES		
Icterus cucullatus	hooded oriole	
Icterus bullockii	Bullock's oriole	
Agelaius phoeniceus	red-winged blackbird	
PARULIDAE - WOOD-WARBLER FAMILY		
Geothlypis trichas	common yellowthroat	
Setophaga petechia	yellow warbler	SSC
Cardellina pusilla	Wilson's warbler	
CARDINALIDAE - CARDINALS AND ALLIES		
Piranga ludoviciana	western tanager	
Pheucticus melanocephalus	black-headed grosbeak	
Passerina amoena	lazuli bunting	
MAMMALS		
SCIURIDAE - SQUIRREL FAMILY		
Sciurus griseus	western gray squirrel	
Otospermophilus beecheyi	California ground squirrel	
CANIDAE - CANID FAMILY		
Canis latrans	coyote (scat)	
Urocyon cinereoargenteus	common gray fox (scat)	
MEPHITIDAE - SKUNK FAMILY		
Mephitis mephitis	striped skunk	
CERVIDAE - CERVID FAMILY		
Odocoileus hemionus	southern mule deer	

CDFW: California Department of Fish and Wildlife

Species Status:

State (CDFW

SE Endangered
FP Fully Protected
SSC Species of Special Concern

ATTACHMENT C

LEAST BELL'S VIREO SURVEY DATA SUMMARY FORM

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information

Project Title:	Big Tujunga Reservoir Sediment Removal Project Site - Upper Portion
Landowner:	Angeles National Forest, Department of Public Works, Los Angeles County

Survey Information

Surveyors:	Lindsay Messett	Year:	2018

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3796269	Northing:	3796667	NAD83
Easting:	391827	Easting:	392954	NAD 83

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
1.55	8	17.30

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	0	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	0	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	0	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)
n/a	n/a	n/a	n/a

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information

Project Title:	Big Tujunga Reservoir Sediment Removal Project Site - Lower Portion
Landowner:	Angeles National Forest, Department of Public Works, Los Angeles County

Survey Information

Surveyors:	Lindsay Messett	Year:	2018

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3795304	Northing:	3794167	NAD83
Easting:	390570	Easting:	389723	NAD 83

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
1.51	8	23

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	0	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	0	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	0	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)
n/a	n/a	n/a	n/a

ATTACHMENT D

WILLOW FLYCATCHER SURVEY AND DETECTION FORM

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: Big Tujunga Reservoir Sediment Removal Project Site - Upper State: California County: Los Angeles

USGS Quad Name: Condor Peak Elevation: 690-719 (meters)

Creek, River, or Lake Name: Big Tujunga Creek

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? ***Yes*** **X** ***No*** ____

Survey Coordinates: Start: E 391827 N 3796269 UTM Datum: NAD83 (See instructions)

Stop: E 392954 N 3796667 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
							# Birds	Sex	UTM E	UTM N
Survey # 1	Date: 5/16/2018	0	0	0	0	n/a	0	n/a	n/a	n/a
Observer(s): L. Messett, J. Aguayo	Start: 8:25									
	Stop: 10:35									
	Total hrs: 2.2									
Survey # 2	Date: 6/4/2018	0	0	0	0	n/a	0	n/a	n/a	n/a
Observer(s): L. Messett, J. Aguayo	Start: 7:55									
	Stop: 10:15									
	Total hrs: 2.3									
Survey # 3	Date: 6/14/2018	0	0	0	0	n/a	0	n/a	n/a	n/a
Observer(s): L. Messett, J. Aguayo	Start: 7:15									
	Stop: 9:30									
	Total hrs: 2.25									
Survey # 4	Date: 6/26/2018	0	0	0	0	n/a	0	n/a	n/a	n/a
Observer(s): L. Messett, J. Aguayo	Start: 7:30									
	Stop: 9:45									
	Total hrs: 2.25									
Survey # 5	Date: 7/9/2018	0	0	0	0	n/a	0	n/a	n/a	n/a
Observer(s): L. Messett, J. Aguayo	Start: 8:00									
	Stop: 10:00									
	Total hrs: 2.00									

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.	0	0	0	0	Were any WIFLs color-banded? Yes ____ No X
Total survey hrs: **11.0**					If yes, report color combination(s) in the comments section on back of form and report to USFWS.

Reporting Individual: Lindsay Messett Date Report Completed: ____

US Fish & Wildlife Service Permit #: TE067064-3 State Wildlife Agency Permit #: 004535

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Lindsay Messett Phone #: (714) 751-7373

Affiliation: Psomas E-mail: lindsay.messett@psomas.com

Site Name: Big Tujunga Reservoir Sediment Removal Project Site - Upper Date report Completed:

Was this site surveyed in a previous year? Yes x No Unknown

Did you verify that this site name is consistent with that ~~u~~sed in previous yrs? Yes x No Not Applicable

If name is different, what name(s) was used in the past? n/a

If site was surveyed last year, did you survey the same general area this year? Yes x No If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes x No If no, summarize below.

Management Authority for Survey Area: Federal x Municipal/County State Tribal Private

Name of Management Entity or Owner (e.g., Tonto National Forest) Angeles National Forest, Department of Public Works, Los Angeles County

Length of area surveyed: 1.55 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

x Native broadleaf plants (entirely or almost entirely, > 90% native)

Mixed native and exotic plants (mostly native, 50 - 90% native)

Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Alnus rhombifolia, Platanus racemosa, Populus fremontii ssp. fremontii,Salix lasiolepis, Baccharis salicifolia

Average height of canopy (Do not include a range): 9 (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Most of the upper survey area is in narrow canyons. The habitat is dense throughout with patches of riparian scrub consisting of mule fat and non-native species.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Attach additional sheets if necessary

Territory Summary Table, continued

Reporting Individual _____ Phone # _____
Affiliation _____ E-mail _____
Site Name _____ Date report Completed _____

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, renesting attemps, behavior)

Comments

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: Big Tujunga Reservoir Sediment Removal Project Site - Lower | State: California | County: Los Angeles

USGS Quad Name: Condor Peak | Elevation: 618-638 (meters)

Creek, River, or Lake Name: Big Tujunga Creek

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* **X** *No* ____

Survey Coordinates: Start: E 390570 N 3795304 UTM Datum: NAD83 (See instructions)

Stop: E 389723 N 3794167 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1	Date: 5/15/2018	4	0	0	0	All four individuals were detected when they responded to taped playback with (Fitz-bew).	# Birds	Sex	UTM E	UTM N
Observer(s): L. Messett	Start: 7:00						4	n/a	390169	3794963
	Stop: 10:30								389919	3794405
	Total hrs: 3.5								390080	3794589
									390138	3794942
Survey # 2	Date: 6/5/2018	2	0	0	0	Two individuals were detected calling (whit) and then subsequently responded to taped playback with (Fitz-bew).	# Birds	Sex	UTM E	UTM N
Observer(s): L. Messett	Start: 7:45						2	n/a	390438	3795183
	Stop: 10:30								389398	3794562
	Total hrs: 2.75									
Survey # 3	Date: 6/15/2018	0	0	0	0	n/a	# Birds	Sex	UTM E	UTM N
Observer(s): L. Messett	Start: 7:00						0	n/a	n/a	n/a
	Stop: 9:30									
	Total hrs: 2.5									
Survey # 4	Date: 6/29/2018	0	0	0	0	n/a	# Birds	Sex	UTM E	UTM N
Observer(s): L. Messett	Start: 7:15						0	n/a	n/a	n/a
	Stop: 10:15									
	Total hrs: 3.00									
Survey # 5	Date: 7/11/2018	0	0	0	0	n/a	# Birds	Sex	UTM E	UTM N
Observer(s): L. Messett	Start: 7:10						0	n/a	n/a	n/a
	Stop: 9:50									
	Total hrs: 2.7									

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes ____ No X
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.	0	0	0	0	If yes, report color combination(s) in the comments section on back of form and report to USFWS.
Total survey hrs: 14.45					

Reporting Individual: Lindsay Messett | Date Report Completed: ____

US Fish & Wildlife Service Permit #: TE067064-3 | State Wildlife Agency Permit #: 004535

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Lindsay Messett | Phone #: (714) 751-7373

Affiliation: Psomas | E-mail: lindsay.messett@psomas.com

Site Name: Big Tujunga Reservoir Sediment Removal Project Site - Lower | Date report Completed:

Was this site surveyed in a previous year? Yes x No ____ Unknown ____

Did you verify that this site name is consistent with that used in previous yrs? Yes x No ____ Not Applicable ____

If name is different, what name(s) was used in the past? n/a

If site was surveyed last year, did you survey the same general area this year? Yes x No ____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes x No ____ If no, summarize below.

Management Authority for Survey Area: Federal x Municipal/County ____ State ____ Tribal ____ Private ____

Name of Management Entity or Owner (e.g., Tonto National Forest): Angeles National Forest, Department of Public Works, Los Angeles County

Length of area surveyed: 1.51 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

x Native broadleaf plants (entirely or almost entirely, > 90% native)

____ Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Alnus rhombifolia, Platanus racemosa, Populus fremontii ssp. fremontii,Salix lasiolepis

Average height of canopy (Do not include a range): 10 (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Most of the lower survey area is in narrow canyons. The habitat is dense riparian forest throughout the survey area.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Attach additional sheets if necessary

Territory Summary Table, continued

Reporting Individual _____ Phone # _____
Affiliation _____ E-mail _____
Site Name _____ Date report Completed _____

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, renesting attemps, behavior)

Comments

ATTACHMENT E

CNDDB FORMS

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/15/2018

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

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Scientific Name: *Empidonax traillii*

Common Name: willow flycatcher

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 6 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Lindsay Messett
Address: 3 Hutton Centre Dr Suite 200
Santa Ana, CA 92707
E-mail Address: lindsay.messett@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

6 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

***Location Description* (please attach map AND/OR fill out your choice of coordinates, below)**

The proposed project is located at the southern edge of the San Gabriel Mountains in the Angeles National Forest (ANF).

County: Los Angeles Landowner / Mgr.: ANF/Dept. of Public Works Los Angeles

Quad Name: Condor Peak Elevation: 445-454 meters

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy 10 feet meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☑

Coordinates: 34.290066, -118.193350 34.286691, -118.194268, 34.289877, -118.193688, 34.292081, -118.190463
34.285016, -118.195996, 34.284162, -118.196706

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

A total six migrant willow flycatchers were detected in the survey area during focused surveys. A total of four migrant willow flycatchers were present on May 15, 2018, and two migrant willow flycatchers were present on June 5, 2018. These willow flycatchers of undetermined subspecies were singing birds in the willow dominated riparian habitat downstream of Big Tujunga Dam in the lower portion of the survey area. All individuals were detected by "Whit" calls and subsequently responded to playback with "Fitz-bew" calls.

Please fill out separate form for other rare taxa seen at this site. American peregrine falcon, yellow warbler, S. CA rufous-crowned sparrow

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Open space in ANF, Big Tujunga Dam/Reservoir

Visible disturbances:

Threats: Human activity, recreation

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/14/2018

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Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

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Scientific Name: *Falco peregrinus anatum*

Common Name: American peregrine falcon

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 2 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Lindsay Messett
Address: 3 Hutton Centre Dr Suite 200
Santa Ana, CA 92707
E-mail Address: lindsay.messett@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

2				
# adults	# juveniles	# larvae	# egg masses	# unknown

☐	☑	☑	☐	☐	☐
wintering	breeding	nesting	rookery	burrow site	other

***Location Description* (please attach map AND/OR fill out your choice of coordinates, below)**

The proposed project is located at the southern edge of the San Gabriel Mountains in the Angeles National Forest (ANF).

County: Los Angeles Landowner / Mgr.: ANF/Dept. of Public Works Los Angeles
Quad Name: Condor Peak Elevation: 445-454 meters
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy 10 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☑
Coordinates: 34.284162, -118.196706

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

A pair of American peregrine falcons was consistently detected in the survey area in the same general area, indicating that they were potentially nesting.

Please fill out separate form for other rare taxa seen at this site. S. CA rufous-crowned sparrow, yellow warbler, willow flycatcher (migrants)

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor
Immediate AND surrounding land use: Open space in the ANF, Big Tujunga Dam/Reservoir
Visible disturbances:
Threats:
Comments: Pair of American falcon were observed nesting in the same general location during previous focused surveys in 2011. 2016, and 2017.

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 07/09/2018

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

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Scientific Name: *Setophaga petechia*

Common Name: yellow warbler

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 13+ Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Lindsay Messett
Address: 3 Hutton Centre Dr Suite 200
Santa Ana, CA 92707
E-mail Address: lindsay.messett@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

13 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

The proposed project is located at the southern edge of the San Gabriel Mountains in the Angeles National Forest (ANF).

County: Los Angeles Landowner / Mgr.: ANF/Dept. of Public Works Los Angeles

Quad Name: Condor Peak Elevation: 445-454 meters

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy 10 feet meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☑

Coordinates: 34.292784 -118.189723, 34.283244 -118.197253, 34.284845 -118.196096, 34.291199 -118.190942, 34.286408 -118.194238, 34.288616 -118.194605, 34.302174 -118.173501, 34.300769, -118.172078, 34.301308, -118.170631

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*

Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Observed up to 13 individuals with territories throughout the focused surveys. Observed many of these birds with fledglings later in the season indicating successful nesting within the survey area.
Additional Points:
34.302550, -118.169259, 34.305200, -118.164771
34.304169, -118.167374, 34.306142, -118.163155

Please fill out separate form for other rare taxa seen at this site. Am. peregrine falcon, rufous-crowned sparrow, willow flycatcher (migrants)

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Open space in ANF, Big Tujunga Dam/Reservoir

Visible disturbances:

Threats: Human activity, recreation

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

DFG/BDB/1747 Rev. 6/16/09

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/15/2018

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Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

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California Native Species Field Survey Form

Send Form

Scientific Name: *Aimophila ruficeps canescens*

Common Name: southern California rufous-crowned sparrow

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 6 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Lindsay Messett
Address: 3 Hutton Centre Dr Suite 200
Santa Ana, CA 92707
E-mail Address: lindsay.messett@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

6 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☑ nesting ☐ rookery ☐ burrow site ☐ other

***Location Description* (please attach map AND/OR fill out your choice of coordinates, below)**

The proposed project is located at the southern edge of the San Gabriel Mountains in the Angeles National Forest (ANF).

County: Los Angeles Landowner / Mgr.: ANF/Dept. of Public Works Los Angeles

Quad Name: Condor Peak Elevation: 445-454 meters

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐

Source of Coordinates (GPS, topo. map & type): GPS

GPS Make & Model Garmin

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐

Horizontal Accuracy 10 feet meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☑

Coordinates: 34.283821, -118.197153, 34.294626, -118.185626
34.283040, -118.198234

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*

Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Observed and/or detected three pairs of rufous-crowned sparrows on the slopes above Big Tujunga Creek. The individuals were detected in the same general location throughout the focused surveys indicating they were nesting in the immediate vicinity.

Please fill out separate form for other rare taxa seen at this site. American peregrine falcon, yellow warbler, willow flycatcher (migrants)

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Open space in the ANF, Big Tujunga Dam/Reservoir

Visible disturbances:

Threats: Human activity, recreation

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

September 24, 2018

Ms. Stacey Love
U.S. Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

VIA EMAIL
Stacey_Love@fws.gov

Subject: Results of the 2018 Western Yellow-Billed Cuckoo Surveys for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles, California

Dear Ms. Love:

This Letter Report presents the results of focused surveys to determine the presence or absence of the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) for the Big Tujunga Reservoir Sediment Removal Project (hereinafter referred to as the "proposed project") located in Los Angeles County, California (Exhibit 1). A Biologist with the necessary experience and the Federal Endangered Species Act 10(a) survey permit conducted the surveys according to U.S. Fish and Wildlife Service (USFWS) protocol for this species.

PROJECT DESCRIPTION AND LOCATION

The proposed project involves the dewatering of the Big Tujunga Reservoir and the removal of sediment to the nearby Maple Canyon Sediment Placement Site. The proposed project is located on the southern edge of the San Gabriel Mountains in the Angeles National Forest (ANF) and is located on the U.S. Geological Survey's (USGS') Condor Peak 7.5-minute topographic quadrangle (Exhibit 1).

The survey area for the western yellow-billed cuckoo surveys included all riparian habitat along Big Tujunga Creek from Big Tujunga Dam downstream to 500 feet downstream of Big Tujunga Canyon Road bridge (Exhibit 2). The area upstream of Big Tujunga Reservoir was not surveyed for western yellow-billed cuckoo because the extent of riparian forest habitat is limited within 500 feet of the sediment removal area. It also consists of a narrower canyon with high cliffs on both sides, which is not preferred by western yellow-billed cuckoo. The lower portion consists of a larger patch of riparian habitat, which, when considered with the contiguous habitat downstream of the survey area, would be considered marginally suitable for this species. The lower portion is also a more open canyon with steep slopes to the north and moderate slopes to the south. The survey area and surrounding vicinity consist of open space in the ANF.

Riparian habitat in the survey area is characterized by riparian forest vegetation dominated by white alder grove-willow thicket. The habitat in this area is relatively dense and continuous and is dominated by white alder (*Alnus rhombifolia*), Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), arroyo willow (*Salix lasiolepis*), and red willow (*S. laevigata*). Common understory species include mule fat (*Baccharis salicifolia)*, hoary nettle (*Urtica dioica* ssp. *holosericea*), mugwort (*Artemisia douglasiana*), and western poison oak (*Toxicodendron diversilobum*). Representative site photos are included in Attachment A.

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SPECIES BACKGROUND

Western yellow-billed cuckoo (Distinct Population Segment [DPS]) is a federally and State listed Endangered species. The USFWS concluded that the western population was discrete from the eastern population based on geographic separation during the breeding season, morphological differences, and behavioral differences (USFWS 2014b). The western yellow-billed cuckoo generally occurs west of the crest of the Rocky Mountains, specifically in southwest British Columbia in Canada; Washington, Idaho, western Montana, Oregon, California, Nevada, southwestern Wyoming, Utah, western Colorado, Arizona, western New Mexico, and Texas in the United States; and Baja California Sur, Sonora, Sinaloa, western Chihuahua, and northwestern Durango in Mexico (USFWS 2014b). It winters in South America east of the Andes, primarily south of the Amazon Basin in southern Brazil, Paraguay, Uruguay, eastern Bolivia, and northern Argentina (Ehrlich et al. 1992; American Ornithologists' Union 1998; Johnson et al. 2008). The western yellow-billed cuckoo arrives in southern California between late May and early July, with most arriving in mid-June; it departs for its wintering grounds from mid-September to mid-October (Halterman et al. 2015). The peak of breeding activity lasts about one month and is typically in July; but in some years it can begin as early as May and can end as late as September (Laymon et al. 1997; Halterman 1991, 2009; McNeil et al. 2013; Halterman et al. 2015).

The western yellow-billed cuckoo requires large tracts of riparian forest or woodland habitat along low-gradient rivers and streams in open riverine valleys that provide wide floodplain conditions (USFWS 2014c). The optimal size of habitat patches for the species is generally greater than 200 acres in extent and has dense canopy closure and high foliage volume of willows and cottonwoods (Laymon and Halterman 1989). Habitat between 100 acres and 200 acres, although considered suitable, are not consistently used by the species (Laymon and Halterman 1989). Habitat patches from 50 to 100 acres in size are considered marginal habitat; sites less than 37 acres are considered unsuitable habitat (Laymon and Halterman 1989). The species does not use narrow, steep-walled canyons (USFWS 2014c). Sites with strips of habitat less than 325 feet in width are rarely occupied for nesting (USFWS 2014c). Stopover and foraging sites can be similar to breeding sites but can be smaller in size (sometimes less than 10 acres in extent), narrower in width, and lack understory vegetation when compared to nesting sites (Laymon and Halterman 1989; USFWS 2014c). Minimum patch size for cuckoo occupancy is 12.4 acres; no cuckoos have been detected attempting to nest in patches this size or smaller in California or Arizona (Halterman et al. 2001; Johnson et al. 2010). They have also not been found nesting in narrow, linear habitat that is less than 33 to 66 feet wide (Halterman et al. 2015).

Optimal breeding habitat contains willow-dominated groves with dense canopy closure and well-foliaged branches for nest building with nearby foraging areas consisting of a mixture of cottonwoods and willows with a high volume of healthy foliage (USFWS 2014c). Sites can be relatively dense, contiguous stands or irregularly shaped mosaics of dense vegetation with open areas (USFWS 2014c). In California, habitat often consists of willows mixed with Fremont cottonwood (Halterman et al. 2015). Nest trees range from 10 feet to 98 feet in height and are an average of 35 feet in height. Nests are typically well-concealed in dense vegetation (Halterman 2002; Laymon et al. 1997; McNeil et al. 2013). Hydrologic conditions can vary from dry in some years to inundated in others (USFWS 2014c). Humid conditions created by surface and subsurface moisture appear to be important habitat parameters for selection of nest sites (USFWS 2014c). Multiple studies have found that cuckoo preferred nesting sites in younger riparian habitat which, when compared to mature woodlands, provided high productivity of invertebrate prey and reduced predator abundance (Layman 1998; McNeil et al. 2013; Carstensen et al. 2015; Stanek and Stanek 2012; Johnson et al. 2008). The dynamic transitional process of vegetation recruitment and maturity must be maintained to keep riparian habitat viable for this species over the long-term (USFWS 2014b).

Western yellow-billed cuckoos historically bred throughout riparian systems in western North America from southern British Columbia, Canada, to northwestern Mexico (Hughes 1999). In the past 90 years, the species' range in the western United States has contracted; the northern limit of breeding along the west coast is now in the Sacramento Valley, while the breeding limit in the western interior states is in southeastern Idaho (USFWS 2013). Within the three states with the highest historical number of yellow-billed cuckoo, past riparian habitat losses are estimated to be 90 to 95 percent in Arizona, 90 percent in New Mexico, and 90 to 99 percent in California (Ohmart 1994; USDOI 1994; Noss et al. 1995; Greco 2008). The primary factors threatening the western yellow-billed cuckoo are the loss and degradation of habitat for the species from altered watercourse hydrology and natural stream processes, livestock overgrazing, encroachment from agriculture, and conversion of native habitat to predominantly non-native vegetation. Additional threats to the species include the effects of climate change, pesticides, wildfire, and small and widely separated habitat patches (USFWS 2014b). Compared to conditions historically, the areas currently used for nesting by the western yellow-billed cuckoo are very limited and disjunct. The breeding population is small, with 680 to 1,025 nesting pairs (350 to 495 pairs in the United States and 330 to 530 nesting pairs in Mexico) and with no site exceeding 60 nesting pairs. Estimating numbers is problematic because an individual can nest in more than one location in a single year, possibly causing overestimates of the number of nesting pairs (USFWS 2014c). The current nesting population in California, based on surveys conducted in 2010, likely does not exceed 40 to 50 pairs found in only the three core locations. Core areas in California include (1) the Sacramento River between Colusa and Red Bluff, (2) the South Fork of the Kern River upstream of Lake Isabella, and (3) lower Colorado River (Laymon and Halterman 1987).

This species formerly nested in the Los Angeles, San Gabriel, and the Santa Clara River systems (Allen and Garrett 1996). Breeding persisted until at least 1952 in the San Gabriel River near El Monte (Long 1993; Garrett and Dunn 1981). No nesting of this species has been documented in Los Angeles County since the late 1950s, although breeding is still "conceivable" in remnant riparian habitat along the Santa Clara River (Allen and Garrett 1996). In recent years, yellow-billed cuckoos occur in Los Angeles County and elsewhere in the Southern California Coastal Region only as rare migrants (Lehman 2015; Unitt 2004; Hamilton and Willick 1996; Garrett and Dunn 1981; Webster et al. 1980). Although no recent breeding observations have been confirmed in the Southern California Coastal Region, multiple observations of yellow-billed cuckoos have been reported at some locations with suitable breeding habitat, including the lower Santa Clara River in Ventura County, the Whittier Narrows area in Los Angeles County, Prado Basin in Riverside and San Bernardino Counties, San Joaquin Marsh in Orange County, and San Luis Rey River near Oceanside in San Diego County. These observations generally consist of single birds and sometimes occur at times that suggest summering individuals rather than migrants (McCaskie and Garrett 2013, 2014, 2015, 2016).

On August 15, 2014, the USFWS published a rule designating proposed critical habitat for the western DPS of the yellow-billed cuckoo (USFWS 2014c). This proposed rule designated approximately 546,335 acres in Arizona, California, Colorado, Idaho, Nevada, New Mexico, Texas, Utah, and Wyoming. In California, proposed critical habitat includes Eel River (Humboldt County), Sacramento River (Colusa, Glenn, Butte, and Tehama Counties), Sutter Bypass (Sutter County), South Fork Kern River Valley (Kern County), Owens River (Inyo County), and Prado Flood Control Basin (Riverside County) and in two areas along the Colorado River (Imperial, Riverside, and San Bernardino Counties in California; Yuma, La Paz, and Mojave Counties in Arizona) (USFWS 2014c). This proposed rule has not yet been finalized by the USFWS. The proposed project is not located within the proposed designated critical habitat area for this species.

SURVEY METHODS

Focused surveys for western yellow-billed cuckoo were conducted for the first time in 2018. The survey area included all riparian habitat from Big Tujunga Dam to 500 feet downstream of the Big Tujunga Canyon Road bridge. The area upstream of Big Tujunga Reservoir was not surveyed for western yellow-billed cuckoo because the extent of riparian forest habitat is limited within 500 feet of the sediment removal area; it consists of patches of riparian herb and riparian scrub habitats. The upper area also consists of a narrower canyon with high cliffs on both sides of the creek, which is not preferred by western yellow-billed cuckoo. The lower portion consists of a larger patch of riparian forest habitat, which, when considered with the contiguous habitat downstream of the survey area, would be considered marginally suitable for this species. The lower portion is also a more open canyon with steep slopes to the north and moderate slopes to the south.

The USFWS survey protocol for western yellow-billed cuckoo requires a minimum of four surveys be conducted in three time periods that span the peak of breeding activity for the western populations of this species: (1) one survey is required from June 15 to June 30 when migrating yellow-billed cuckoos are passing through but breeding birds are also arriving; (2) two surveys are required from July 1 to July 31 when individual cuckoos encountered are mostly breeders but are occasionally migrants, wandering individuals, or young of the year; and (3) one survey is required from August 1 to August 15 when most breeding yellow-billed cuckoos have finished breeding activities and are departing. Each survey needs to be conducted 12 to 15 days apart. Focused surveys were conducted by Ms. Messett (TE-067064-3).

Ms. Messett systematically surveyed the riparian habitats by walking slowly and methodically along the margins of riparian habitat and using meandering transects through the riparian habitat in the survey area. Per USFWS survey protocol for the species, Ms. Messett played recorded contact or "kowlp" calls of western yellow-billed cuckoo five times at one-minute intervals at each calling station (or point) established in the survey area. Compact speakers capable of broadcasting recorded bird calls in excess of 70 decibels were used during all surveys. Upon arriving at each calling point, Ms. Messett listened and watched for cuckoos for one minute prior to playing the broadcast contact calls. Calling points were established approximately every 328 feet in riparian habitat that provided potentially suitable or marginally suitable habitat for the western yellow-billed cuckoo. All surveys are conducted under optimal weather conditions (i.e., between 55 degrees Fahrenheit [°F] and 95°F with wind speeds between 0 and 15 miles per hour) and during the morning hours when bird activity is at a peak. Additionally, per USFWS guidelines, all incidental observations of least Bell's vireo (*Vireo bellii pusillus*) and willow flycatcher (*Empidonax trailli*) were recorded and mapped. Survey data are presented in Table 1. All wildlife species detected during the surveys were recorded and are included in Attachment B.

TABLE 1
SUMMARY OF SURVEY DATA AND CONDITIONS FOR WESTERN YELLOW-BILLED CUCKOO SURVEYS

Survey Dates	Surveyors	Time	Air Temperature (°F)		Cloud Cover	Wind (mph)
			Start	End		
June 21	Messett	7:00 AM–10:00 AM	62	76	0%	0–4
July 6	Messett	6:20 AM–9:45 AM	73	84	70% → 30%	0–1
July 20	Messett	7:10 AM–10:05 AM	68	83	0%	0–2
August 10	Messett	6:45 AM–9:40 AM	73	85	0% → 30%	0–1

RESULTS

No western yellow-billed cuckoos were observed in the survey area during the focused surveys. The required Yellow-Billed Cuckoo Survey Summary and Site Detection Forms are included as Attachment C.

Per permit conditions, notable wildlife species incidentally observed during the surveys included yellow warbler (*Setophaga petechia*; State Species of Special Concern) and southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*; State Watch List Species) (Exhibit 3). These species are tracked by the California Department of Fish and Wildlife's (CDFW's) California Natural Diversity Database (CNDDB). Details and CNDDB forms for these species will be included in the *Results of the 2018 Least Bell's Vireo and Southwestern Willow Flycatcher Surveys for the Big Tujunga Reservoir Sediment Removal Project* Report (Psomas 2018).

Brown-headed cowbirds were not observed or detected during the focused surveys.

Psomas appreciates the opportunity to assist on this project. If you have any comments or questions, please call Amber Heredia at (714) 751-7373.

Sincerely,
PSOMAS

Amber O. Heredia
Senior Project Manager

Lindsay A. Messett, CWB®
Senior Biologist

I certify that the information in this survey repot and attached exhibits fully and accurately represents my work.

Lindsay A. Messett, CWB®
Senior Biologist
(TE067064-3)

Enclosures: Exhibit 1
Exhibit 2
Exhibit 3
Attachment A – Site Photographs
Attachment B – Wildlife Compendium
Attachment C – Yellow-Billed Cuckoo Survey Summary and Site Detection Forms

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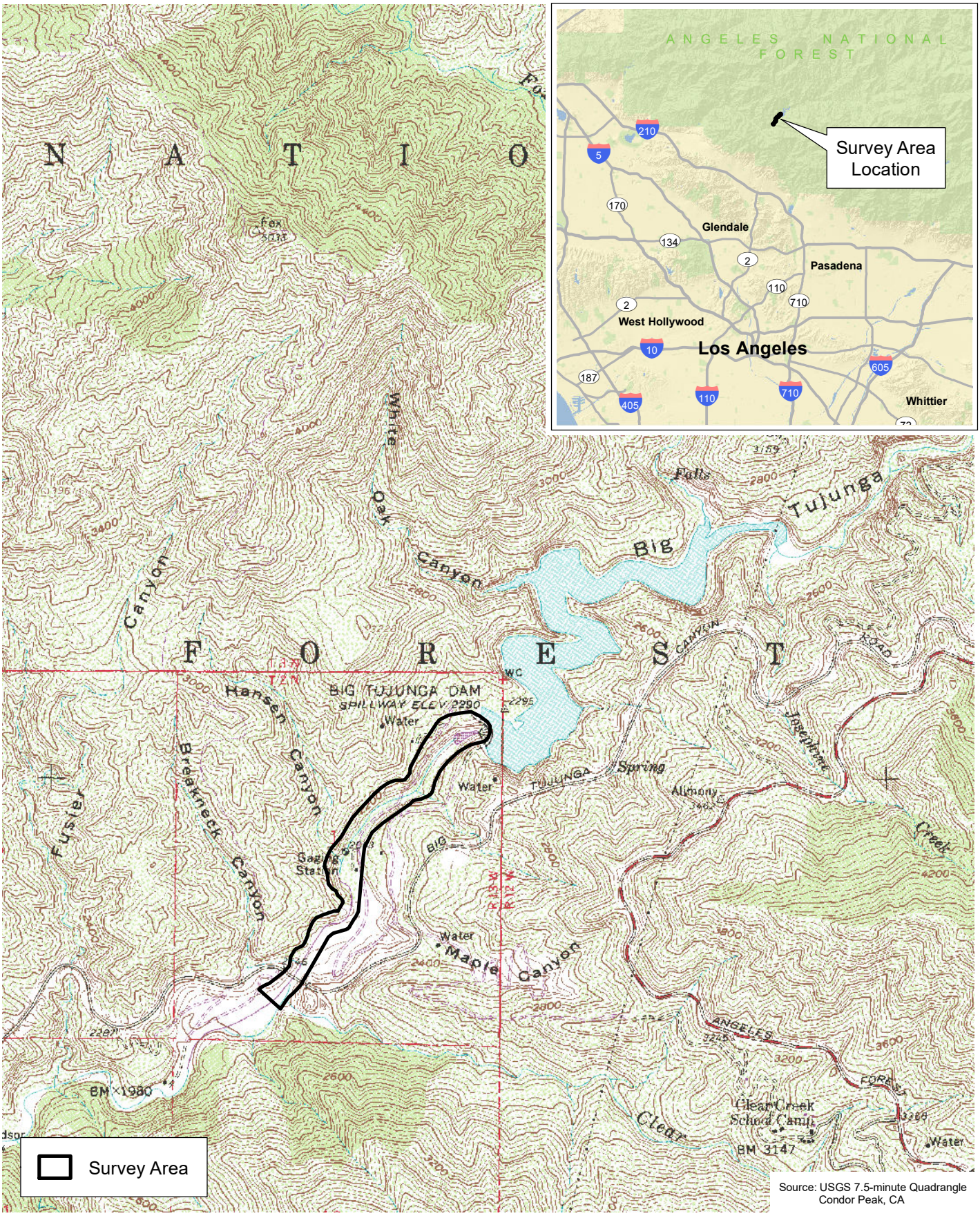

Source: USGS 7.5-minute Quadrangle
Condor Peak, CA

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Regional Location and Local Vicinity

Exhibit 1

Big Tujunga Reservoir Sediment Removal Project Site

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2,000 1,000 0 2,000
Feet

PSOMAS

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Survey Area

Exhibit 2

Big Tujunga Reservoir Sediment Removal Project Site

N
W E
S

2,000 1,000 0 2,000

Feet

PSOMAS

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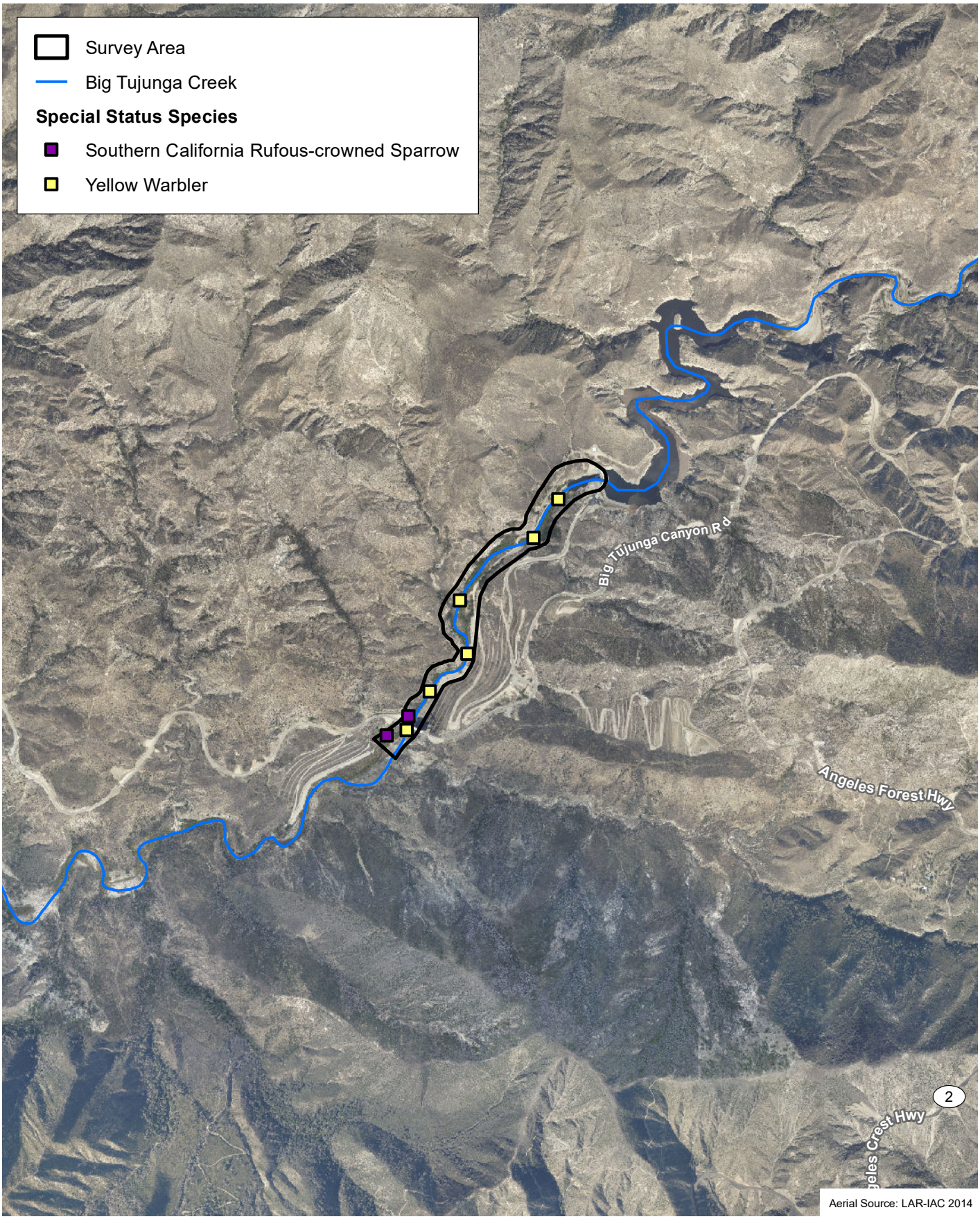

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Special Status Species Observed

Exhibit 3

Big Tujunga Reservoir Sediment Removal Project Site

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W E
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2,000 1,000 0 2,000

Feet

PSOMAS

(Rev: 09/21/2018 MMD) R:\Projects\DPW\3DPW029312\Graphics\WYBC\ex_SS_Observed.pdf

ATTACHMENT A

REPRESENTATIVE PHOTOGRAPHS



Representative riparian forest habitat in the upstream portion of the survey area. Photo taken looking northeast.



Representative riparian forest habitat in the upstream portion of the survey area. Photo taken looking northwest.

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Site Photographs

Attachment A-1

Big Tujunga Reservoir Sediment Removal Project Site

PSOMAS



Representative riparian forest habitat in the central portion of the survey area. Photo taken looking northeast.



Representative riparian forest habitat in the downstream portion of the survey area. Photo taken looking southwest.

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Site Photographs

Attachment A-2

Big Tujunga Reservoir Sediment Removal Project Site

PSOMAS

ATTACHMENT B

WILDLIFE COMPENDIUM

WILDLIFE SPECIES OBSERVED DURING SURVEYS

Scientific Name	Common Name	Special Status
AMPHIBIANS		
HYLIDAE - TREEFROG FAMILY		
Pseudacris cadaverina	California treefrog	
LIZARDS		
PHRYNOSOMATIDAE - SPINY LIZARD FAMILY		
Sceloporus occidentalis	western fence lizard	
BIRDS		
ODONTOPHORIDAE - NEW WORLD QUAIL FAMILY		
Callipepla californica	California quail	
COLUMBIDAE - PIGEON AND DOVE FAMILY		
Zenaida macroura	mourning dove	
APODIDAE - SWIFT FAMILY		
Aeronautes saxatalis	white-throated swift	
TROCHILIDAE - HUMMINGBIRD FAMILY		
Calypte anna	Anna's hummingbird	
Selasphorus sasin	Allen's hummingbird	
CATHARTIDAE - NEW WORLD VULTURE FAMILY		
Cathartes aura	turkey vulture	
ACCIPITRIDAE - HAWK FAMILY		
Buteo jamaicensis	red-tailed hawk	
PICIDAE - WOODPECKER FAMILY		
Melanerpes formicivorus	acorn woodpecker	
Picoides nuttallii	Nuttall's woodpecker	
Picoides villosus	hairy woodpecker	
FALCONIDAE - FALCON FAMILY		
Falco sparverius	American kestrel	
TYRANNIDAE - TYRANT FLYCATCHER FAMILY		
Contopus sordidulus	western wood-pewee	
Empidonax difficilis	Pacific-slope flycatcher	
Sayornis nigricans	black phoebe	
Myiarchus cinerascens	ash-throated flycatcher	
Tyrannus verticalis	western kingbird	
VIREONIDAE - VIREO FAMILY		
Vireo gilvus	warbling vireo	
CORVIDAE - JAY AND CROW FAMILY		
Aphelocoma californica	California scrub-jay	
Corvus corax	common raven	
HIRUNDINIDAE - SWALLOW FAMILY		
Tachycineta thalassina	violet-green swallow	
Stelgidopteryx serripennis	northern rough-winged swallow	
Petrochelidon pyrrhonota	cliff swallow	
PARIDAE - TITMOUSE FAMILY		
Baeolophus inornatus	oak titmouse	

WILDLIFE SPECIES OBSERVED DURING SURVEYS

Scientific Name	Common Name	Special Status
AEGITHALIDAE - BUSHTIT FAMILY		
Psaltriparus minimus	bushtit	
TROGLODYTIDAE - WREN FAMILY		
Salpinctes obsoletus	rock wren	
Catherpes mexicanus	canyon wren	
Troglodytes aedon	house wren	
Thryomanes bewickii	Bewick's wren	
SYLVIIDAE - SILVIID WARBLERS FAMILY		
Chamaea fasciata	wrentit	
TURDIDAE - THRUSH FAMILY		
Turdus migratorius	American robin	
MIMIDAE - MOCKINGBIRD AND THRASHER FAMILY		
Toxostoma redivivum	California thrasher	
PTILOGONATIDAE - SILKY-FLYCATCHER FAMILY		
Phainopepla nitens	phainopepla	
FRINGILLIDAE - FINCH FAMILY		
Haemorhous mexicanus	house finch	
Spinus psaltria	lesser goldfinch	
Spinus lawrencei	Lawrence's goldfinch	
PASSERELLIDAE - NEW WORLD SPARROW FAMILY		
Pipilo maculatus	spotted towhee	
Aimophila ruficeps	southern California rufous-crowned sparrow	WL
Melozone crissalis	California towhee	
Melospiza melodia	song sparrow	
ICTERIDAE - BLACKBIRDS AND ORIOLES		
Icterus cucullatus	hooded oriole	
Icterus bullockii	Bullock’s oriole	
Agelaius phoeniceus	red-winged blackbird	
PARULIDAE - WOOD-WARBLER FAMILY		
Geothlypis trichas	common yellowthroat	
Setophaga petechia	yellow warbler	SSC
Cardellina pusilla	Wilson's warbler	
CARDINALIDAE - CARDINALS AND ALLIES		
Piranga ludoviciana	western tanager	
Pheucticus melanocephalus	black-headed grosbeak	
Passerina amoena	lazuli bunting	
MAMMALS		
SCIURIDAE - SQUIRREL FAMILY		
Sciurus griseus	western gray squirrel	
Otospermophilus beecheyi	California ground squirrel	
CANIDAE - CANID FAMILY		
Canis latrans	coyote (scat)	
Urocyon cinereoargenteus	common gray fox (scat)	

WILDLIFE SPECIES OBSERVED DURING SURVEYS

Scientific Name	Common Name	Special Status
MEPHITIDAE - SKUNK FAMILY		
Mephitis mephitis	striped skunk	
CERVIDAE - CERVID FAMILY		
Odocoileus hemionus	southern mule deer	

USFWS: U.S. Fish and Wildlife Service; CDFW: California Department of Fish and Wildlife

Species Status:

Federal (USFWS)	State (CDFW)	
Not applicable	SSC	Species of Special Concern
	WL	Watch List

ATTACHMENT C

YELLOW-BILLED CUCKOO SURVEY SUMMARY AND SITE DETECTION FORMS

Yellow Billed Cuckoo Survey Form

Site Name: Big Tujunga Reservoir Sediment Removal | County: Los Angeles | State: CA

USGS Quad Name: Condor Peak | Elevation: 618-638 meters

Creek, River, Wetland, or Lake Name: Big Tujunga Creek

Site Coordinates: Start: E 390570 N 3795304 | UTM Zone: NAD83

Stop: E 389723 N 3794167 | Datum: 11

Ownership: BLM Reclamation NPS USFWS ✓USFS Tribal State Private Other (Municipal/County)

Was site surveyed in previous year? Yes ✓No Unknown | If yes, what site name was used? Big Tujunga Reservoir Sediment Removal Project Site

Survey # Observer(s) (Last Name, First Initial)	Date (m/d/y) Survey, Time, Total Hours	Total Number of YBCUs detected.	Time Detected (AM):	Detect Type: I=Incidental P=Playback A=aural V=visual B=both	Voc. Type: CN=Contact CO=coo AL=alarm OT=other (describe)	Playback #: Number of times 'Kowlp' call played before YBCU responded	Behavior code	Surveyor Detection Coordinates		Distance (m)	Bearing	Cuckoo #	Corrected Coordinates	
								UTM E	UTM N				UTM E	UTM N
Survey Period #1	Date:		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	6/21/2018													
Observer(s):	Start:													
	7:00													
	Stop:													
	10:00													
	Total hrs:	Total:												
	3.0	0												
Survey Period #2	Date:		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	7/6/2018													
Observer(s):	Start:													
	6:20													
	Stop:													
	9:45													
	Total hrs:	Total:												
	3.4	0												
Survey Period #3	Date:		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	7/20/2018													
Observer(s):	Start:													
	7:10													
	Stop:													
	10:05													
	Total hrs:	Total:												
	2.9	0												
Survey Period #4	Date:		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	8/10/2018													
Observer(s):	Start:													
	6:45													
	Stop:													
	9:40													
	Total hrs:	Total:												
	2.9	0												
Survey Period #5	Date:		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Observer(s):	Start:													
	Stop:													
	Total hrs:	Total:												
		n/a												
Survey Summary:		# Det	#PO	#PR	#CO		#Nests found		Total Survey Hours:					
Total YBCUs*		0	n/a	n/a	n/a		n/a		12.20					

Notes (refer to Cuckoo # associated with individual detections): n/a

*Include justification for these designations.

Behavior Codes: AN = at nest, BI = brooding or incubating, CF = adult carrying food, CN = carrying nest material, COP = copulation, CP = catches prey, DD = distraction displays/defense of nesting area, EF = eats food, FL = recently fledged young of species incapable of flight, FLY = flying, FO = foraging, FS = adult carrying a fecal sac, FY = adults feeding nestlings, JUV = juvenile, NB = nest building, NE = active nest with unbroken eggs in it, NY = nest with young seen or heard in it, ON = occupied nest, PR = preening, SI = sitting, US = used, inactive nest with blue-green eggshells.

Fill in the following information completely

Name of Reporting Individual: Lindsay Messett

Date Report completed: 9/21/18

Affiliation: Psomas

Phone #: (714) 751-7373

Email: lindsay.messett@psomas.com

USFWS Permit #: TE067064-3

State Permit #: 004535

Site Name: Big Tujunga Reservoir Sediment Removal Project Site

Length of area surveyed: 1.51 km

(in kilometers = km)

Did you survey the same general area during each visit to this site this year? ☐ Yes / No If no, summarize in comments below: n/a

If site was surveyed last year, did you survey the same general area this year? ☐ Yes / No If no, summarize in comments below: n/a

Overall Vegetation Characteristics: Overall, are the species in tree/shrub layer at this site comprised predominantly of (check one):

Native broadleaf plants (>75% native)	x	Mixed native and exotic plants (mostly native 51%-	
Exotic/introduced plants (>75% exotic)		Mixed native and exotic plants (mostly exotic 51%-	

Average height of canopy (m): 10 (specify units): meters

Estimated Canopy Cover (percent): 80

Overstory Vegetation: (provide percent estimate of the following dominant species). Use <1%; 10%, 25%, 50%, 75%, 90%, 100%.

25	Cottonwood		Goodding's Willow		Coyote Willow	75	Other (specify) Arroyo willow
	Tamarisk		Russian Olive	alder 25	Other (specify)		Other (specify)

Average height of understory canopy (m): 10 (specify units): meters

Estimated Understory Cover (percent): 30

Understory Vegetation: (provide percent estimate of the following dominant species).Use <1%; 10%, 25%, 50%, 75%, 90%, 100%.

	Cottonwood		Goodding's Willow		Coyote Willow	25	Other (specify) mugwort
	Tamarisk		Russian Olive	hoary nettle 10	Other (specify)	25	Other (specify) poison oak
	Baccharis		New Mexico Oli				

Was surface water or saturated soil present at or adjacent to site within 300 meters? ☑ Yes ☐ No (circle one)

Was surface water or saturated soil present at or adjacent to all patches surveyed? ☑ Yes ☐ No (circle one)

Comments. Please provide comments regarding differences between the survey patches within the site. For example, if the average canopy for this site is 30% cover, but within one patch it is 60% cover - please note. Also, please note significant differences between dominant overstory and understory vegetation among the patches. Document these differences with photographs whenever possible. Make sure to reference comments to photo number whenever available.

Riparian habitat in the survey area is characterized by continuous riparian forest vegetation dominated by white alder grove-willow thicket. The habitat in this area is relatively dense and continuous and is dominated by white alder (Alnus rhombifolia), Fremont cottonwood (Populus fremontii ssp. fremontii), arroyo willow (Salix lasiolepis), and red willow (Salix laevigata). Common understory species include mule fat (Baccharis salicifolia), hoary nettle (Urtica dioica ssp. holosericea), mugwort (Artemisia douglasiana) and western poison oak (Toxicodendron diversilobum). Habitat is contiguous with larger/wider habitat downstream that is also potentially suitable for cuckoo.

Please provide USGS 7.5 minute quad (or similar)showing survey area to each survey form

Yellow-billed Cuckoo Survey and Detection Form, continued

Name of Reporting Individual Lindsay Messett Phone # (714) 751-7373

Affiliation Psomas Email lindsay.messett@psomas.com

Site Name Big Tujunga Reservoir Sediment Removal Project Site

Survey # Observer(s) (Last Name, First Initial)	Date (m/d/y) Survey, Time, Total Hours	Time Detected (AM):	Detect Type: I=Incidental P=Playback A=aural V=visual B=both	Voc. Type: CN=Contact CO=coo AL=alarm OT=other (describe)	Playback #: Number of times 'Kowlp' call played before YBCU responded	Behavior code	Surveyor Detection Coordinates		Distance (m)	Bearing	Cuckoo #	Corrected Coordinates	
							UTM E	UTM N				UTM E	UTM N

Notes - Cont. (refer to Cuckoo # associated with individual detections)

APPENDIX B-9

FLOW DATA ANALYSIS MEMORANDUM

BonTerra CONSULTING

MEMORANDUM

January 24, 2013

To:
Mr. Eric Lim, P.E.
Water Resources Division
Los Angeles County Department of Public Works

From:
Carl Demetropoulos
Senior Fisheries Biologist
BonTerra Consulting

Subject: Flow Data Analysis for the Big Tujunga Reservoir Sediment Removal Project, Los Angeles County, California

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Dear Mr. Lim:

The purpose of this Memorandum is to analyze potential impacts of the proposed sediment removal activities at the Big Tujunga Reservoir and the associated changes in reservoir water releases on the Santa Ana sucker (*Catostomus santaanae*), a federally Threatened fish species that inhabits Big Tujunga Creek below Big Tujunga Dam. With respect to the Santa Ana sucker, there are two potential impacts of concern: (1) maximum water releases during dewatering and (2) lack of operational releases during the dry season. An analysis of the project's anticipated effects on the Santa Ana sucker are discussed below in this Memorandum.

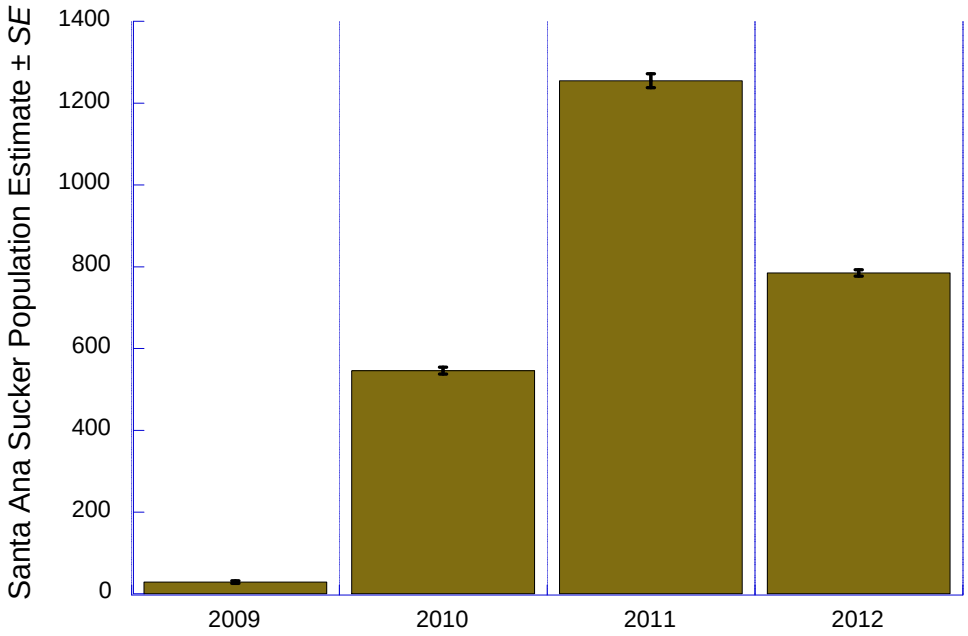
EXISTING CONDITIONS

Santa Ana Sucker Background

The Santa Ana sucker is known to occur in Big Tujunga Creek just downstream of the plunge pool (BonTerra Consulting 2011, 2012, 2013). Santa Ana sucker typically begins to breed (i.e., lay eggs/spawn) in March and April and continue breeding through mid-August (Moyle 2002).

Figure 1 shows Santa Ana sucker populations for 18–22 reaches in Big Tujunga Creek below the dam as described in the 2009–2012 Santa Ana sucker long-term monitoring conducted during September and October of each year by San Marino Environmental Associates (SMEA) and BonTerra Consulting (SMEA 2010a, 2010b; BonTerra Consulting 2012, 2013). In this study, a series of 25-meter reaches are sampled in order to assess the sucker population within Big Tujunga Creek. It should be noted that the first year of sucker population surveys (2009) followed the Station Fire and population counts were extremely low that year; since then, the sucker population has been increasing (Figure 1).

Figure 1
Santa Ana Sucker Population Estimates
September/October 2009–2012



Regular water releases from Big Tujunga Dam are part of Santa Ana sucker ecology in Big Tujunga Creek. Typically, dam releases track what occurs naturally; during a storm, higher flows are released, while during a dry year, lower flows are released. However, the dam operations buffer the Santa Ana sucker somewhat from natural conditions by: (1) dampening high storm flows during the rainy season, and (2) providing water releases during the dry season for water conservation purposes. The Los Angeles County Department of Public Works (LACDPW) has been participating in the Santa Ana Sucker Working Group (SASWG) in order to adaptively manage releases to minimize adverse effects and to increase beneficial effects of releases on the sucker population.

Historic Average Annual Reservoir Reductions

On an annual basis during the storm season, the reservoir flows are released on an as-needed basis, particularly after a large storm event, to ensure adequate capacity behind the dam. These large dam releases during the rainy season are illustrated by the high mean flows in January, February, and March shown in Figure 2 below, which shows average releases for each month of the year from the reservoir from 1999 to 2012. Per discussions with County staff, the dam operators typically release flows from the dam to reach a "minimum pool" by April 15th (i.e., the end of the rainy season) (Mahulikar 2013).

Figure 2
Mean Annual Flow Rates From 1999 Through 2012 ± Standard Error (SE)

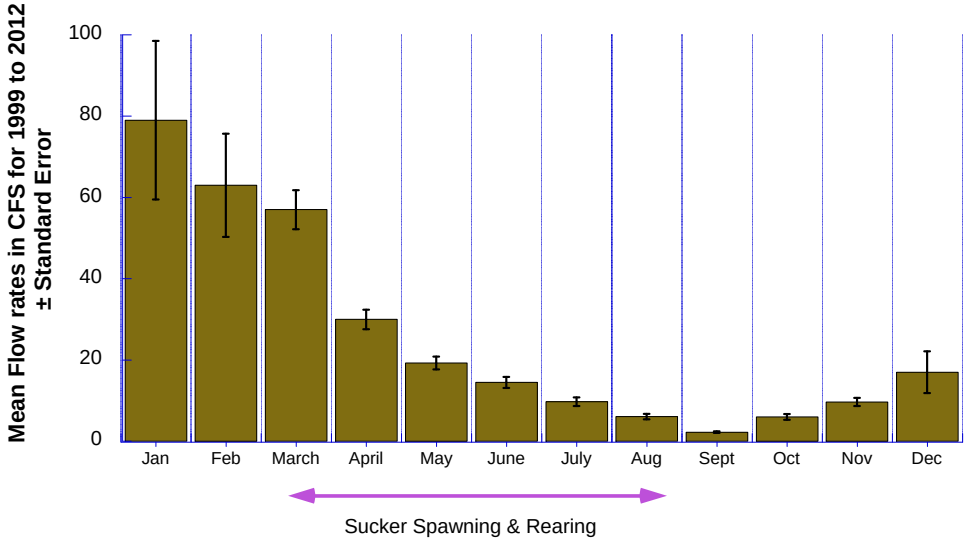
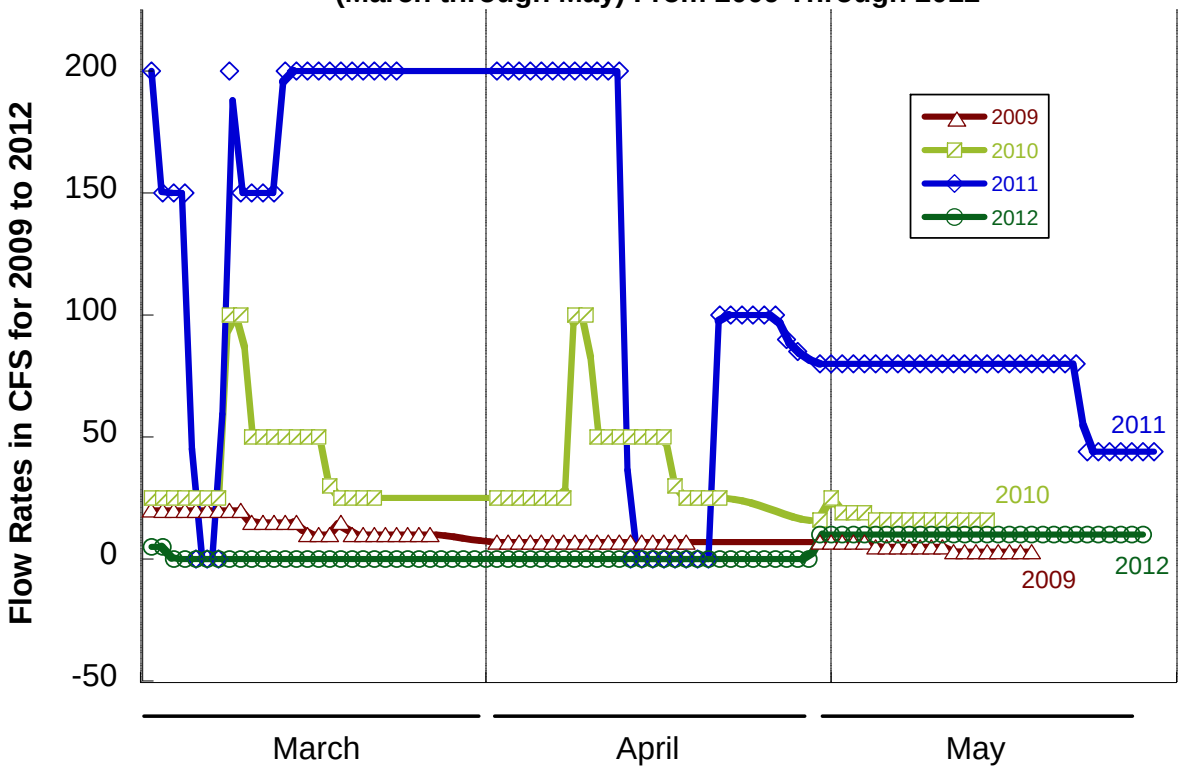


Figure 3
Flow Rates as a Function of Release Dates
(March through May) From 2009 Through 2012[1]



[1] Missing days of flow rate data were assumed to have flow rates equal to days immediately prior to and after those days

Flow data is available that can be compared to the same years as the Santa Ana sucker population survey data (Figures 1 and 3). As illustrated in Figure 3, March 13, 2011 through April 12, 2011 had the highest flow releases of any of the four years of data analyzed. During this time period, a total of 27 of 31 days were at releases of 200 cubic feet per second (cfs), with the remaining 4 days at 150 cfs.

PROJECT DEWATERING PROGRAM

The reservoir is expected to be at a minimum pool elevation of currently estimated at 2,188 ft at the end of the rainy season (April 15th). During each year of sediment removal, dewatering activities would start on or shortly after April 15th. The Contractor would be responsible for two initial tasks: (1) installing a bypass line to direct inflow from upstream of the reservoir into the plunge pool thus "bypassing" the work area in the reservoir, and (2) dewatering the plunge pool and relocating any special status fish[2] from the plunge pool to downstream areas. These efforts are anticipated to take approximately five days.

As the fish relocation efforts are occurring, all valves would be closed; no water releases would occur from the dam into the plunge pool. During this time, recession flows (inflow into the reservoir) would pond behind the dam. Wet and average season recession flows (which are estimated through modeling) show that, in a wet year, the reservoir would rise to elevation of 2,221 feet and in an average year, the reservoir would rise to 2,207 feet (calculated using the average recession flow rates). In a dry year, the flows would be negligible. For the purpose of preparing a conservative analysis with respect to potential impacts to the SAS, only the wet year scenario (i.e., rainfall greater than 32 inches) is considered. The wet year scenario would require the most water to be released from the dam, thus, it is the worst-case scenario that should be evaluated with respect to the Santa Ana sucker. The average inflow to Big Tujunga Reservoir during the months of April and May in a wet year is estimated to be 72.5 cfs.

Table 1 presents the proposed dewatering schedule for a typical wet year; it should be noted that timing and intensity of storms of the rainy season could modify the schedule. This is the anticipated schedule that LACDPW would adhere to during a wet year to dewater the reservoir after April 15th. As previously mentioned, per discussions with County staff, the dam operators typically release flows from the dam to reach a "minimum pool" by April 15th; therefore, dam operations prior to April 15th are considered to be a part of typical operations and are not considered to be dewatering activities associated with the Project.

[2] Arroyo chub (*Gila orcutti*) and Santa Ana speckled dace (*Rhinichthys osailolus*) are known to occur in the plunge pool. Santa Ana sucker has not been found within the plunge pool, but is known to occur in the Big Tujunga creek just below the plunge pool.

TABLE 1
PROPOSED "WET YEAR" DEWATERING SCHEDULE

Day	Time	Dam Flows	Estimated Elevation
1	All Day	None (Close Valves)	2,188
2	All Day	None (Close Valves)	–
3	All Day	None (Close Valves)	–
4	All Day	None (Close Valves)	–
5	All Day	None (Close Valves)	2,221
6	8:00 am to 3:00 pm	Ramp from15 cfs to 60 cfs	2,222
7	8:00 am to 3:00 pm	Ramp from 75 cfs to 100 cfs	2,221
8	All Day	120 cfs	2,220
9	All Day	140 cfs	2,216
10	All Day	160 cfs	2,210
11	All Day	180 cfs	2,202
12	8:00 am to 5:00 pm	180 cfs*	2,188
13	All Day	82.5 cfs	–
14	All Day	82.5 cfs	–
15	All Day	82.5 cfs	–
16	All Day	82.5 cfs	–
17	All Day	82.5 cfs	–
18	All Day	82.5 cfs	–
19	All Day	82.5 cfs	–
20	All Day	82.5 cfs	–
21	All Day	82.5 cfs	–
22	All Day	82.5 cfs	–
23	All Day	82.5 cfs	–
24	All Day	82.5 cfs	–
25	12:00 am to 3:00 am	82.5 cfs	2170

Although not specifically shown through a change in valve pressure in this table, the flows would ramp down naturally as the water approaches elevation 2,188 feet (current minimum pool) and there is less water pressure from water in the reservoir (Chimienti 2013).

The Contractor would begin dewatering the plunge pool and installing the water diversion system no sooner than April 15th. For five days, the Contractor would dewater the plunge pool and begin to install the bypass line and upstream cofferdam. A qualified Biologist would perform fish relocation in the plunge poolif needed. During these five days, all valves on the dam would remain closed and inflow to the reservoir would pond behind the dam. Although the valves to the dam would be closed, pumping to dewater the plunge pool and leakage from the dam would still provide water to Big Tujunga Creek downstream of the dam.

At the end of the 5 days, ponded water would have reached elevation of 2,221 feet based on an average inflow of 72.5 cfs in a wet year. At this time, Valve A-1 would be used to release water starting at 15 cfs and ramping flows up to 180 cfs (Table 1). It would take approximately 5 days of ramping flows to reach an outflow of 180 cfs. After 1 additional day of releasing at 180 cfs, the water elevation would be below the elevation of the inlet riser for Penstock 1, which is 2,188 feet. At this time, either Valve 2 would be used or pumps would be used to continue to dewater

the reservoir. Therefore, in total, approximately 5 days of ramping releases from 0 to 160 cfs, and 2 additional days of releases at 180 cfs, would be required to dewater the reservoir in a wet year from an elevation of 2,221 feet to an elevation of 2,188 feet. Flows would ramp down (decrease) naturally as the water approaches minimum pool since there will be less water pressure from the depth of water in the reservoir to push flow through the outlet. (Chimienti 2013).

At this point, the Contractor would have completed installation of the upstream bypass line (a high density polyethylene pipe), and inflows to the reservoir would then be diverted past the reservoir directly into Penstock 1 or 2. The Contractor would use a floating barge and pumps to continue to dewater the reservoir from an elevation of 2,188 feet to the top of sediment elevation at 2,170 feet. The pumps would release approximately 10 cfs through either Penstock 1 or 2. The pumped water would combine with the bypass water for a total of approximately 82.5 cfs, and this outflow would continue for approximately 13 days until the reservoir is completely dewatered to an elevation of 2,170 feet (i.e., the sediment level) (Table 1). In total, the dewatering process in a wet year would take a minimum of 25 days; however, only 2 days would include releases of 180 cfs. It should be noted that this time frame is an estimate only; dewatering activities may take longer if late season storms occur late in the rainy season or after April 15th.

Dewatering activities in Year 2 and subsequent years would be similar to those in Year 1. Penstock 1 would be used to dewater the reservoir until it reaches an elevation of 2,202 feet or at the elevation of the Penstock 1 inlet riser. In order to dewater the reservoir from the elevation at 2,202 feet to the sediment level, the hydraulic slide gate may be used if the sediment in the vicinity of the gate has been removed during the previous season's sediment-removal activities.

POTENTIAL DEWATERING IMPACTS TO SANTA ANA SUCKER

A threshold (i.e., maximum) of this species' tolerance to storm or other high water flows has not yet been established. If dewatering occurs at a rate similar to a typical storm, the Santa Ana sucker can likely withstand the higher volume flows for a limited period of time. However, if dewatering flows are large enough for an extended period of time, they could displace suckers and their eggs downstream, affecting their breeding activity. In order to determine whether dewatering would affect the Santa Ana sucker, the maximum storm flow releases from the dam during the months of March and April (see Figure 3) were compared to recent Santa Ana sucker population counts (see Figure 1) recorded during long-term monitoring efforts for the Santa Ana sucker in 2009–2012 (SMEA 2010a, 2010b; BonTerra Consulting 2012, 2013).

Within the time period for which there is sucker population data, only one year (2011) had high flows for consecutive days (Figure 3). Between March 13 and April 12, 2011, 27 of 31 days included releases of 200 cfs, with the remaining 4 days at 150 cfs. This time period corresponds to the survey results in September/October 2011, which indicate that Santa Ana sucker populations were at their highest numbers (Figure 1). When examining the data by size class, the number of juveniles observed in 2011 was not significantly different from the number of juveniles observed in 2010 or 2012; the number of adults was not significantly different from the number of adults observed in 2012 and was greater than the number of adults observed in 2010 (BonTerra Consulting 2013).The data does not indicate sucker populations were impacted by increased flows from the dam during March–April 2011. Moreover, flows up to 200 cfs for 27 days during 2011 correlate to relatively strong sucker population numbers 5 months later.

It should be noted that, while the Santa Ana sucker breeding season begins in March or April, it continues into May and even into the summer months if conditions are suitable. It is not known whether the high flows for extended periods of time have any effect on sucker breeding, potentially by delaying the spawning until May. It is possible that historic high releases during a wet year result in conditions that would be suitable for the sucker to continue breeding into the later spring and early summer months, thereby offsetting potential negative effects caused by high flows in the early spring.

While one year maximum flow data is not enough to draw conclusions for the species' tolerance range, it can be assumed that the Santa Ana sucker was able to persist during the previous periods of extremely high flows (e.g., 2005, 2006). This relationship can be further examined as additional years of sucker population data are collected for the Santa Ana Sucker Working Group.

The proposed dewatering regime flow rate recommendation (i.e., maximum of 180 cfs) is within the range of flows and the below the maximum flow (i.e. 200 cfs) experienced by the Santa Ana sucker in 2011 (and during previous wet years), and is therefore not expected to affect the sucker population. As shown in Table 1, Dam operations would 'ramp' flows (i.e., step-wise increases and decreases) to mimic natural stream hydrology.

Dewatering Impact Conclusion

Flow data show that 31 days of relatively high flows (i.e., March 13, 2011–April 12, 2011) did not cause a reduction in the Santa Ana sucker population count the following fall (October 2011); therefore, it can be assumed that future flow rates at this same level and for a similar interval of time would not negatively impact the Santa Ana sucker population. As such, the proposed Dewatering Program with only two days of releases at 180 cfs after April 15th (Table 1) is not expected to impact the Santa Ana sucker population.

It should be noted that appropriate sediment controls would be in place to ensure that increased flow velocity and reservoir dewatering would not cause increased siltation impacts. The breeding season is a critical time of year for Santa Ana sucker, when egg-laying, hatching of larva, and fry rearing occur. It is critical for Best Management Practices for sediment control operate effectively because silt has the potential to smother lithic diatoms (algae) critical to the growth of early life-stages of the sucker and can cause fouling of gills in larvae and juvenile sucker. The Biological Monitor would inspect the sediment controls in the plunge pool and at the outflow into the creek downstream of the plunge pool to ensure that these protective measures are functioning properly.

DRY SEASON BYPASS FLOWS

During sediment removal, flows from Big Tujunga Creek would be taken in a bypass line around the reservoir and released into the plunge pool. Therefore, the inflow into the bypass line from the creek above the reservoir would equal the amount of outflow from the bypass downstream of the dam. During this time, the Santa Ana sucker would be completely dependent on natural flows; there would be no water in the reservoir to release to supplement the creek flows. As under natural conditions in a dry year, the stream could dry up and strand the sucker in small puddles, and could kill the sucker if the stream becomes too shallow or dries completely.

During typical operating procedures, the LACDPW generally releases water from the reservoir at the same rate as the inflow into the reservoir (Chimienti 2012); thus, the stream flows mimic

natural conditions during the dry season. A t-test analysis was performed on inflow/outflow data[3] during the months of May, June, July, August, and September to verify whether water releases during the dry season have typically equaled inflow to the reservoir. While this time period included a wide range of natural variation with both extremely dry and wet years, the analysis verifies that inflow typically equals outflow. September was the only month to show an inflow vs. outflow difference, with a mean outflow of 0.60 cfs compared to inflow of 1.6 cfs ($p < 0.0001$), which suggests that, on average, September may provide more water during bypass operations than has typically been released in this month.

Dry Season Bypass Flows Impact Conclusion

Although Santa Ana sucker population estimates were not available until 2009, the flow data between 1999 and 2012 show that there were multiple cycles of dry years and wet years, and the Santa Ana suckers were able to persist through dry years (e.g., 2002, 2007, and 2012). Additionally, as shown from the long-term monitoring data to date (2009–2012), the Santa Ana sucker population is able to recover from disturbance relatively quickly. For example, following the Station Fire in 2009, the Santa Ana sucker only occurred in two reaches (EDAW and SMEA 2009), but by 2011, they had expanded to 17 of the 18 reaches surveyed (BonTerra Consulting 2012) . Therefore, if there is a dry year and Santa Ana sucker die off (as would be expected under natural conditions [i.e. without the dam in place impounding additional water] in a dry year), the Santa Ana sucker have the capacity to recover from the disturbance within a few years. Based on observable historic data, the bypass system (inflow equal to outflow) is not expected to negatively impact the Santa Ana sucker.

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[3] It should be noted that inflow data was measured in the morning once per day compared to gauge measurements continuously taken for outflow data; continuous inflow data is not available.

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MEMORANDUM

Big Tujunga Habitat Conservation Plan
Hydraulic Analysis Supplemental Release Memo

April 8, 2019

To: Melanie Morita
Los Angeles County Public Works

From: Amber Heredia
Psomas

The purpose of this memorandum is to evaluate changes in the downstream channel hydraulics along Big Tujunga Creek as a result of supplemental releases from Big Tujunga Dam. The Los Angeles County Public Works (Public Works) began supplemental releases in 2012 upon the completion of their seismic retrofit project that added a low-flow valve. The U.S. Fish and Wildlife Service (USFWS) asked Public Works to implement supplemental releases throughout the non-storm season (April 15 to October 15) with the intention of benefitting downstream habitat that is occupied by special status fish, including the federally listed Threatened Santa Ana sucker (*Catostomus santaanae*), by increasing the amount of suitable habitat (area and depth). Public Works manages water stored in Big Tujunga Reservoir over the storm system to provide up to 1,500 acre-feet (af) of water for supplemental releases over the non-storm season. Supplemental releases add up to 5 cubic feet per second (cfs) over the base discharge during the non-storm season; however, in years of lower rainfall, it is recognized that supplemental releases may be lower than 5 cfs. During drought conditions over the last few years, supplemental releases were approximately 1 cfs to 3 cfs over the base discharge. The current analysis will assume the maximum supplemental release of 5 cfs in order to review the maximum difference in channel hydraulics with the addition of the supplemental releases. The results will support the biological impact analysis of the supplemental releases in the Big Tujunga Habitat Conservation Plan (in preparation).

The analysis is conducted by running a two-dimensional (2D) Hydrologic Engineering Center River Analysis System (HEC-RAS) hydraulic model of the stream for distinct discharge events. The supplemental release analysis builds upon the previous Big Tujunga Operation and Maintenance Habitat Conservation Plan Hydraulic Analysis Memorandum, which examined Big Tujunga Creek's hydraulic behavior for a range of discrete, steady-state discharge events, representing various operational scenarios (i.e., 5 cfs, 250 cfs, and 600 cfs) (Psomas 2019). This memorandum describes additional modeling under two low-discharge scenarios, with and without supplemental releases, to examine the resulting differences in the downstream channel hydraulics.

METHODS

HEC has added the ability to perform 2D hydraulic modeling to the unsteady flow analysis capability of HEC-RAS (version 5.0 and later). Two-dimensional modeling is accomplished by adding grid cells into a model domain and incorporating appropriate boundary conditions. The software is designed to utilize an unstructured computation mesh of cells that are orthogonal and up to eight sides. The model solves the implicit finite volume scheme of the Saint-Venant equations (or the simplified diffusion wave equations). The diffusion wave equation was selected after conducting the sensitivity analysis. The present modeling generally has low velocities without abrupt changes in depth or other hydraulic parameters. The full Saint Venant equations would significantly increase the model run time without changing the model results. This approach allows unsteady flows and wetting and drying within the model domain robustly.

Model Description

Hydraulic modeling was completed by Dr. David Jaffe using the U.S. Army Corps of Engineers' (USACE's) HEC-RAS 5.0.3. The HEC-RAS numerical model was designed to calculate water surface profiles in channels, assuming a steady flow and uniform discharge, based on site hydrology. The HEC-RAS model was run in 2D mode. A description of the model and the model set-up follows.

Governing Equations

Two-Dimensional shallow water models can be used to resolve depth and depth-averaged velocities in the horizontal directions x and y. For more information, see Chapter 2 (Unsteady Flow Hydrodynamics) in the HEC-RAS 2D Hydraulic Reference Manual (USACE 2016)

Topographic Representation and Model Extent

The HEC-RAS model domain for the study area (Exhibit 1) was developed in RAS Mapper, a subroutine of HEC-RAS, using 2015 topographic information (tested at an accuracy of +/- 2.0 feet [ft] at 95 percent confidence level) provided by Public Works. A Manning's coefficient was applied to the study reach, and hydrographs were developed as described below. The model extends from downstream of the Big Tujunga Dam plunge pool to just upstream of the Oro Vista Avenue stream crossing. Two-dimensional numerical hydraulic models are made up of individual computational cells (i.e., units of area analyzed), which can vary in size. As based on the results of a sensitivity analysis, the study model includes approximately 91,340 computational cells with an approximately 15-foot cell size (225 square feet [sqft]).

Manning's Values

HEC-RAS uses Manning's Equation to represent friction loss in the model. Manning's values were selected based on aerial (Los Angeles Region Imagery Acquisition Consortium [LARIAC] 2015) and field site photography. The Manning's values were set to n = 0.085, which would be representative of a range of channel morphology in the study area's canyon section including relatively narrow channel widths, relatively steep bed slopes, sandy beds, and variable (but frequently dense) vegetation. These values follow guidance for the selection of Manning's values as presented in Barnes (1967) and Chow (1959).

A Release Attenuation Study was planned to calibrate the roughness against observed runoff and depth; however, it was not able to be carried out due to complications with obtaining authorization for a relatively large release from the Dam during the time frame needed to complete the model for the project. If the Release Attenuation Study is possible in the future (potentially during the storm season), the Manning's value could be adjusted to verify and/or calibrate the model.

Boundary Conditions

The downstream model boundary condition was set to normal depth, while the inflowing boundary condition was set to an inflowing discharge. The model considered only inflow from Big Tujunga Reservoir; tributary and groundwater inflows were excluded. Loss in the model was only a function of friction and topography.

Hydrology

To determine the base flow released during the non-storm season, a discharge series was developed based on the monthly natural inflow to Big Tujunga Reservoir. Because Public Works discharges 100 percent of non-storm season inflows, the characteristic discharge is commensurate with outflow. The discharge series was developed by averaging the inflow to Big Tujunga Reservoir daily for the periods 1998 -2009 and 2012-2017. Daily averaging was completed from April 15 to October 15 of all years on record. Then,

the mean and median monthly inflow were calculated for each 30-day period of averaged daily data; the mean and median were compared and found to be within 0.5 cfs for each month. The mean discharge value was selected to represent the monthly characteristic discharge released from Big Tujunga Reservoir for the numeric model (Table 1). Thus, the model represents six months in time with the mean discharge value adjusted monthly to represent the decrease in inflow over the non-storm season. The supplemental releases are represented in the discharge series by adding 5 cfs to the mean discharge value and running the model over the same six-month series (Table 1).

TABLE 1
DISCHARGE SERIES FOR NON-STORM SEASON RELEASES
EVALUATED IN THE HEC-RAS MODEL

Month	Median Q (cfs) without Supplemental Releases	Median Q (cfs) with Supplemental Releases
April 15 – May 14	16.4	21.4
May 15 – June 14	9.7	14.7
June 15 – July 14	6.4	11.4
July 15 – August 14	5.0	10.0
August 15 – September 14	2.8	7.8
September 15 – October 14	2.6	7.6

Hydraulic Assumptions

Modeling used in this study is uncalibrated hydraulically because no data exists with which to calibrate the model; no data that compares discharge to depth, velocity, or other hydraulic parameters exists. It is assumed that the present modeling is conservative, as it does not consider evaporation, infiltration, evapotranspiration, or other forms of loss besides friction and topography (i.e., abstraction). Attenuation in the model is only a function of friction.

Two culverts are present in the model: the Dam Access Road located immediately downstream of the plunge pool and the La Paloma Road (upstream of the intersection of Vogel Flat Road and Stoneyvale Road). Other bridges in the study area span Big Tujunga Creek (e.g., Big Tujunga Canyon Road Bridge No. 1 and No. 2). Psomas decided to model the system without bridges and/or culverts because of the 5.0.3 HEC-RAS functionality and because the structures do not have a significant impact on the outcome of the study.

The model runs will be reported at 48-hour output intervals for April-May, May-June, June-July, and July-August discharges (>3 cfs), and 72-hour output intervals for the August-September and September-October discharges (<3 cfs). The output intervals are developed to allow the discharges to travel the full length of the study area, from the Big Tujunga Dam plunge pool to the Oro Vista Avenue stream crossing.

RESULTS

The HEC-RAS model was run for two representative monthly time series: monthly characteristic outflow without supplemental releases and monthly characteristic outflow with supplemental releases. This section compares maximum area, depth, and velocity for each modeled discharge event.

The area of inundation is shown in Table 2 and Exhibits 2A–2D. As expected, the area of inundation decreases through the non-storm season, as the median discharge for each period decreases. The change in inundation acreages ranges from 2.67 acres in April-May to 6.27 acres in September-October, representing a change from 6.1 percent to 17.7 percent, respectively. The increase in inundated area

includes a slight increase in width of active stream throughout the study area and a few areas where previously dry braids become active (Exhibit 2D, Sheets 3 and 4).

TABLE 2
AREA OF INUNDATION WITH AND WITHOUT SUPPLEMENTAL RELEASES

Month	Median Q (cfs) without Supplemental Releases	Median Q (cfs) with Supplemental Releases	Area of Inundation without Supplemental Releases (acres)	Area of Inundation with Supplemental Releases (acres)	Difference (acres)	Percent change (%)
April 15 – May 14	16.4	21.4	41.37	44.04	2.67	6.1
May 15 – June 14	9.7	14.7	36.93	40.58	3.65	9.0
June 15 – July 14	6.4	11.4	34.13	38.47	4.34	11.3
July 15 – August 14	5.0	10.0	32.62	37.44	4.82	12.9
August 15 – September 14	2.8	7.8	29.59	35.66	6.07	17.0
September 15 – October 14	2.6	7.6	29.21	35.48	6.27	17.7

The maximum depth occurs in April and is shown in Table 3 and Exhibits 3A–3B. As expected, the maximum depth decreases through the non-storm season, as the median discharge for each period decreases. The change in maximum depth ranges from 0.1 foot (1.2 inches) in April-May to 0.2 foot (2.4 inches) in September-October, representing a change from 1.5 percent to 3.3 percent, respectively. The biggest change in maximum depth occurs in September-October; the increase in maximum depth ranges from 0.0 to 0.2 inch along the active stream throughout the study area with a slightly larger increase of 0.2 to 0.5 inch in pools (Exhibit 3B). The increase in maximum depth as a result of the supplemental releases suggests that it is only minimally increased by the supplemental releases.

TABLE 3
MAXIMUM DEPTH WITH AND WITHOUT SUPPLEMENTAL RELEASES

Month	Median Q (cfs) without Supplemental Releases	Median Q (cfs) with Supplemental Releases	Maximum Depth without Supplemental Releases (feet)	Maximum Depth with Supplemental Releases (feet)	Difference (feet)	Percent change (%)
April 15 – May 14	16.4	21.4	6.4	6.5	0.1	1.5
May 15 – June 14	9.7	14.7	6.2	6.4	0.2	3.1
June 15 – July 14	6.4	11.4	6.1	6.3	0.2	3.2
July 15 – August 14	5.0	10.0	6.0	6.2	0.2	3.2
August 15 – September 14	2.8	7.8	5.9	6.1	0.2	3.3
September 15 – October 14	2.6	7.6	5.9	6.1	0.2	3.3

The average depth is shown in Table 4 and Exhibits 4A–4D. As expected, the average depth decreases through the non-storm season, as the median discharge for each period decreases. The change in average depth ranges from 0.05 foot (0.60 inch) in April-May to 0.09 foot (1.10 inch) in September-October, representing a change that ranges from 7.2 percent to 16.4 percent, respectively. The average depth over the entire time series is approximately 0.07 feet (0.8 inch) deeper with the supplemental releases; many areas along the active stream range from 1.0 to 2.4 inches deeper with pools increasing by 2.4 to 3.2 inches (Exhibit 4D). The small change in average depth suggests that it is not substantially increased by the supplemental releases.

TABLE 4
AVERAGE DEPTH WITH AND WITHOUT SUPPLEMENTAL RELEASES

Month	Median Q (cfs) without Supplemental Releases	Median Q (cfs) with Supplemental Releases	Average Depth without Supplemental Releases (feet)	Average Depth with Supplemental Releases (feet)	Difference (feet)	Percent change (%)
April 15 – May 14	16.4	21.4	0.64	0.69	0.05	7.2
May 15 – June 14	9.7	14.7	0.57	0.63	0.06	9.5
June 15 – July 14	6.4	11.4	0.53	0.59	0.06	10.2
July 15 – August 14	5.0	10.0	0.51	0.58	0.07	12.1
August 15 – September 14	2.8	7.8	0.47	0.55	0.08	14.5
September 15 – October 14	2.6	7.6	0.46	0.55	0.09	16.4
Average (whole time series)	N/A	N/A	0.53	0.60	0.07	11.7

The maximum velocity is shown in Table 5 and Exhibits 5A–5B. As expected, the maximum velocity decreases through the non-storm season, as the median discharge for each period decreases. The change in maximum velocity ranges from 0.2 feet per second (fps) in April-May to 0.9 fps in September-October, representing a change from 5.3 percent to 31.0 percent, respectively. For most areas along the active stream, the increase in maximum velocity is 0.2 to 0.4 fps with smaller segments increasing more (0.4 to 0.6 fps or 0.8 to 2.9 fps) and larger pools increasing less (0.0 to 0.2 fps) (Exhibit 5B). The increase in maximum velocity suggests that it is moderately increased by supplemental releases.

TABLE 5
MAXIMUM VELOCITY WITH AND WITHOUT SUPPLEMENTAL RELEASES

Month	Median Q (cfs) without Supplemental Releases	Median Q (cfs) with Supplemental Releases	Maximum Velocity without Supplemental Releases (feet per second)	Maximum Velocity with Supplemental Releases (feet per second)	Difference (feet per second)	Percent change (%)
April 15 – May 14	16.4	21.4	3.6	3.8	0.2	5.3
May 15 – June 14	9.7	14.7	3.1	3.5	0.4	11.4
June 15 – July 14	6.4	11.4	2.7	3.2	0.5	15.6
July 15 – August 14	5.0	10.0	2.5	3.1	0.6	19.4
August 15 – September 14	2.8	7.8	2.0	2.9	0.9	31.0
September 15 – October 14	2.6	7.6	2.0	2.9	0.9	31.0

The average velocity is shown in Table 6 and Exhibits 6A–6D. As expected, the average velocity decreases through the non-storm season, as the median discharge for each period decreases. The change in average velocity ranges from 0.09 fps in April-May to 0.21 fps in September-October, representing a change from 10.0 percent to 35.6 percent, respectively. The average velocity over the entire time series is approximately 0.2 fps faster with the supplemental releases; the difference is greater at the downstream end of the study area (Exhibit 6D, Sheets 9–15). The increase in average velocity suggests that it is moderately increased by the supplemental releases.

TABLE 6
AVERAGE VELOCITY WITH AND WITHOUT SUPPLEMENTAL RELEASES

Month	Median Q (cfs) without Supplemental Releases	Median Q (cfs) with Supplemental Releases	Average Velocity without Supplemental Releases (feet per second)	Average Velocity with Supplemental Releases (feet per second)	Difference (feet per second)	Percent change (%)
April 15 – May 14	16.4	21.4	0.81	0.90	0.09	10.0
May 15 – June 14	9.7	14.7	0.66	0.77	0.11	14.3
June 15 – July 14	6.4	11.4	0.55	0.70	0.15	21.4
July 15 – August 14	5.0	10.0	0.50	0.66	0.16	24.2
August 15 – September 14	2.8	7.8	0.39	0.60	0.21	35.0
September 15 – October 14	2.6	7.6	0.38	0.59	0.21	35.6
Average (whole time series)	N/A	N/A	0.54	0.70	0.20	28.6

Following the above analysis, the additional wetted areas inundated by the supplemental releases (2.67 acres in April-May to 6.27 acres in September-October; Table 2) were examined. The analysis results for these additional wetted areas are shown in Table 7 and Exhibits 7A-7B. The average velocity for these areas ranges from 0.57 fps to 0.69 fps. The average depth for these areas ranges from 0.05 foot (0.60 inch) to 0.10 foot (1.10 inch). These averages indicate that the areas wetted by the supplemental releases are generally limited to flow depths of 1 inch and velocities much less than 1 fps (0.61 fps).

TABLE 7
AREAS WETTED BY SUPPLEMENTAL RELEASES

Month	Median Q (cfs) without Supplemental Releases	Median Q (cfs) with Supplemental Releases	Additional Wetted Area (acres)	Average Velocity for Additional Wetted Area (feet per second)	Average Depth for Additional Wetted Area (feet)
April 15 – May 14	16.4	21.4	2.67	0.69	0.05
May 15 – June 14	9.7	14.7	3.65	0.63	0.06
June 15 – July 14	6.4	11.4	4.34	0.60	0.07
July 15 – August 14	5.0	10.0	4.82	0.60	0.08
August 15 – September 14	2.8	7.8	6.07	0.58	0.09
September 15 – October 14	2.6	7.6	6.27	0.57	0.10
Average (whole time series)	N/A	N/A	4.64	0.61	0.08

SUMMARY

The 2D functionality of HEC-RAS was used to model Big Tujunga Creek from downstream of the Big Tujunga Dam plunge pool to just upstream of the Oro Vista Avenue stream crossing to compare the stream hydraulics with and without supplemental releases between April 15 and October 15. Results indicate that the supplemental releases add from 2.67 to 6.27 acres of additional wetted areas; however, these additional areas are generally limited to flow depths of 1 inch and velocities much less than 1 fps. The supplemental releases result in small increases in maximum depth (less than 0.2-foot increase for most of the active stream) and small increases in average depth (average depth increase of 0.8 inch). The supplemental releases result in a moderate increase in both maximum velocity (0.2 to 0.4 fps for most of the active stream, larger increases in segments) and a moderate increase in average velocity (average 0.2 fps faster).

The model results illustrate the model's ability to capture distinct flow patterns in the study area, including braiding and relatively small changes in velocity and depth. While the model Manning's value has not been calibrated, model output indicates that the model robustness is able to distinguish relatively fine-scale stream flow features along the length of the study area. The model is included as Attachment A.

Attachments: Exhibits 1 – 7
A – HEC-RAS model files (digital)

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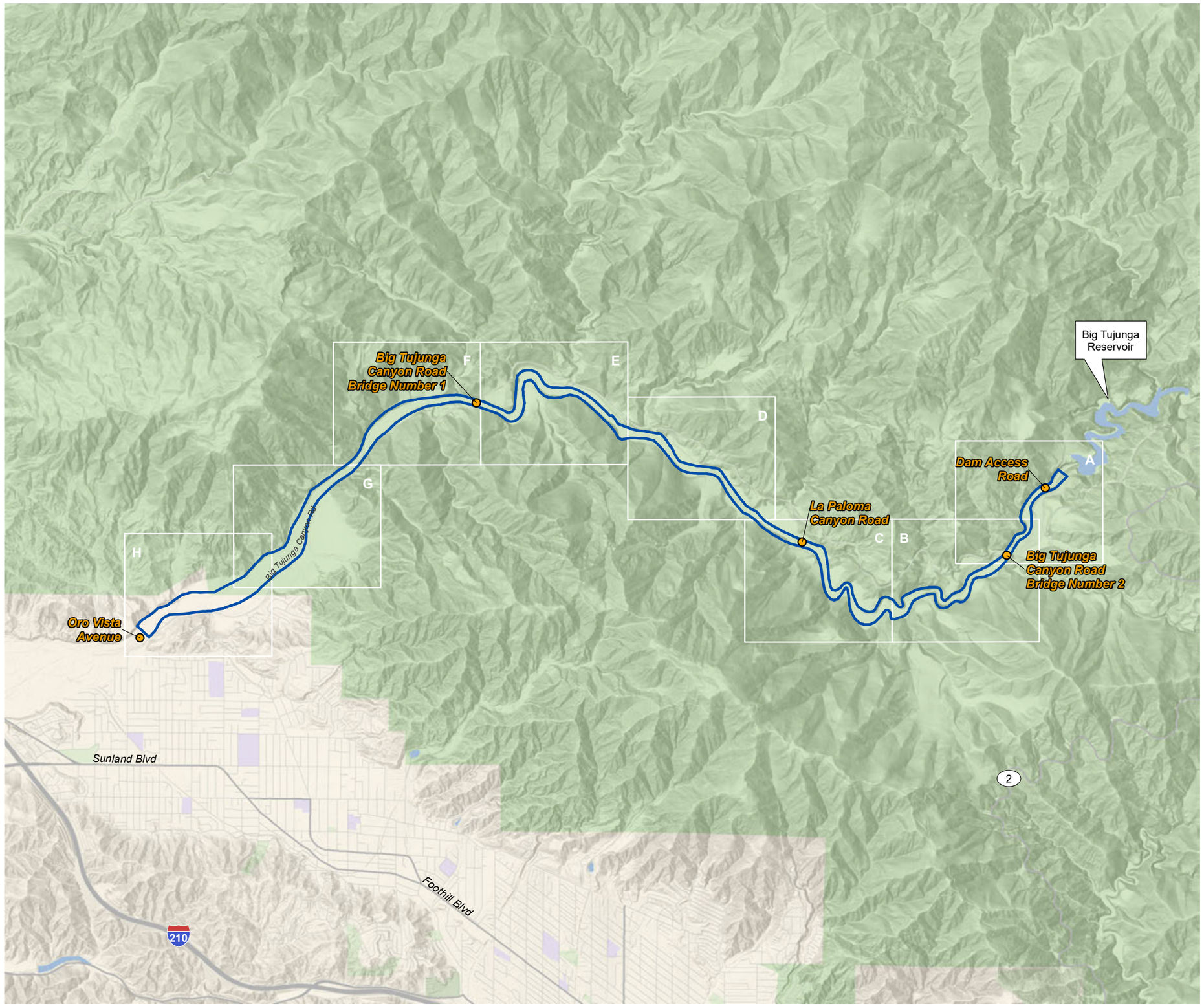

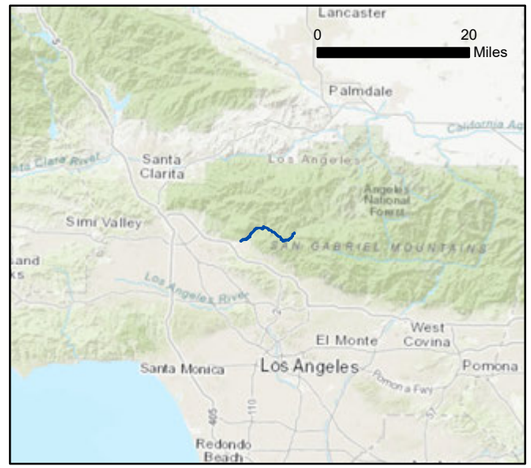

Stream Crossing Location

Study Area

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Feet

Aerial Source: LAR-IAC 2014

Study Area

Exhibit 1

Big Tujunga Creek HEC-RAS Model

PSOMAS

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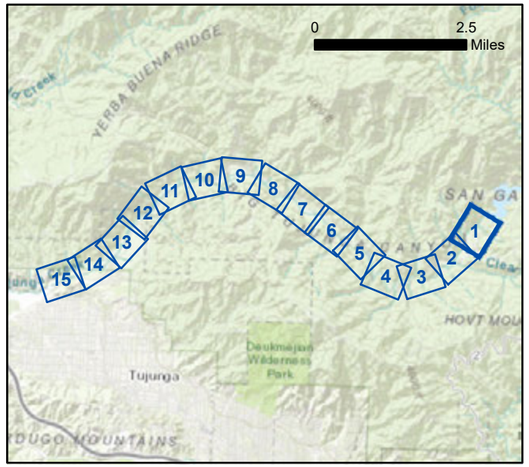
Without Releases





With Releases



Inundation Area

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Feet

Aerial Source: LAR-IAC 2014

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Extent of Inundation (April)	Exhibit 2A Sheet 1
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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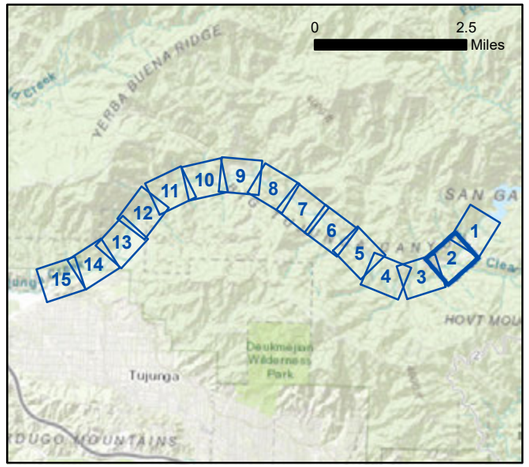

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (April)

Exhibit 2A
Sheet 2

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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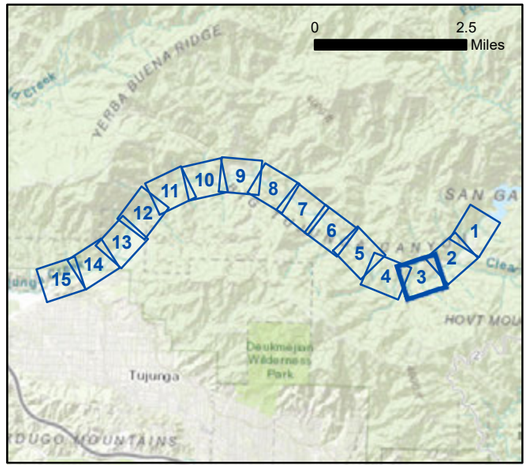
Without Releases





With Releases



Inundation Area

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Feet

Aerial Source: LAR-IAC 2014

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Extent of Inundation (April)	Exhibit 2A Sheet 3
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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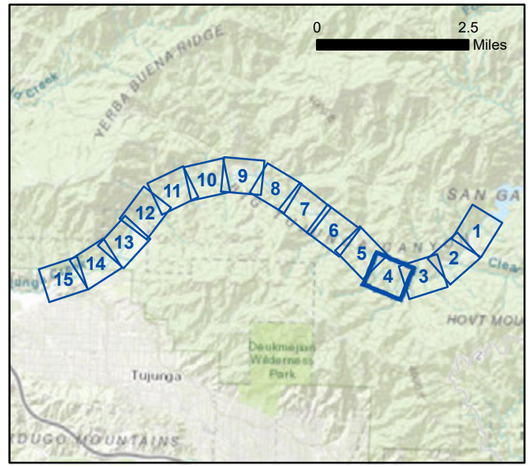
Without Releases





With Releases



Inundation Area

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (April)	Exhibit 2A Sheet 4
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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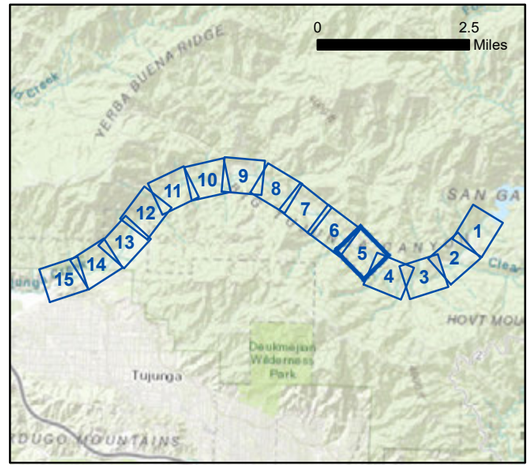
Without Releases





With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (April)

Exhibit 2A Sheet 5

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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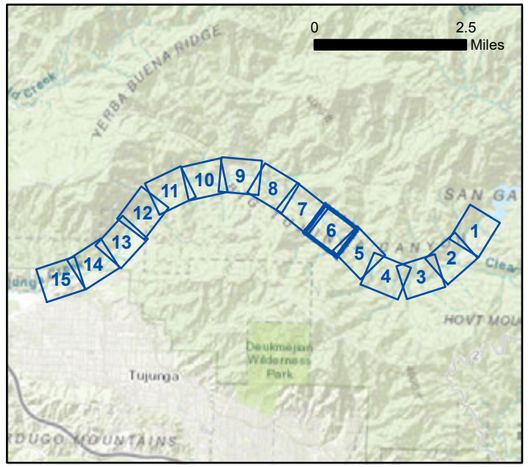
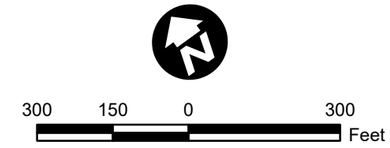


With Releases



Inundation Area



Aerial Source: LAR-IAC 2014

Extent of Inundation (April)

Exhibit 2A Sheet 6

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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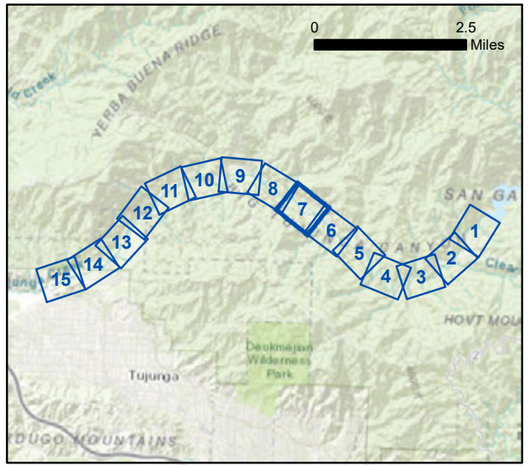

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Extent of Inundation (April)

Exhibit 2A
Sheet 7

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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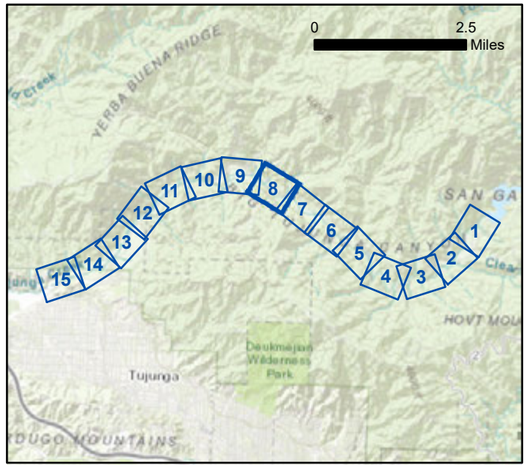

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Extent of Inundation (April)

Exhibit 2A
Sheet 8

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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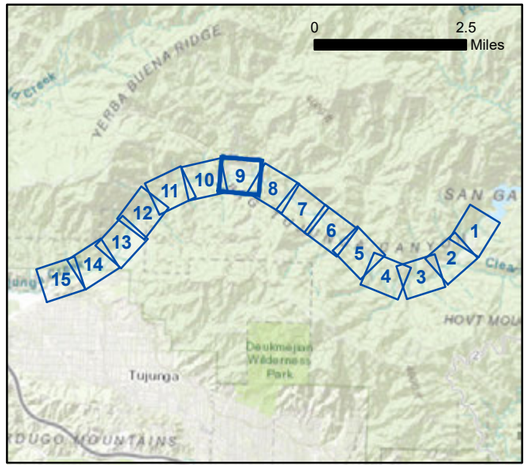
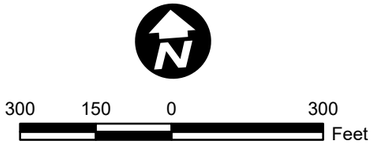


With Releases



Inundation Area



Aerial Source: LAR-IAC 2014

Extent of Inundation (April)

Exhibit 2A
Sheet 9

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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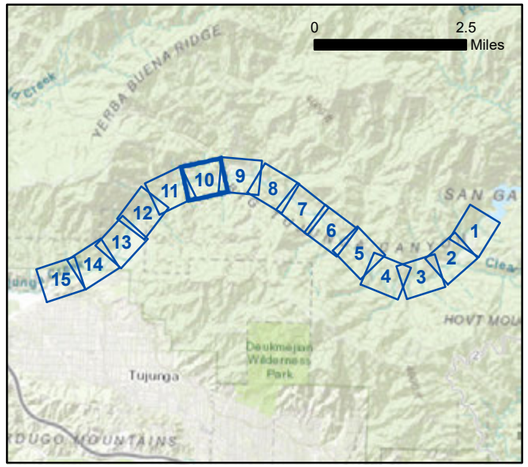

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (April)

Exhibit 2A
Sheet 10

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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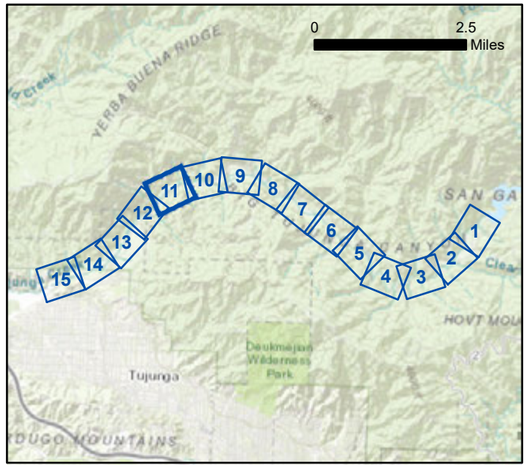

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (April)	Exhibit 2A Sheet 11
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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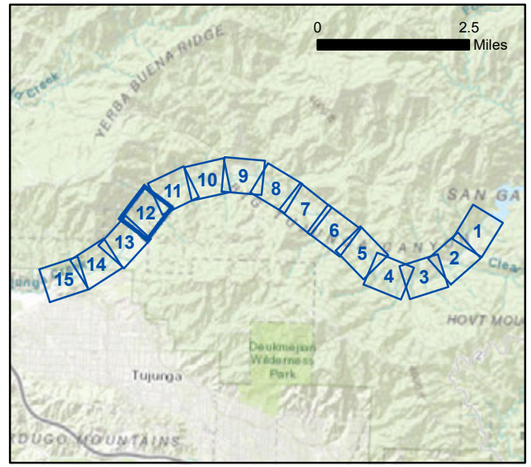

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (April)	Exhibit 2A Sheet 12
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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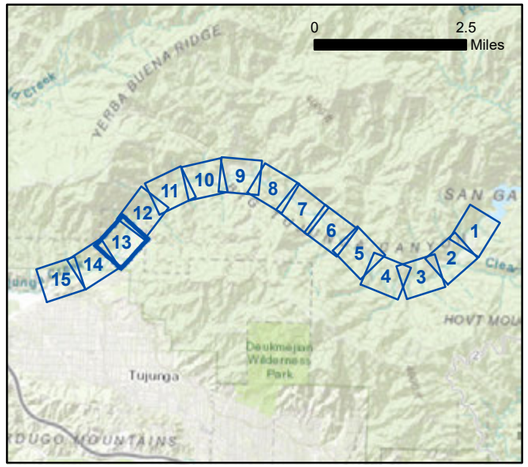

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (April)

Exhibit 2A
Sheet 13

Big Tujunga Dam – Supplemental Release Study

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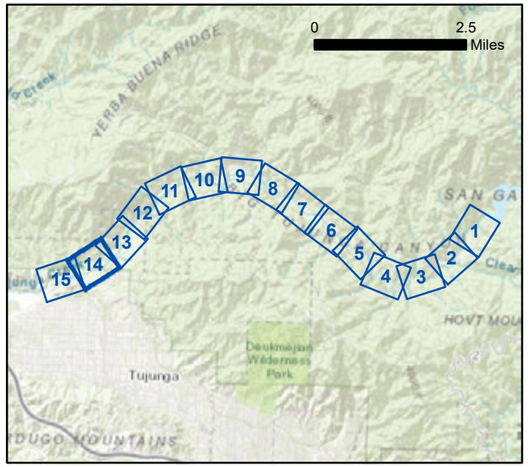

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (April)

Exhibit 2A
Sheet 14

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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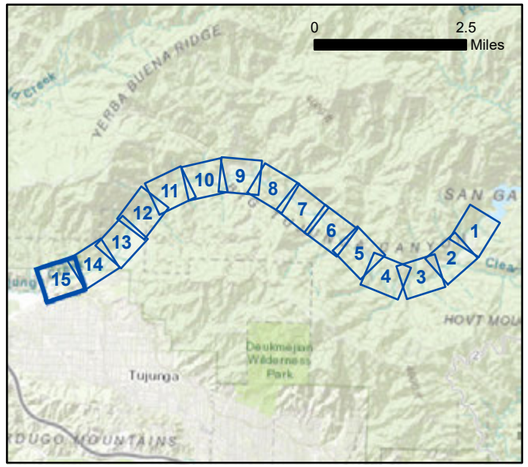

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (April)

Exhibit 2A
Sheet 15

Big Tujunga Dam – Supplemental Release Study

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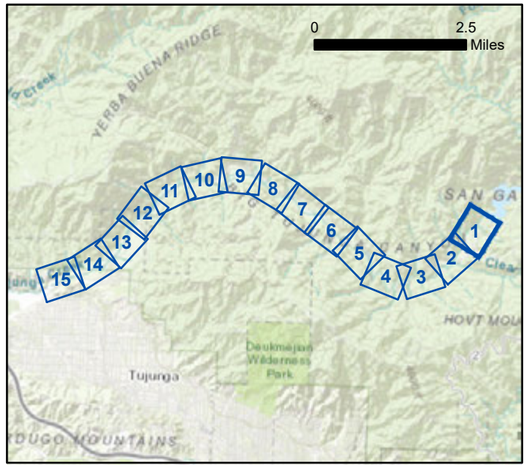

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (June)

Exhibit 2B Sheet 1

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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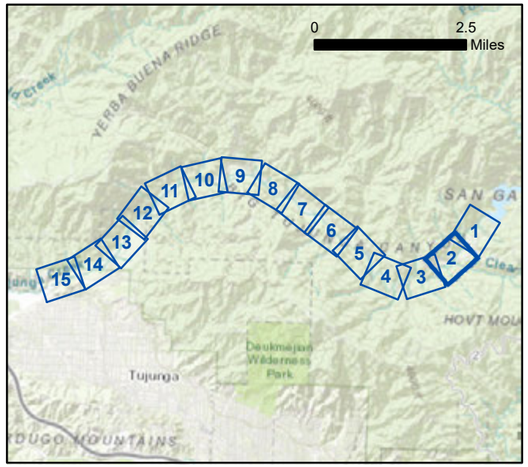

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (June)

Exhibit 2B
Sheet 2

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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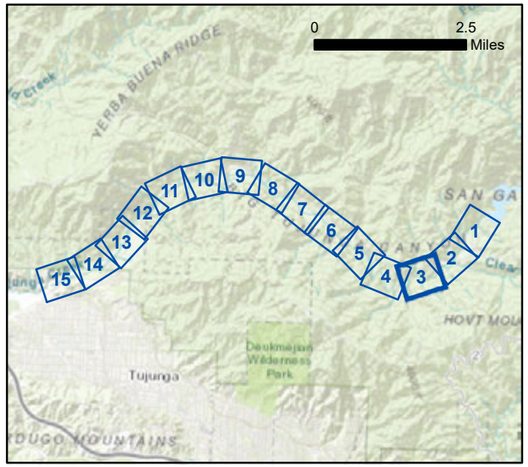

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Extent of Inundation (June)	Exhibit 2B Sheet 3
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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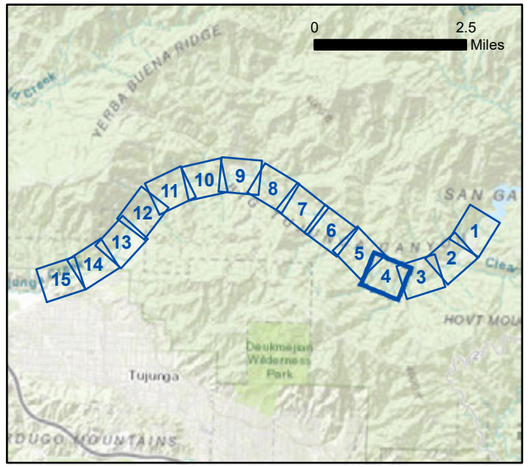

With Releases



Inundation Area

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (June)	Exhibit 2B Sheet 4
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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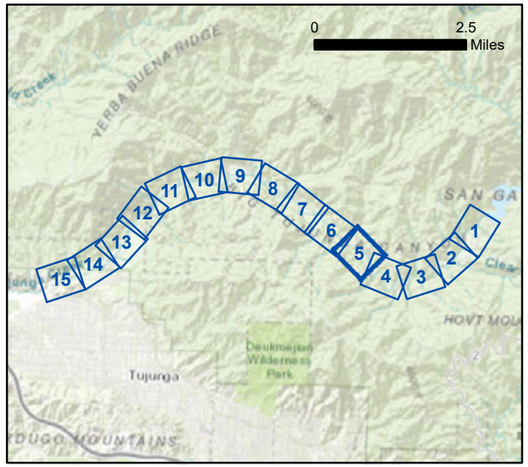
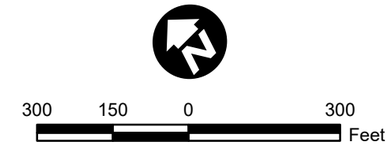


With Releases



Inundation Area



Aerial Source: LAR-IAC 2014

Extent of Inundation (June)

Exhibit 2B Sheet 5

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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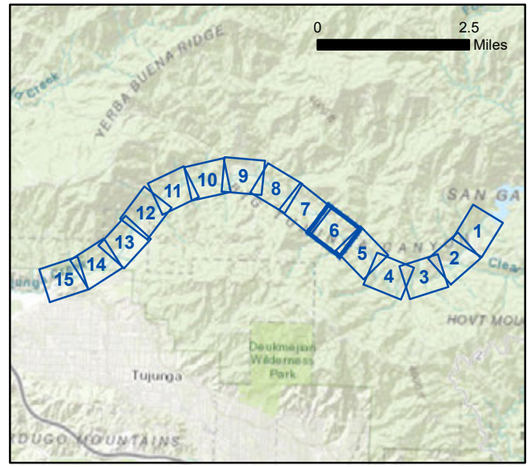
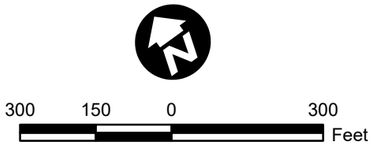


With Releases



Inundation Area



Aerial Source: LAR-IAC 2014

Extent of Inundation (June)

Exhibit 2B Sheet 6

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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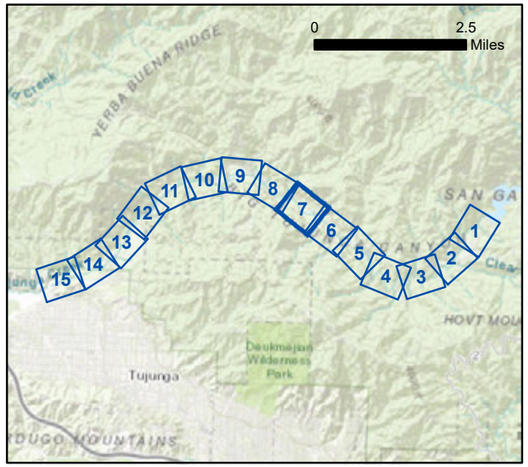

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Extent of Inundation (June)

Exhibit 2B
Sheet 7

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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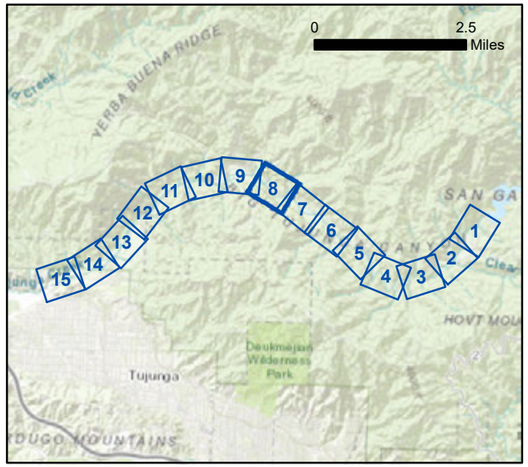
Without Releases





With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (June)

Exhibit 2B
Sheet 8

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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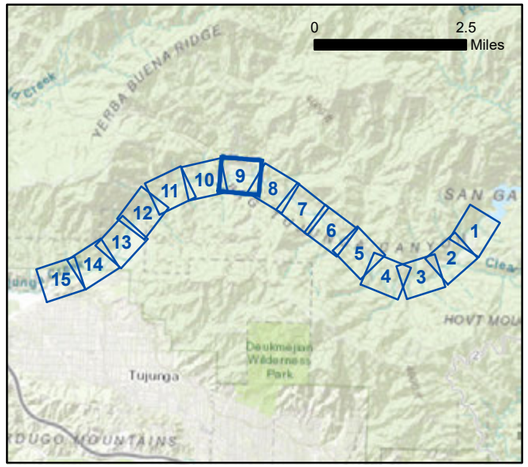

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (June)

Exhibit 2B
Sheet 9

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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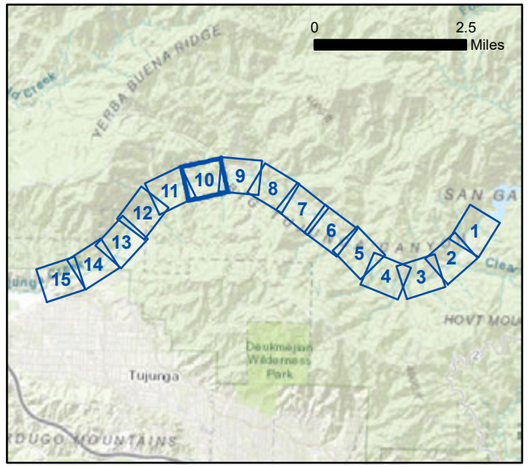

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (June)

Exhibit 2B
Sheet 10

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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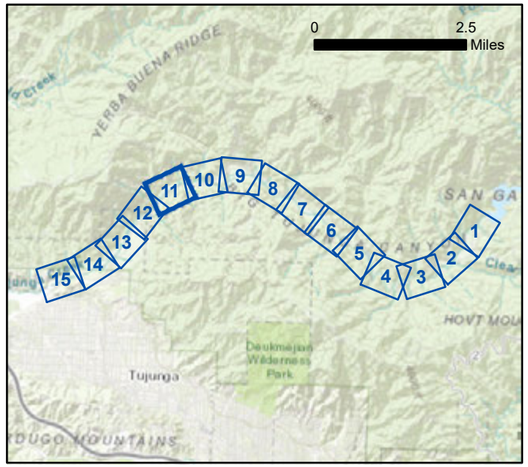

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (June)	Exhibit 2B Sheet 11
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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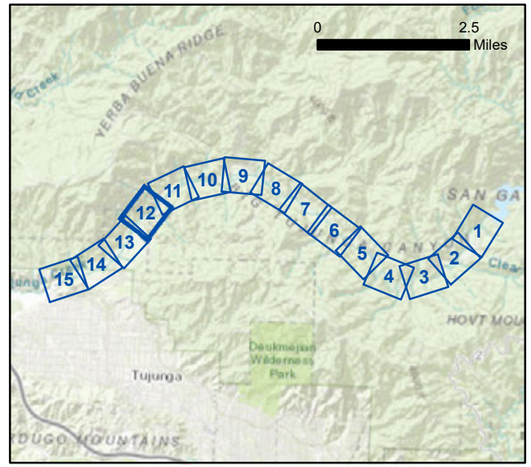

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (June)

Exhibit 2B
Sheet 12

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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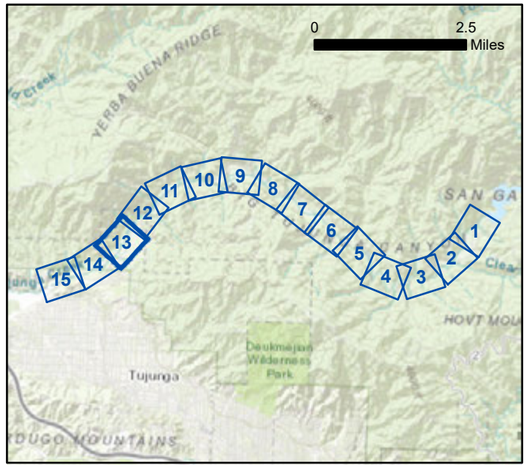

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (June)

Exhibit 2B
Sheet 13

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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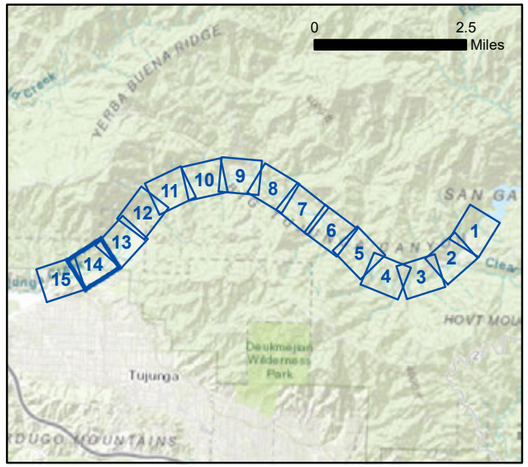

With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (June)

Exhibit 2B
Sheet 14

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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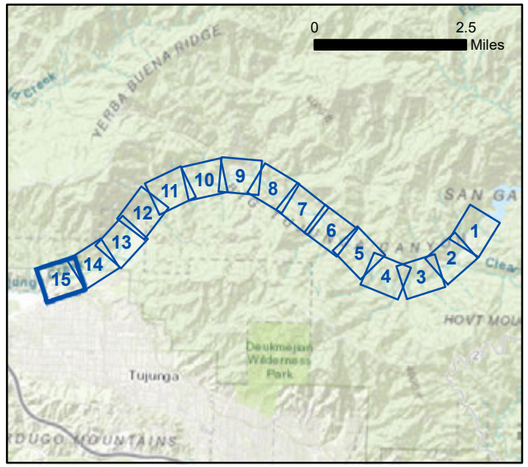
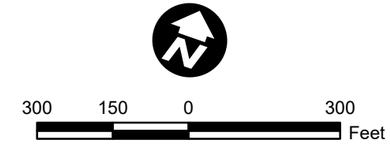


With Releases



Inundation Area



Aerial Source: LAR-IAC 2014

Extent of Inundation (June)

Exhibit 2B
Sheet 15

Big Tujunga Dam – Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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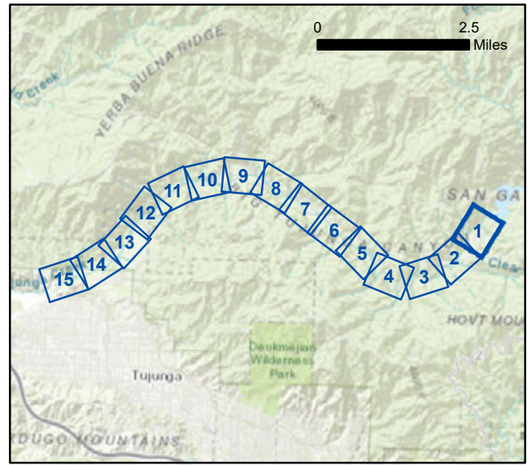
Without Releases





With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Extent of Inundation (September)

Exhibit 2C
Sheet 1

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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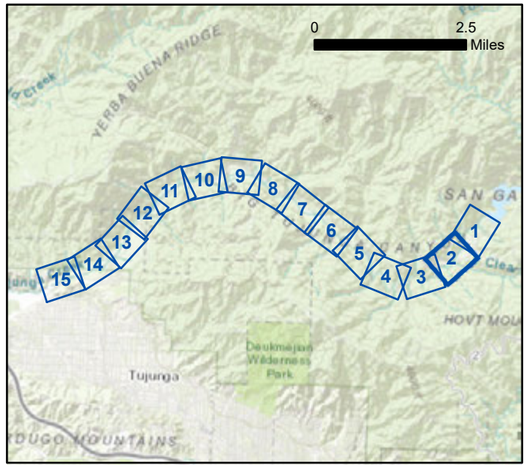
Without Releases





With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (September)

Exhibit 2C
Sheet 2

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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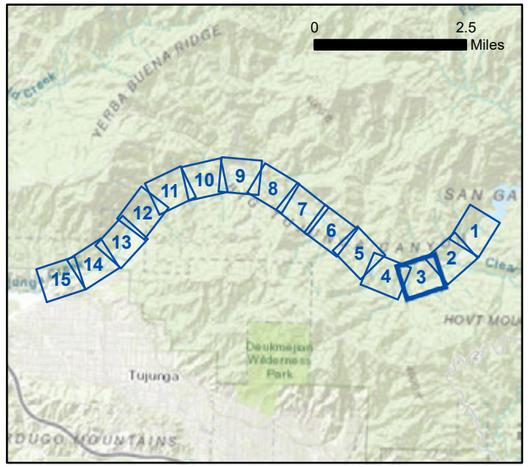
D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases





With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Extent of Inundation (September)

Exhibit 2C
Sheet 3

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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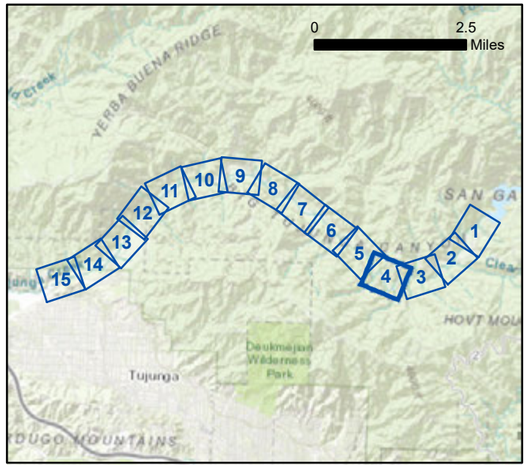
Without Releases





With Releases



Inundation Area

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (September)	Exhibit 2C Sheet 4
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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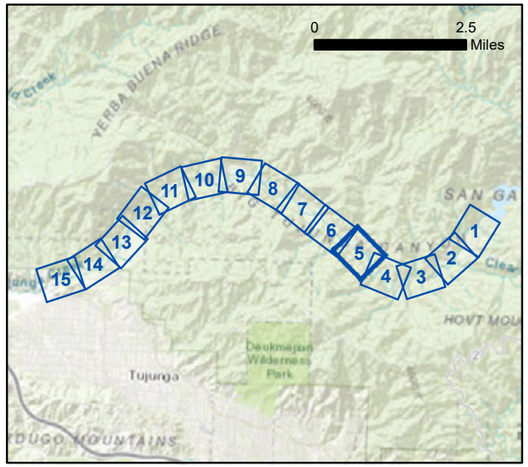
Without Releases





With Releases



Inundation Area

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (September)

Exhibit 2C
Sheet 5

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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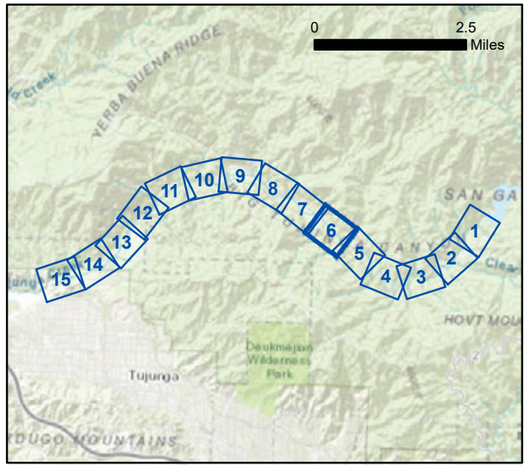
Without Releases





With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Extent of Inundation (September)

Exhibit 2C
Sheet 6

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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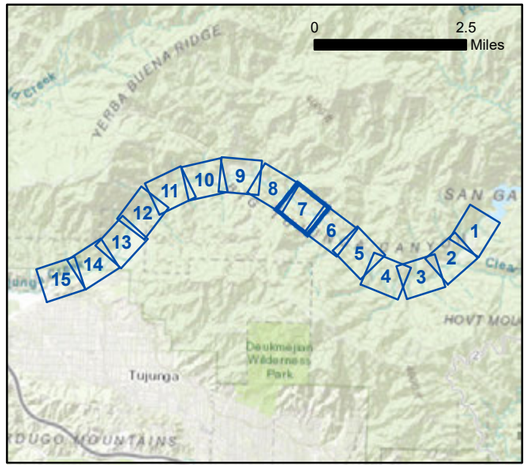
Without Releases



With Releases





Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (September)

Exhibit 2C Sheet 7

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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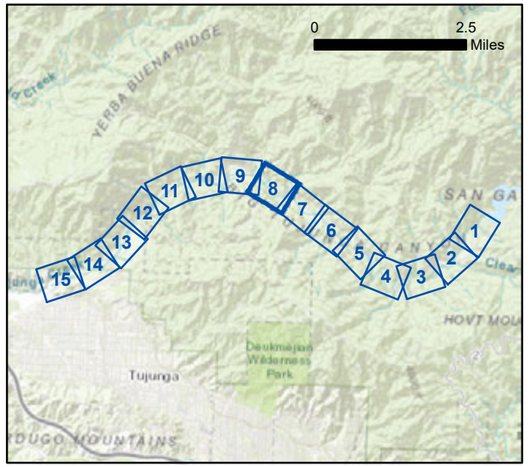
Without Releases





With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (September)

Exhibit 2C
Sheet 8

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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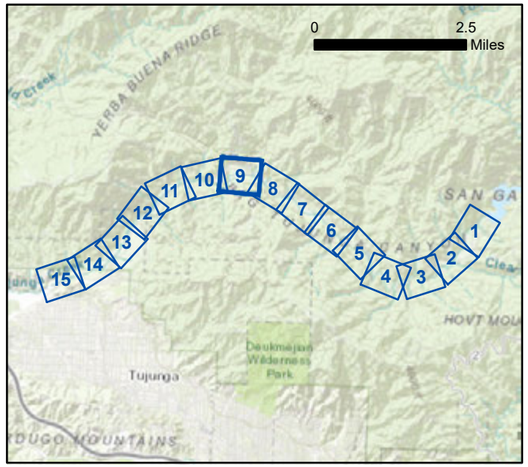
Without Releases





With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (September)

Exhibit 2C
Sheet 9

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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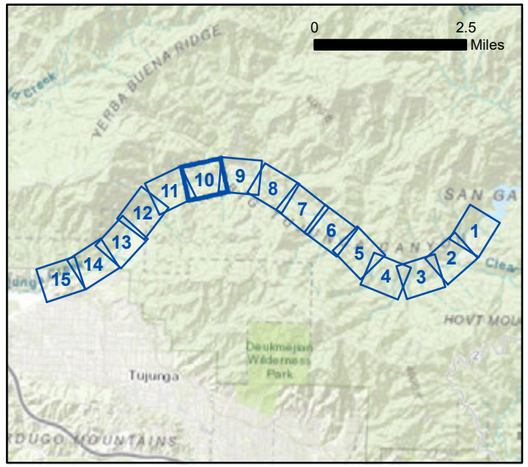
Without Releases





With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (September)

Exhibit 2C
Sheet 10

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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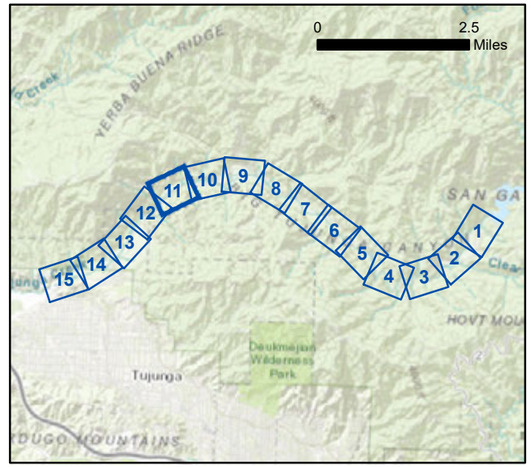
Without Releases



With Releases





Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (September)

Exhibit 2C
Sheet 11

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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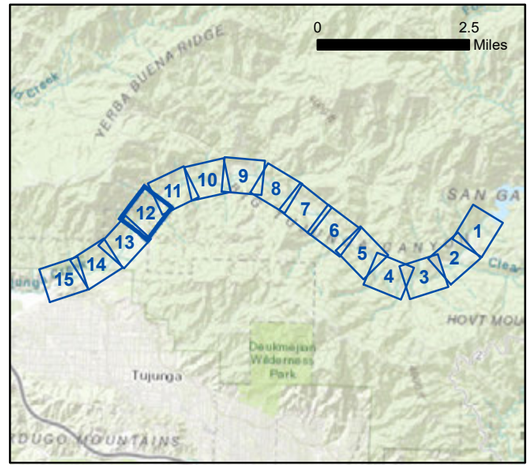
Without Releases





With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (September)	Exhibit 2C Sheet 12
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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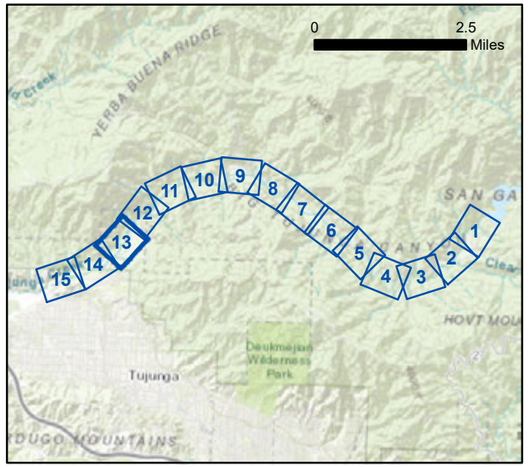
Without Releases



With Releases





Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (September)

Exhibit 2C
Sheet 13

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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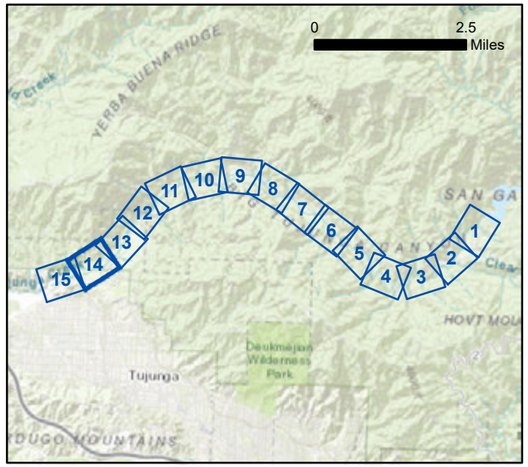
Without Releases





With Releases



Inundation Area

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (September)

Exhibit 2C
Sheet 14

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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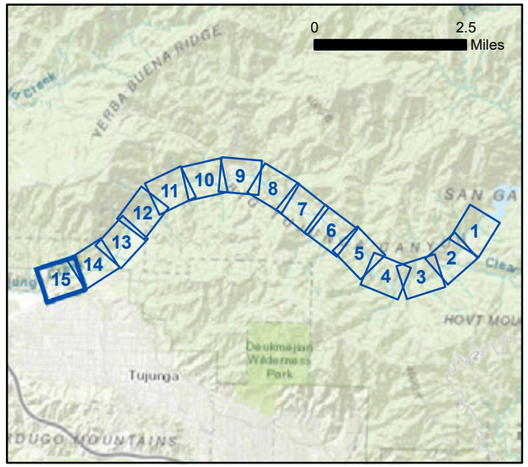
Without Releases





With Releases



Inundation Area

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Extent of Inundation (September)	Exhibit 2C Sheet 15
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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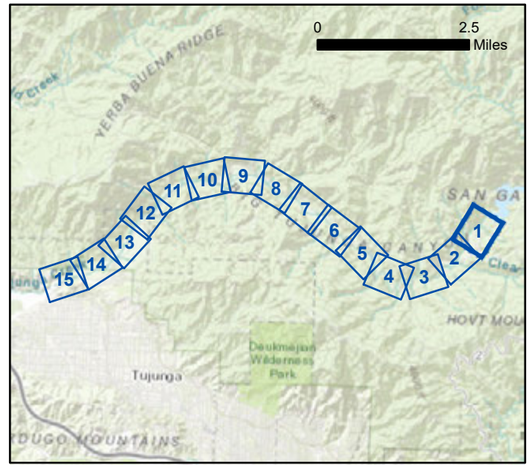
Without Releases



With Releases





Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

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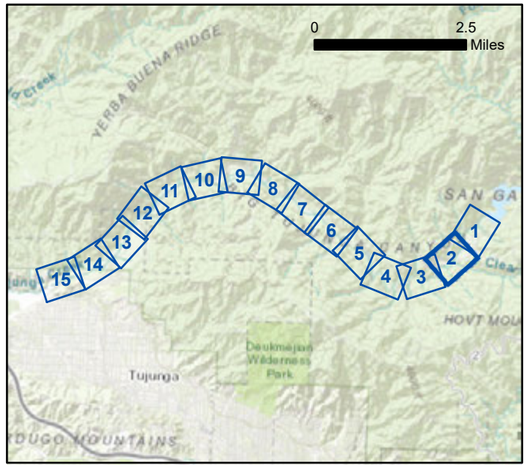
Maximum Change in Wetted Area (September)	Exhibit 2D Sheet 1
Big Tujunga Dam – Supplemental Release Study	PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

Maximum Change in Wetted Area (September)	Exhibit 2D Sheet 2
Big Tujunga Dam – Supplemental Release Study	PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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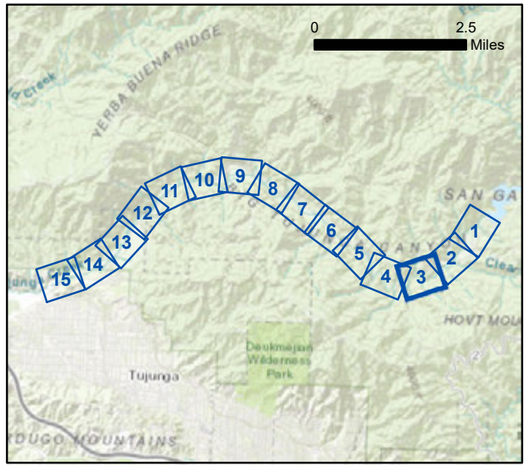
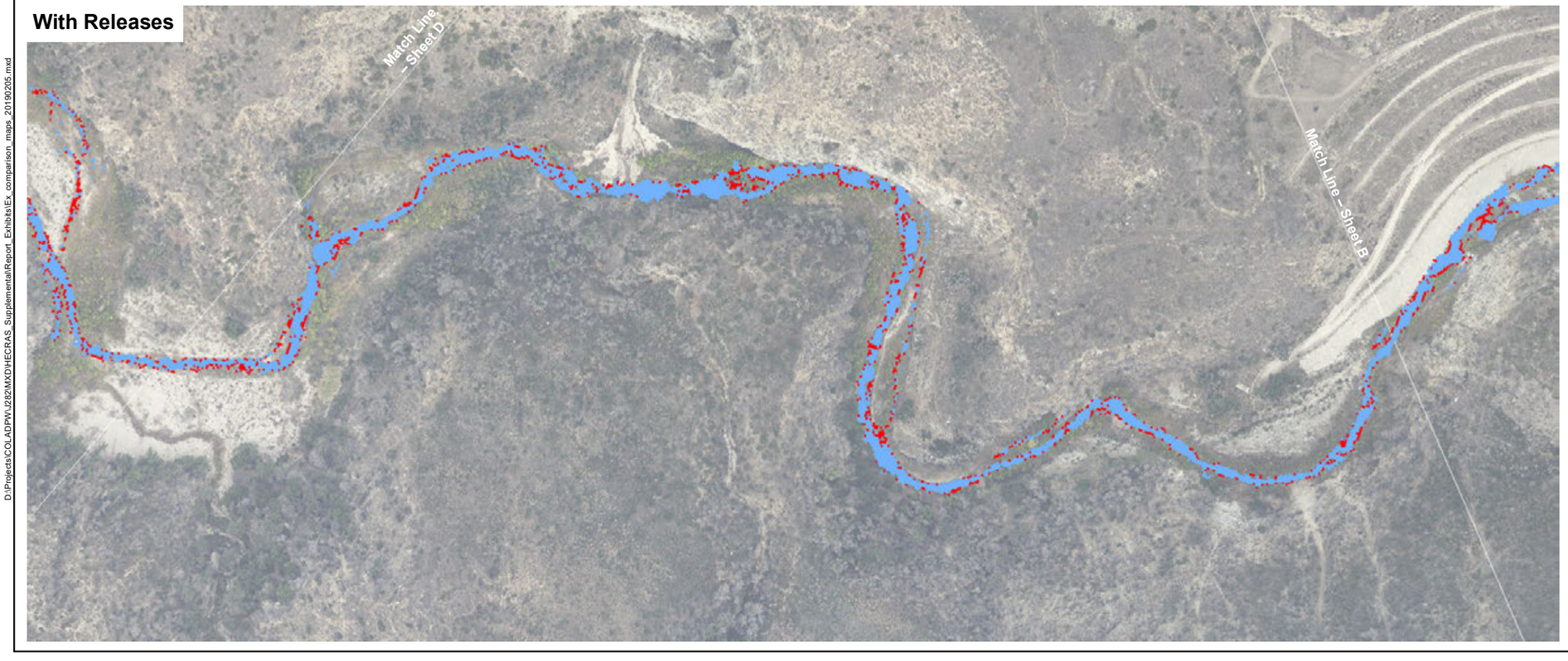
Without Releases





With Releases



Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

Maximum Change in Wetted Area (September)

Exhibit 2D
Sheet 3

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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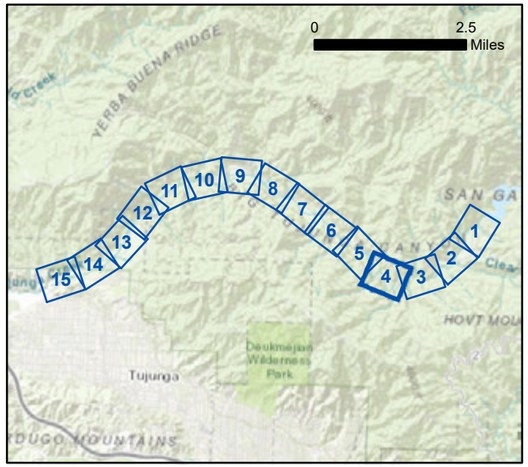
Without Releases



With Releases





Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

Maximum Change in Wetted Area (September)

Exhibit 2D
Sheet 4

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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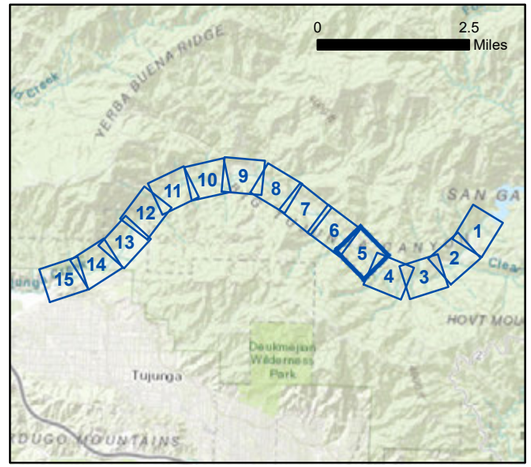
Without Releases



With Releases





Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

Maximum Change in Wetted Area (September)	Exhibit 2D Sheet 5
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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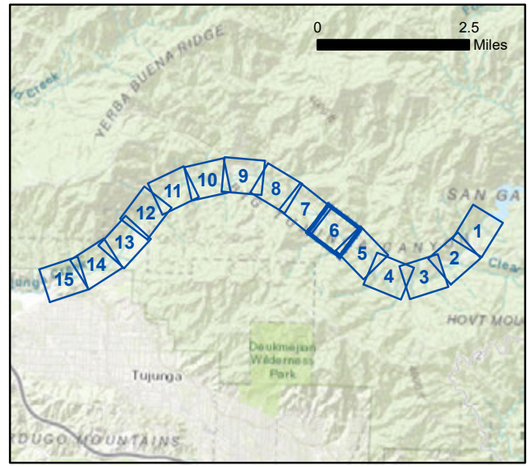
Without Releases





With Releases



Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

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Maximum Change in Wetted Area (September)

Exhibit 2D
Sheet 6

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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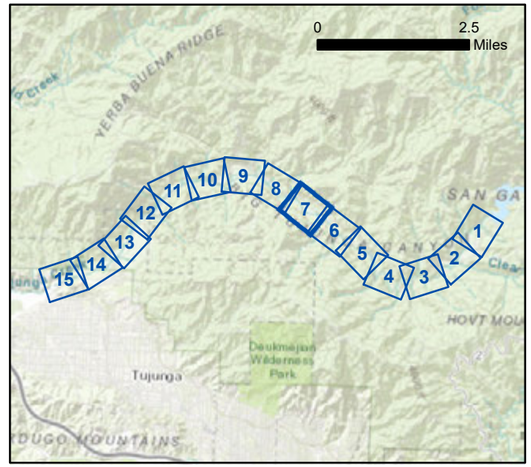
Without Releases



With Releases





Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

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Maximum Change in Wetted Area (September)

Exhibit 2D Sheet 7

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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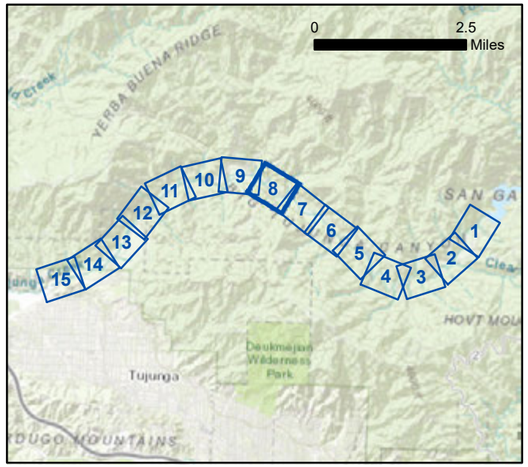
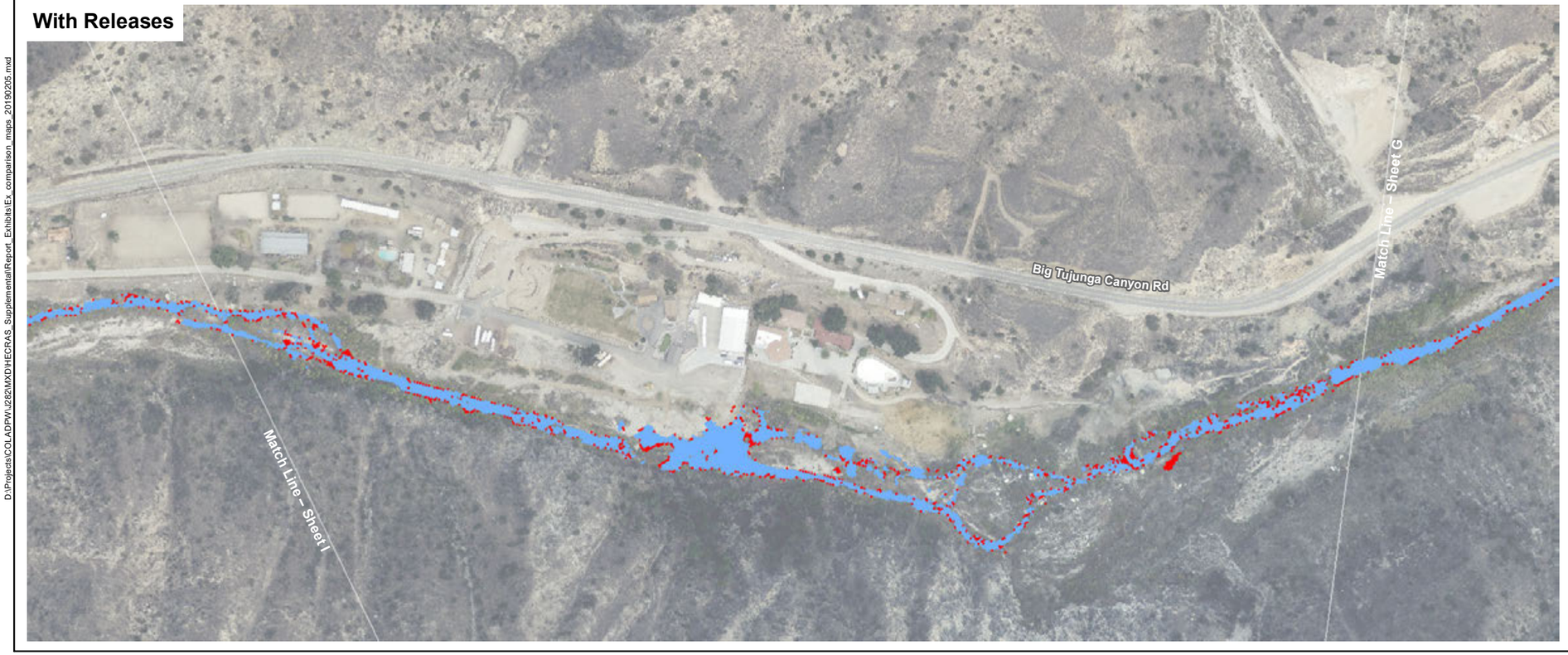
Without Releases





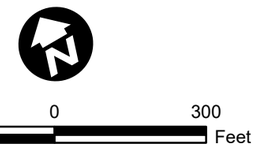
With Releases



Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*



Aerial Source: LAR-IAC 2014

Maximum Change in Wetted Area (September)	Exhibit 2D Sheet 8
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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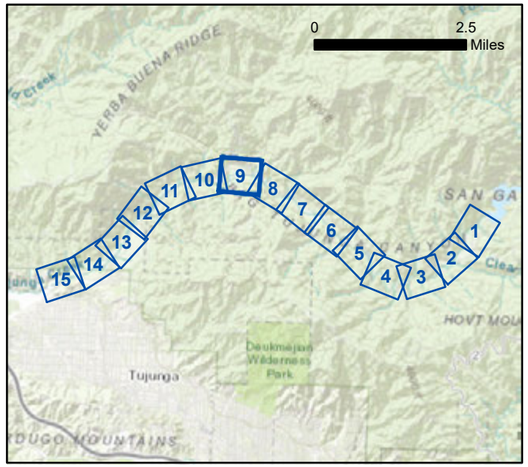
Without Releases





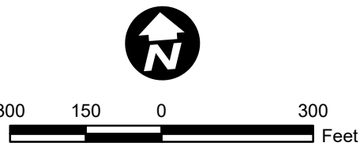
With Releases



Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*



Aerial Source: LAR-IAC 2014

Maximum Change in Wetted Area (September)

Exhibit 2D
Sheet 9

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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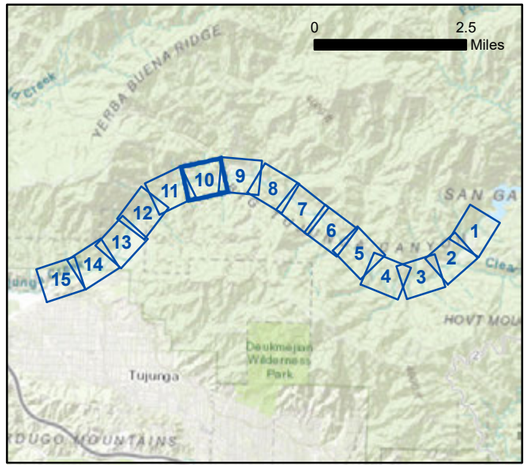
Without Releases





With Releases



Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

Maximum Change in Wetted Area (September)	Exhibit 2D Sheet 10
Big Tujunga Dam – Supplemental Release Study	PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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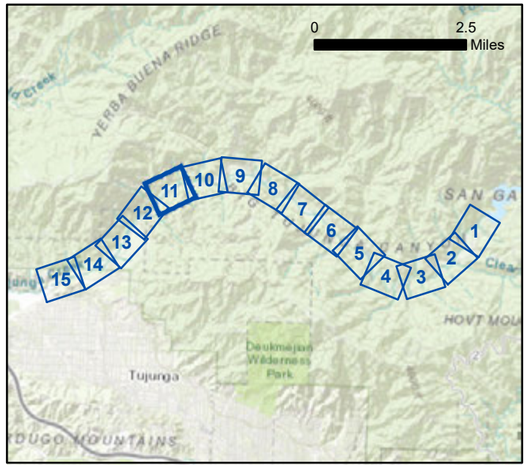

With Releases



Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

Maximum Change in Wetted Area (September)

Exhibit 2D
Sheet 11

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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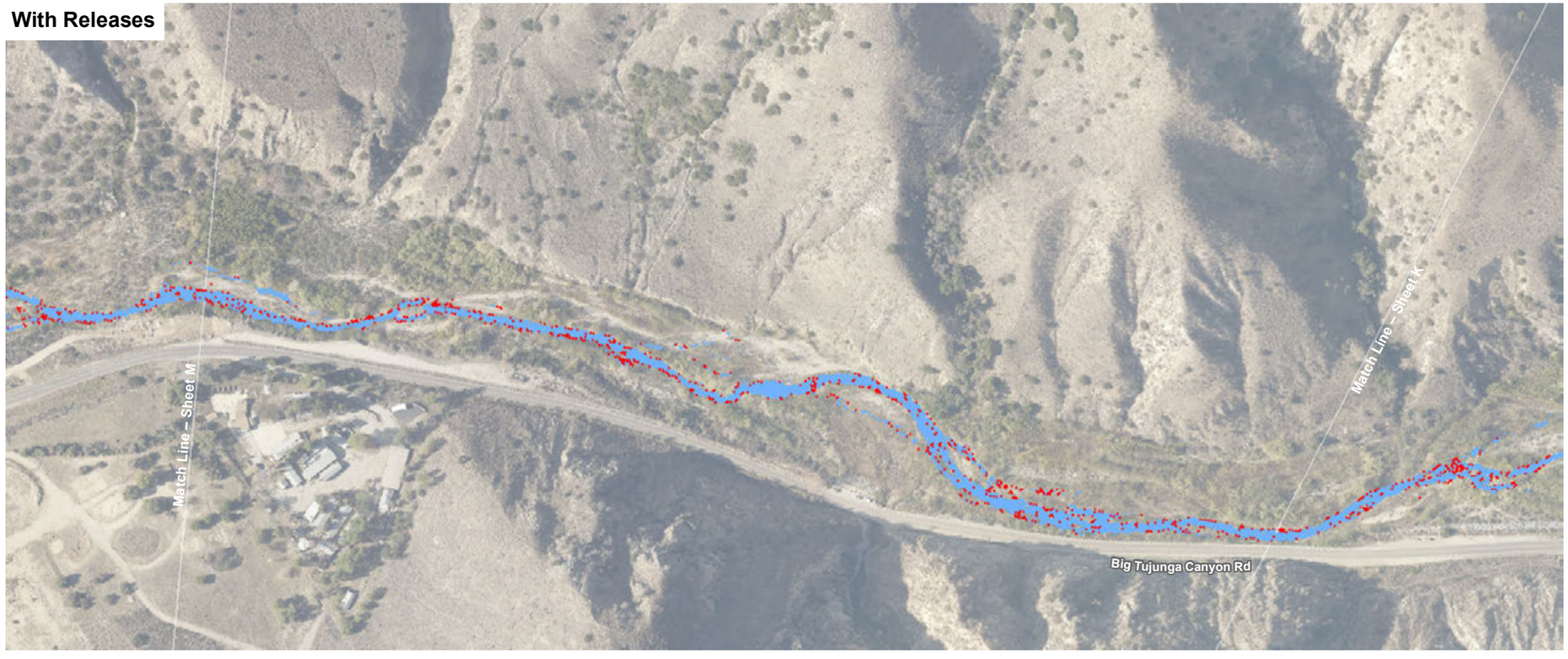
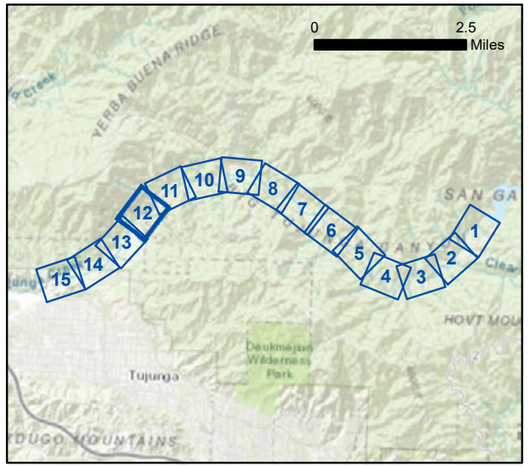
Without Releases



With Releases





Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

Maximum Change in Wetted Area (September)

Exhibit 2D
Sheet 12

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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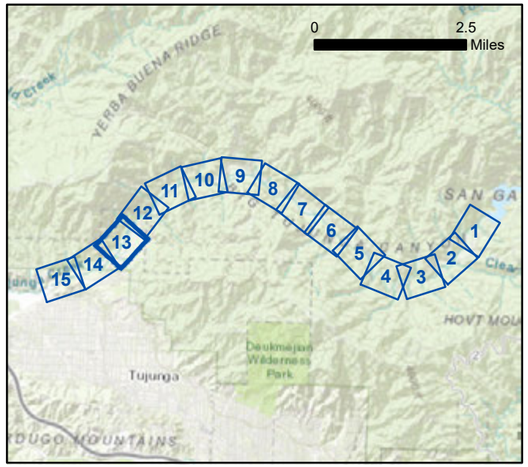

With Releases



Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

Maximum Change in Wetted Area (September)

Exhibit 2D
Sheet 13

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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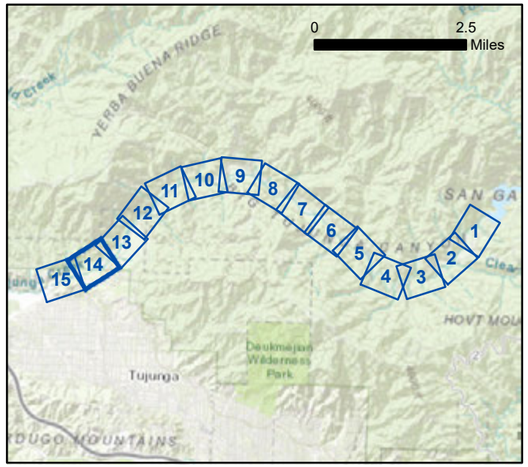

With Releases



Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

Maximum Change in Wetted Area (September)

Exhibit 2D
Sheet 14

Big Tujunga Dam – Supplemental Release Study

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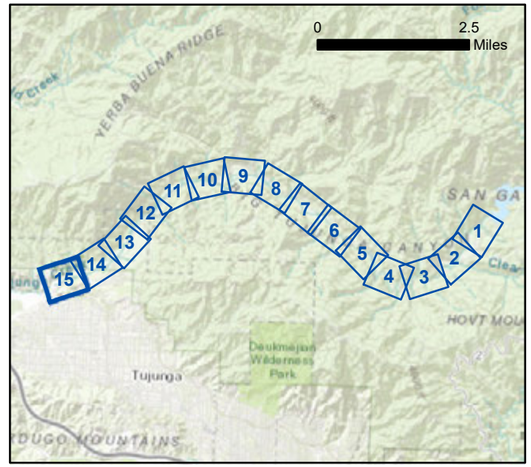

With Releases



Addtional Inundation Area*

Inundation Area

**This graphic shows the maximum change in wetted area, which occurs during the September 15 - October 15 release.*

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

Maximum Change in Wetted Area (September)	Exhibit 2D Sheet 15
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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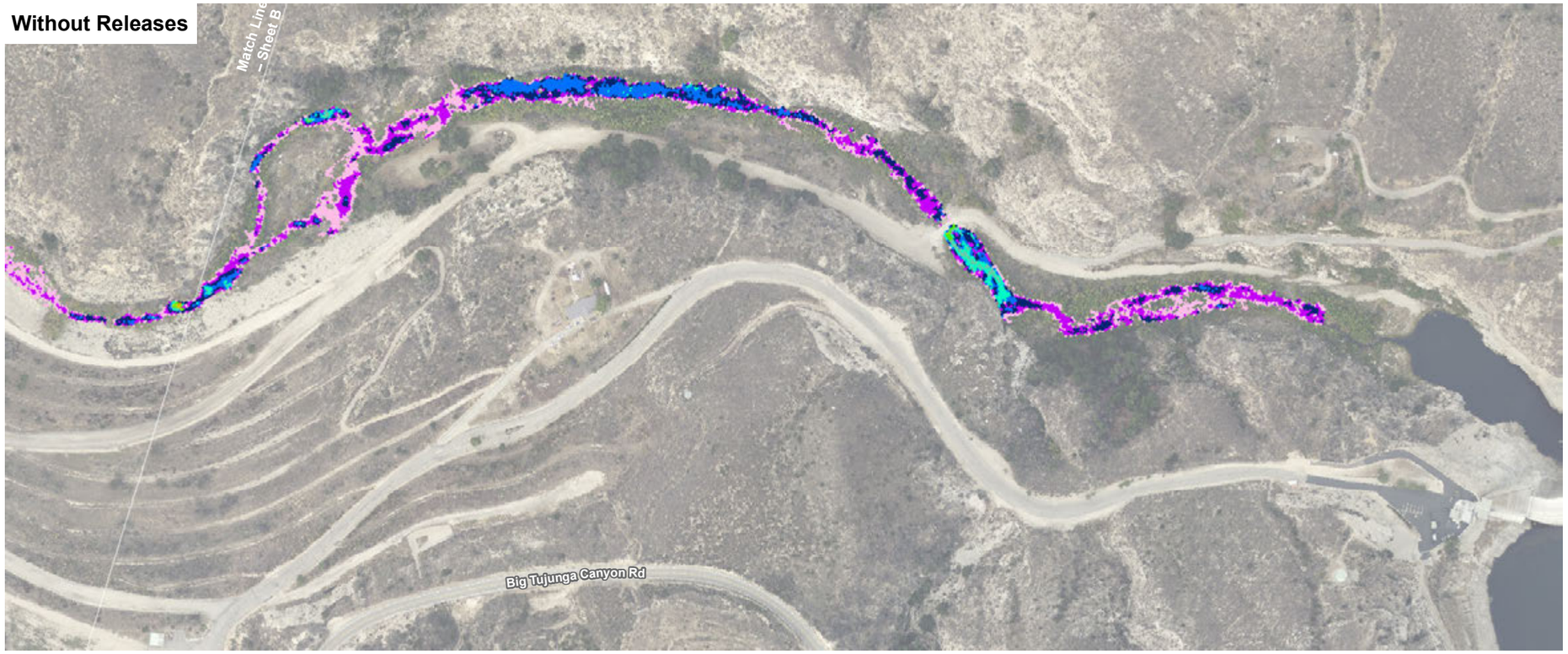
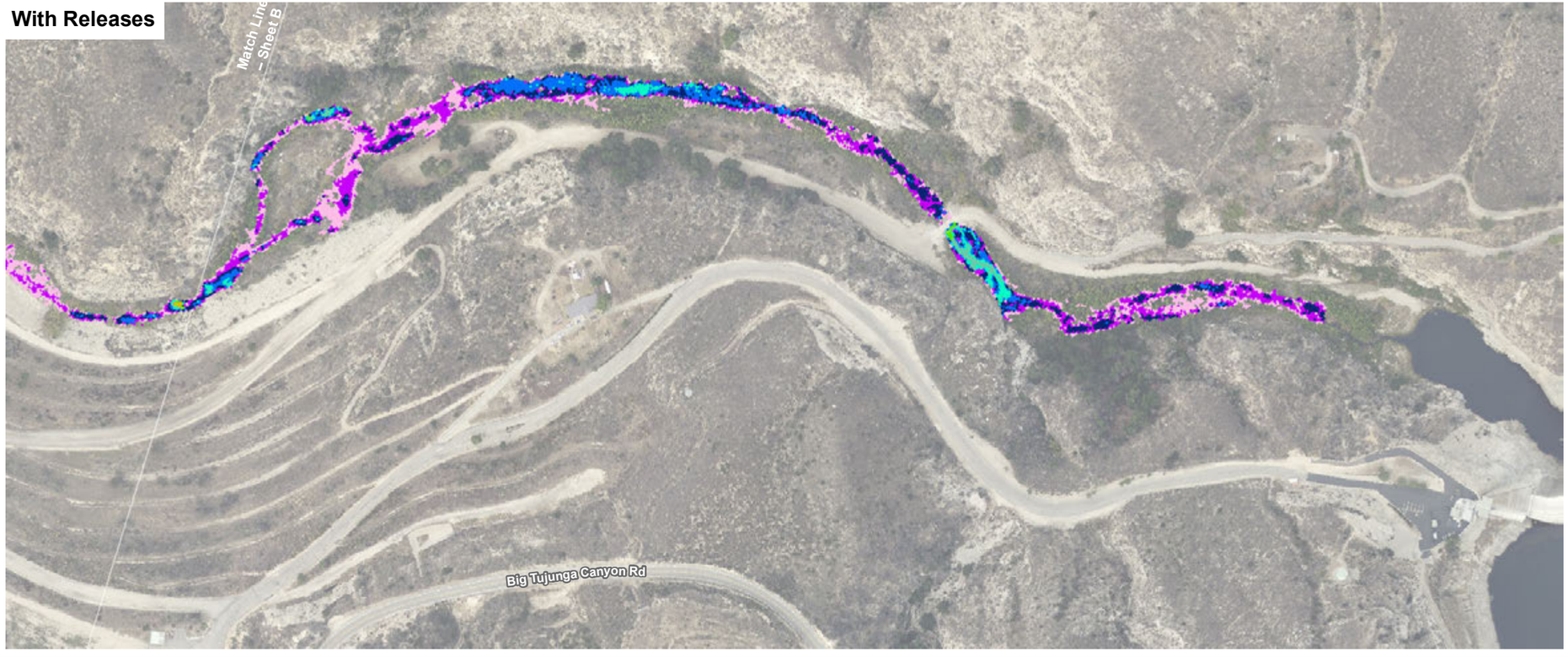
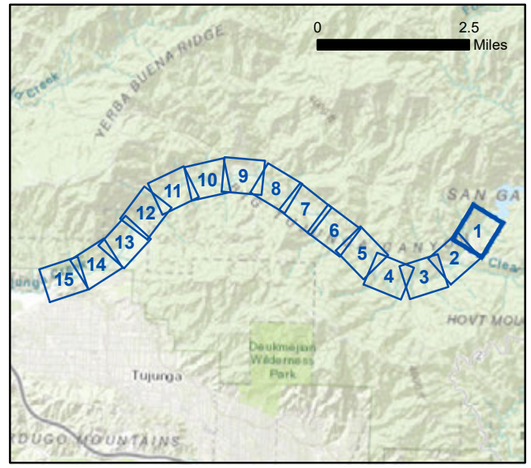


With Releases





Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24
- 24 - 30
- 30 - 36
- 36 - 42
- 42 - 48
- 48 - 54

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 3A
Sheet 1

Maximum Depth (April)

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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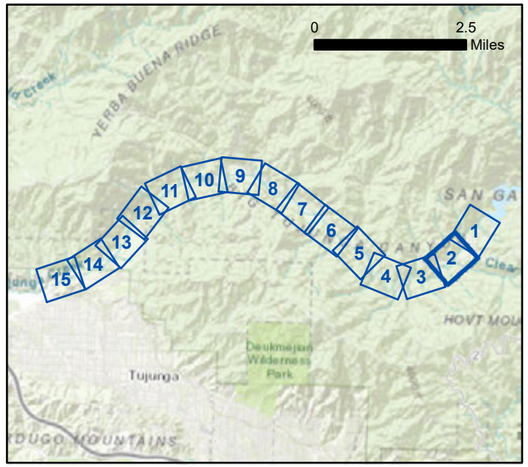
Without Releases



With Releases





Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24
- 24 - 30
- 30 - 36
- 36 - 42
- 42 - 48
- 48 - 54
- 54 - 60
- 60 - 66

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 3A
Sheet 2

Maximum Depth (April)

Big Tujunga Dam – Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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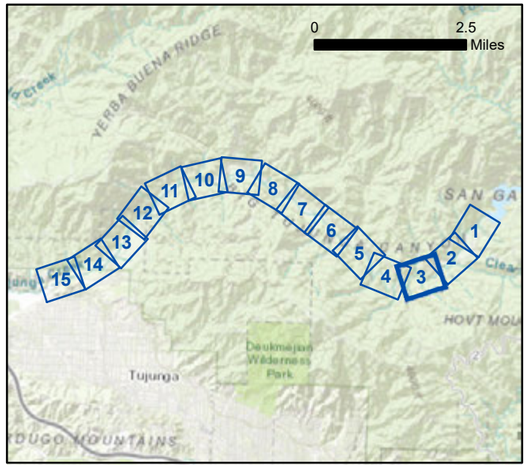
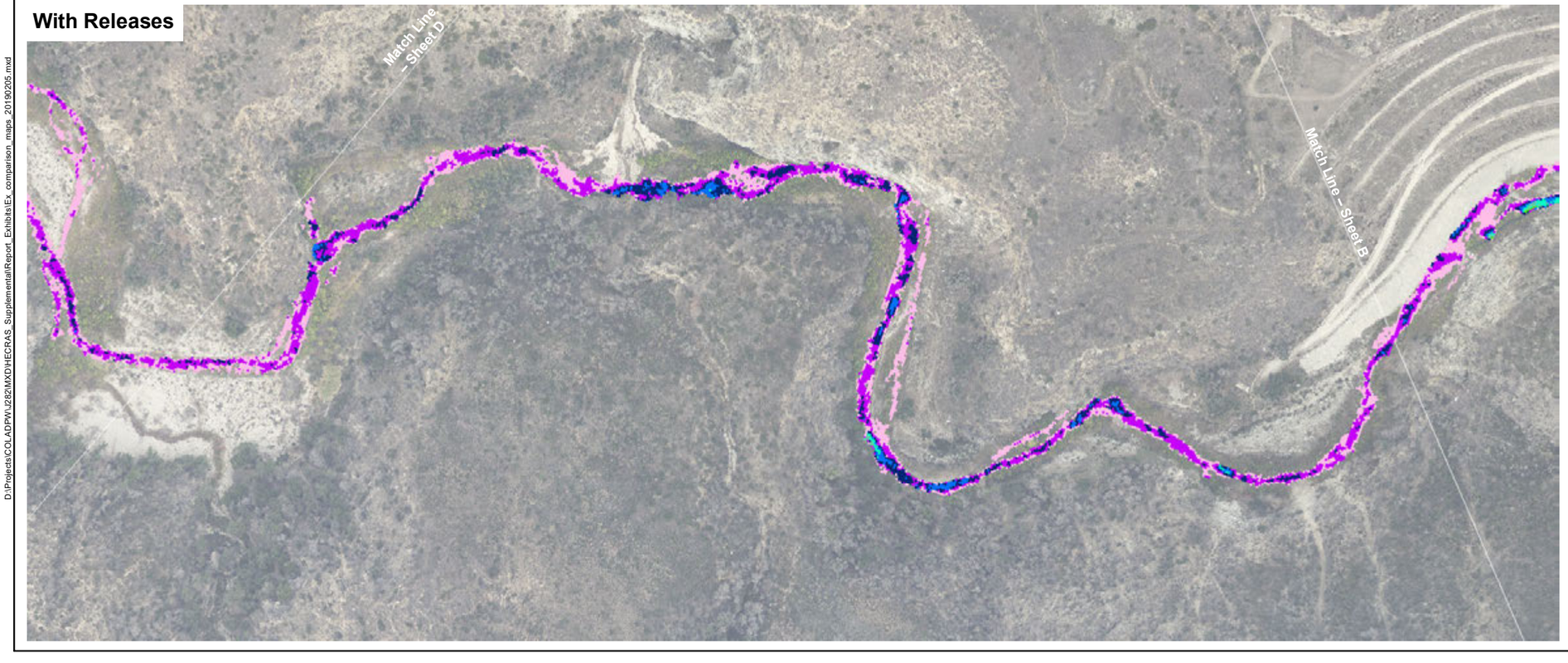
Without Releases





With Releases



Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24
- 24 - 30
- 30 - 36
- 36 - 42

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 3A
Sheet 3

Maximum Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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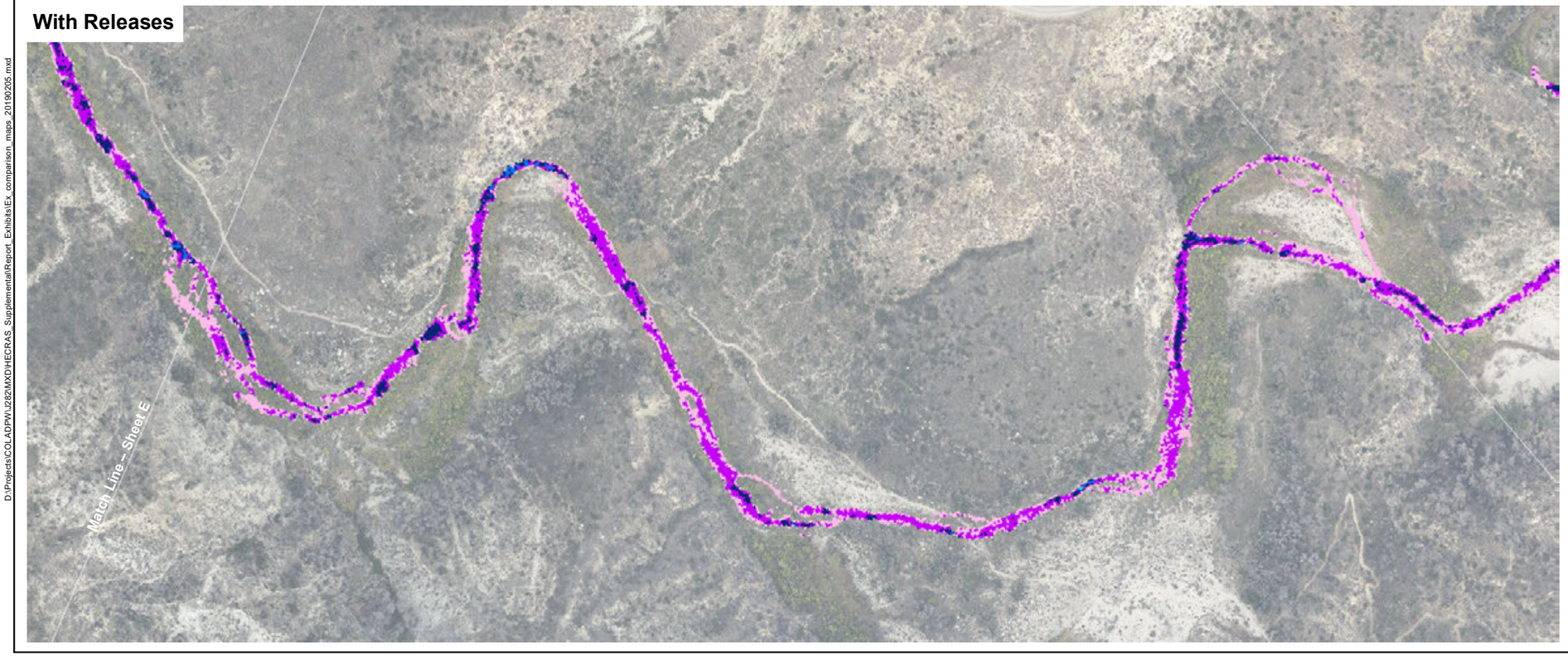
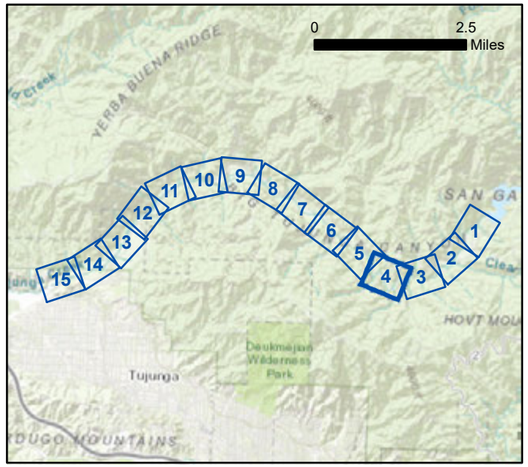
Without Releases



With Releases

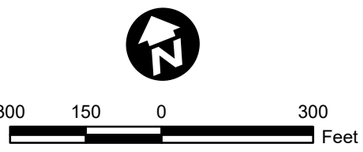




Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24
- 24 - 30

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*



Aerial Source: LAR-IAC 2014

Exhibit 3A
Sheet 4

Maximum Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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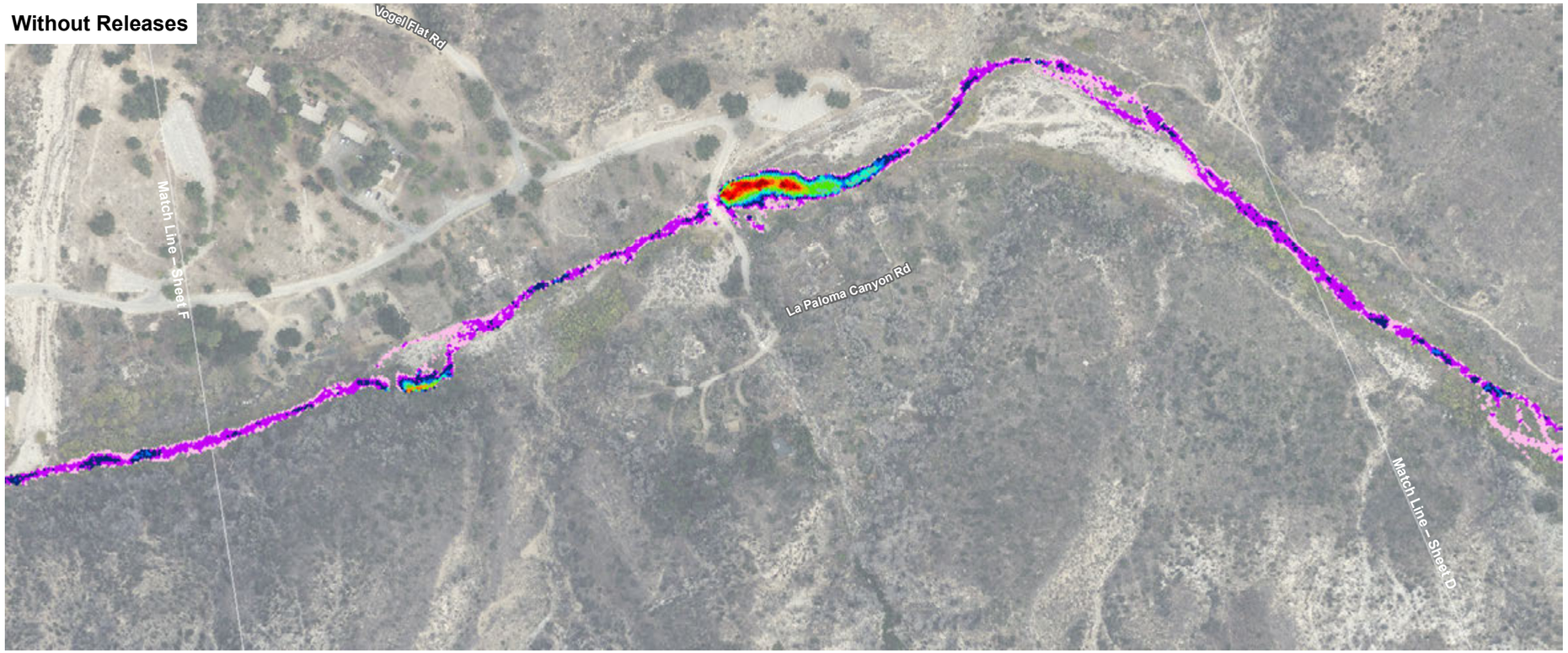
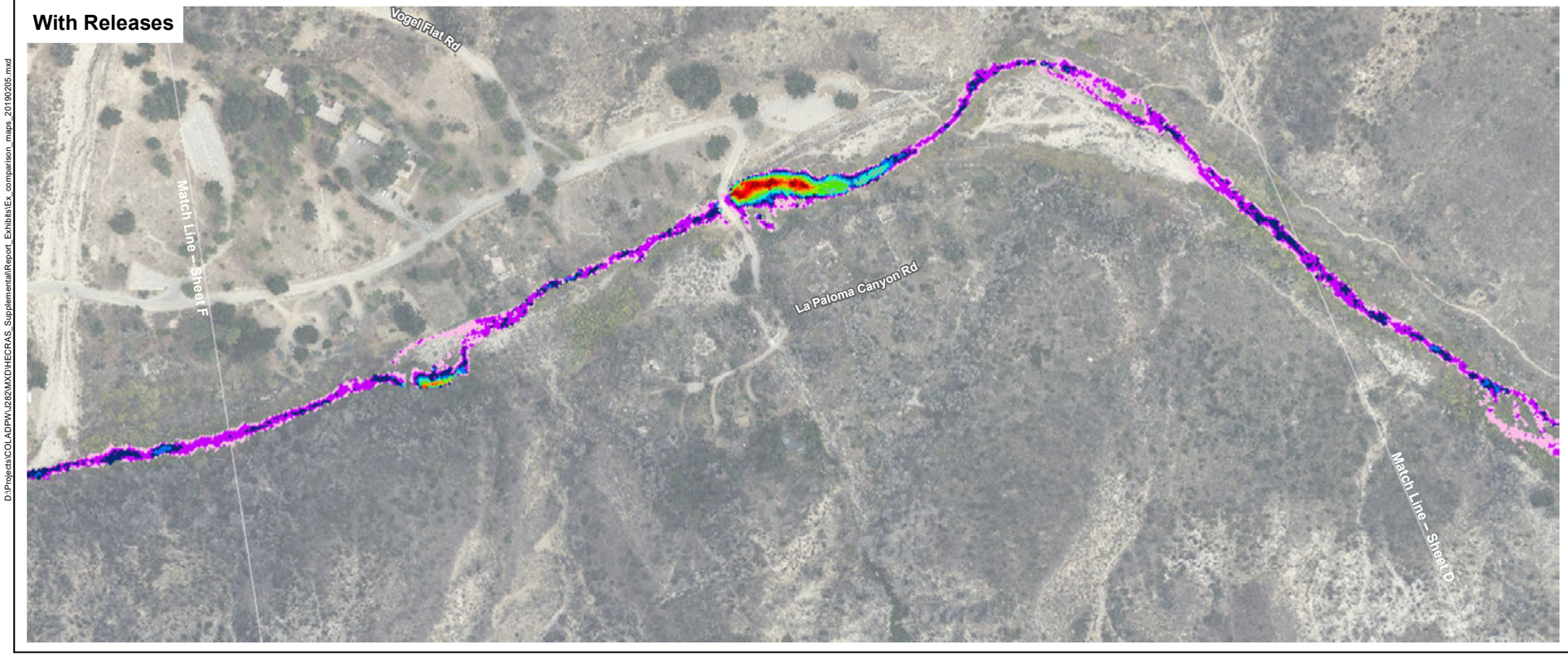
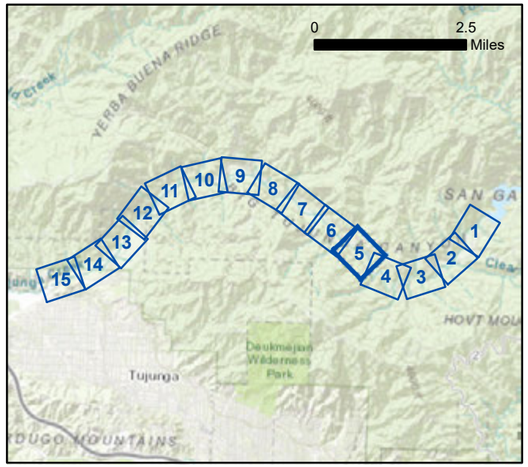
Without Releases



With Releases





Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24
- 24 - 30
- 30 - 36
- 36 - 42
- 42 - 48
- 48 - 54
- 54 - 60
- 60 - 66
- 66 - 72
- 72 - 78

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 3A
Sheet 5

Maximum Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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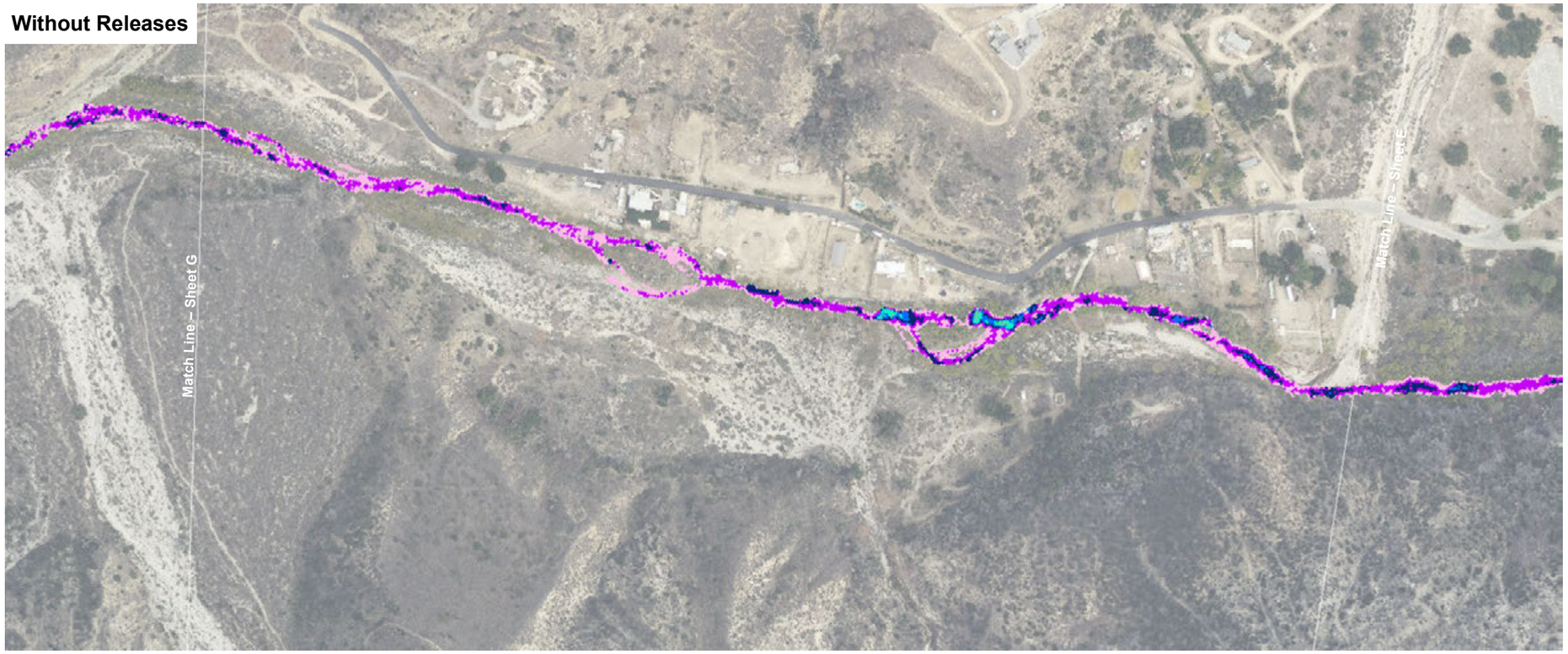
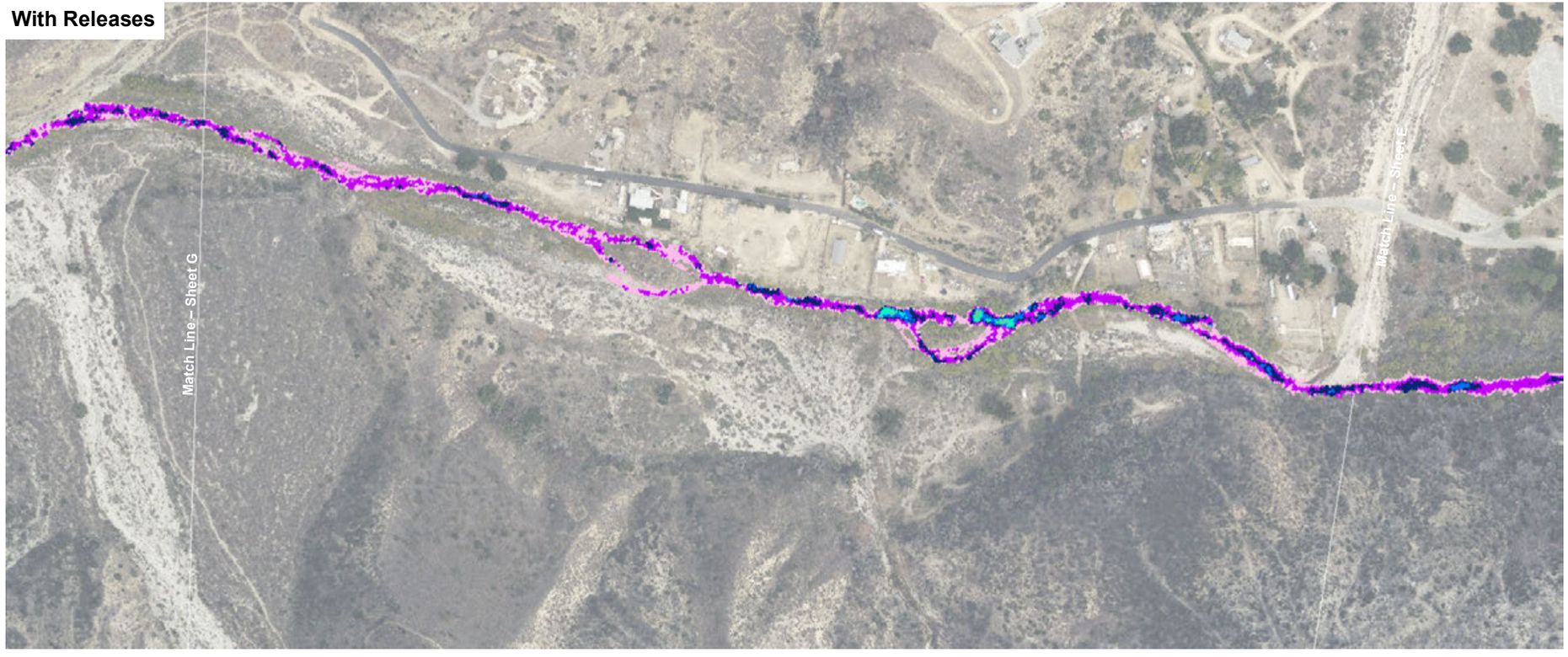
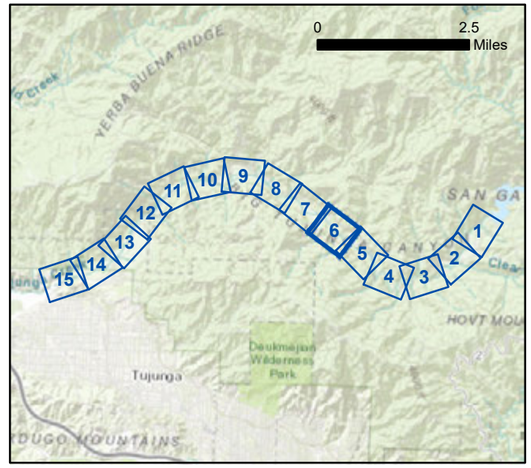
Without Releases



With Releases

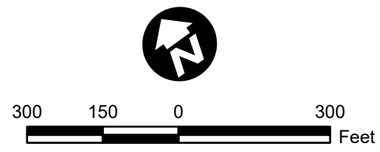




Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24
- 24 - 30
- 30 - 36
- 36 - 42

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*



Aerial Source: LAR-IAC 2014

Exhibit 3A
Sheet 6

Maximum Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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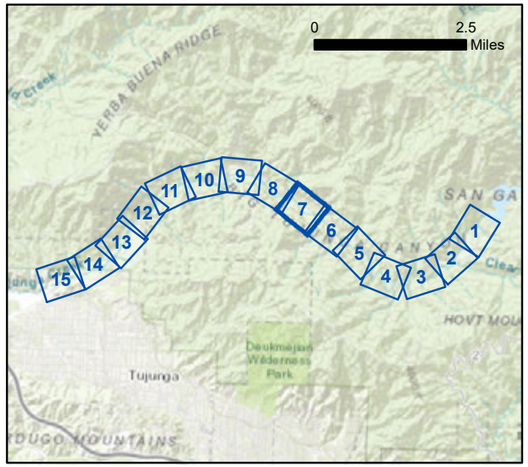
Without Releases



With Releases





Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24
- 24 - 30
- 30 - 36

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 3A
Sheet 7

Maximum Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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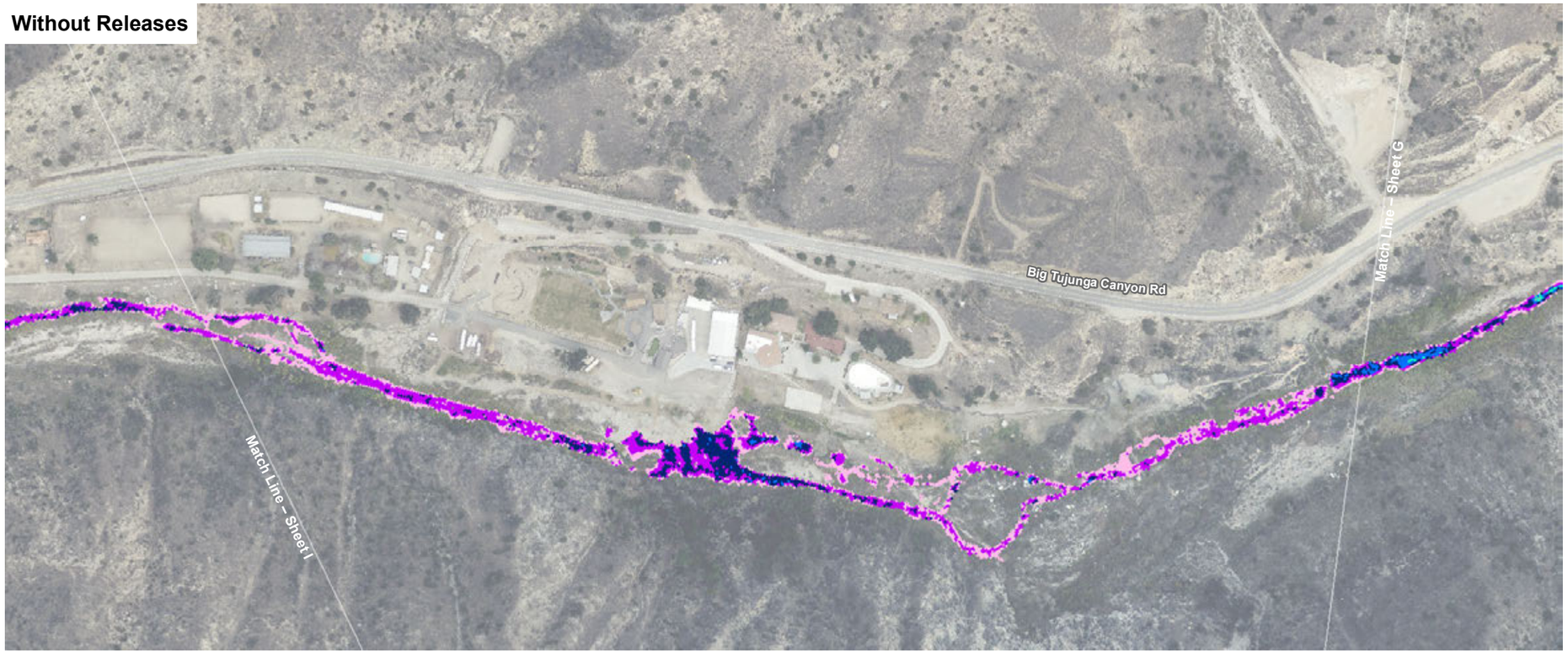
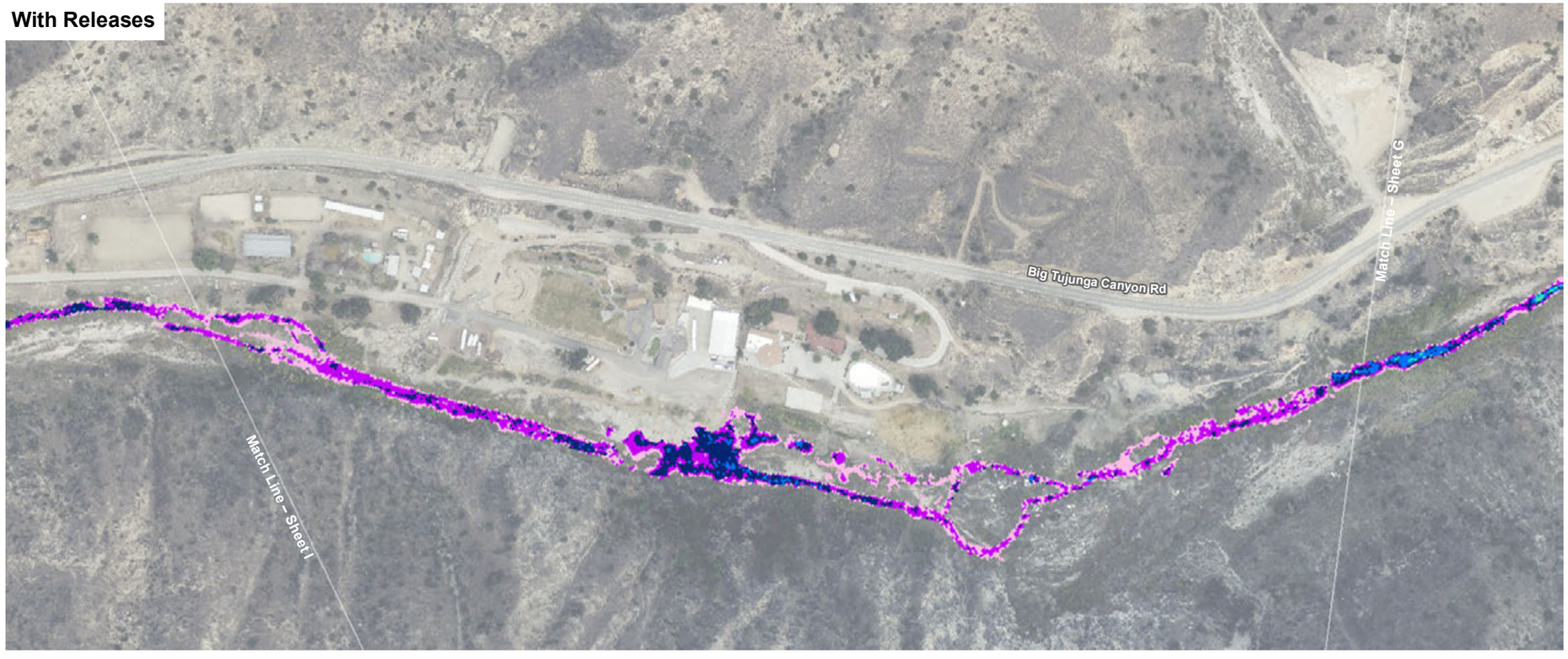
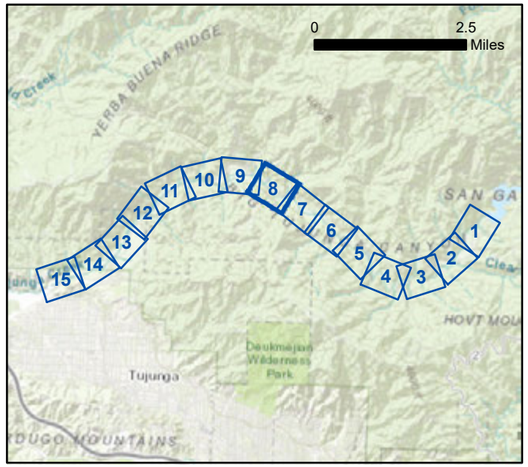
Without Releases



With Releases





Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24
- 24 - 30
- 30 - 36

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 3A
Sheet 8

Maximum Depth (April)

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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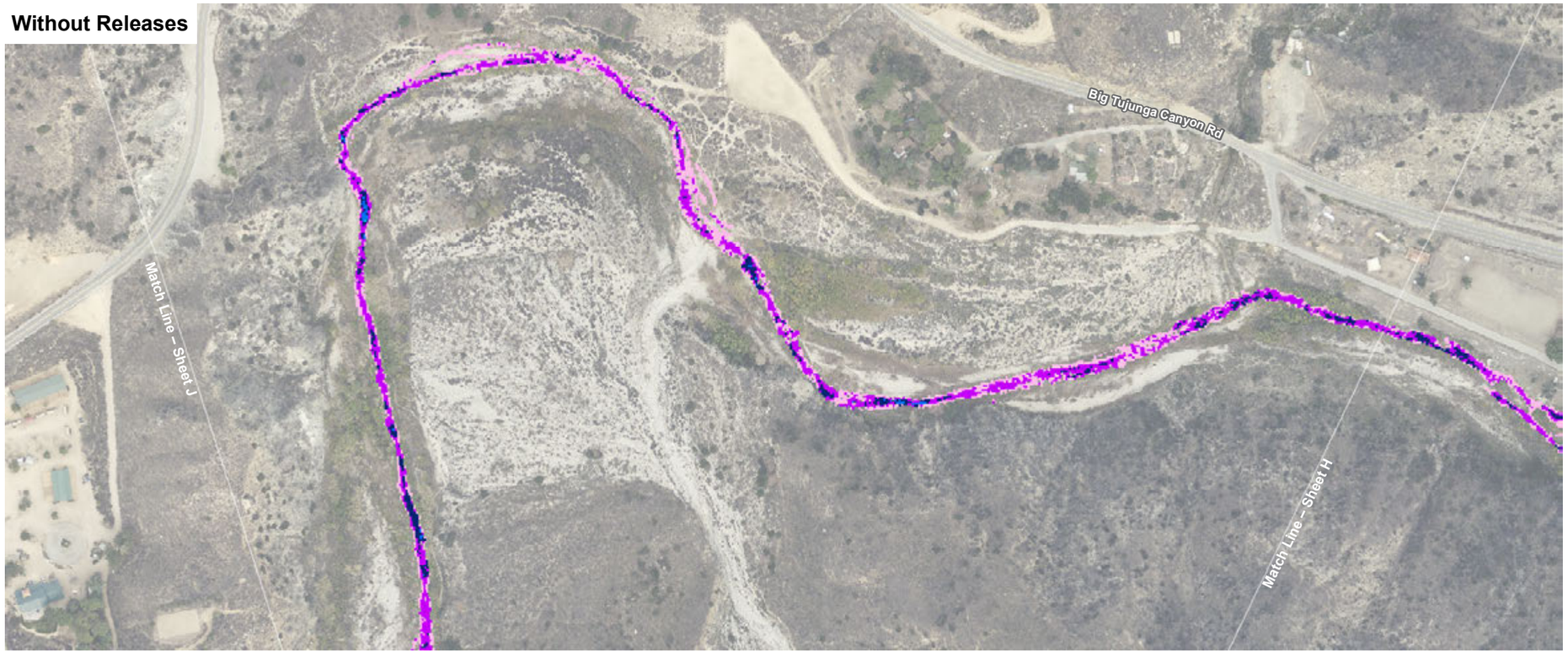
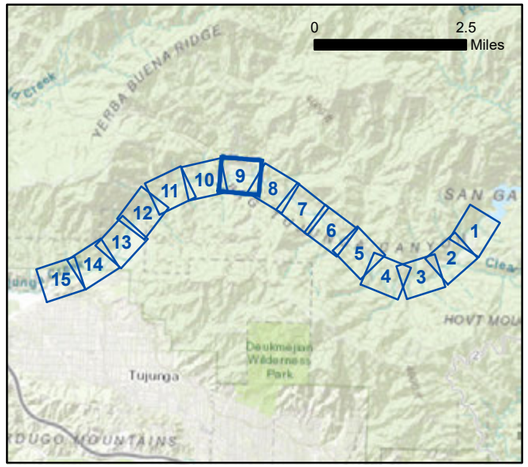


With Releases





Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24
- 24 - 30

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*

N

300 150 0 300 Feet

Aerial Source: LAR-IAC 2014

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Exhibit 3A
Sheet 9

Maximum Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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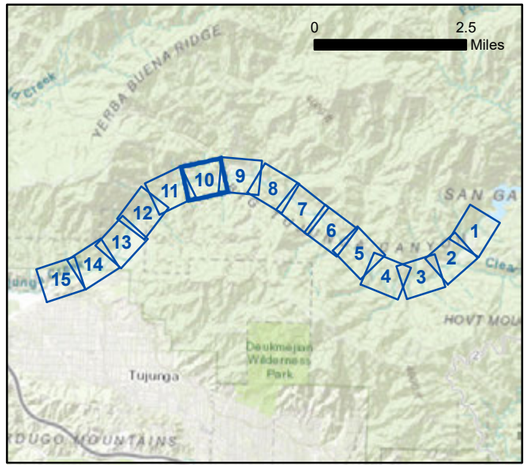
Without Releases



With Releases





Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24
- 24 - 30
- 30 - 36
- 36 - 42
- 42 - 48
- 48 - 54
- 54 - 60

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 3A
Sheet 10

Maximum Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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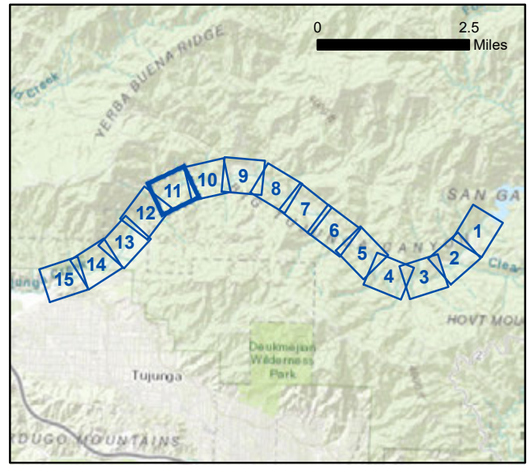
Without Releases





With Releases



Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 3A
Sheet 11

Maximum Depth (April)

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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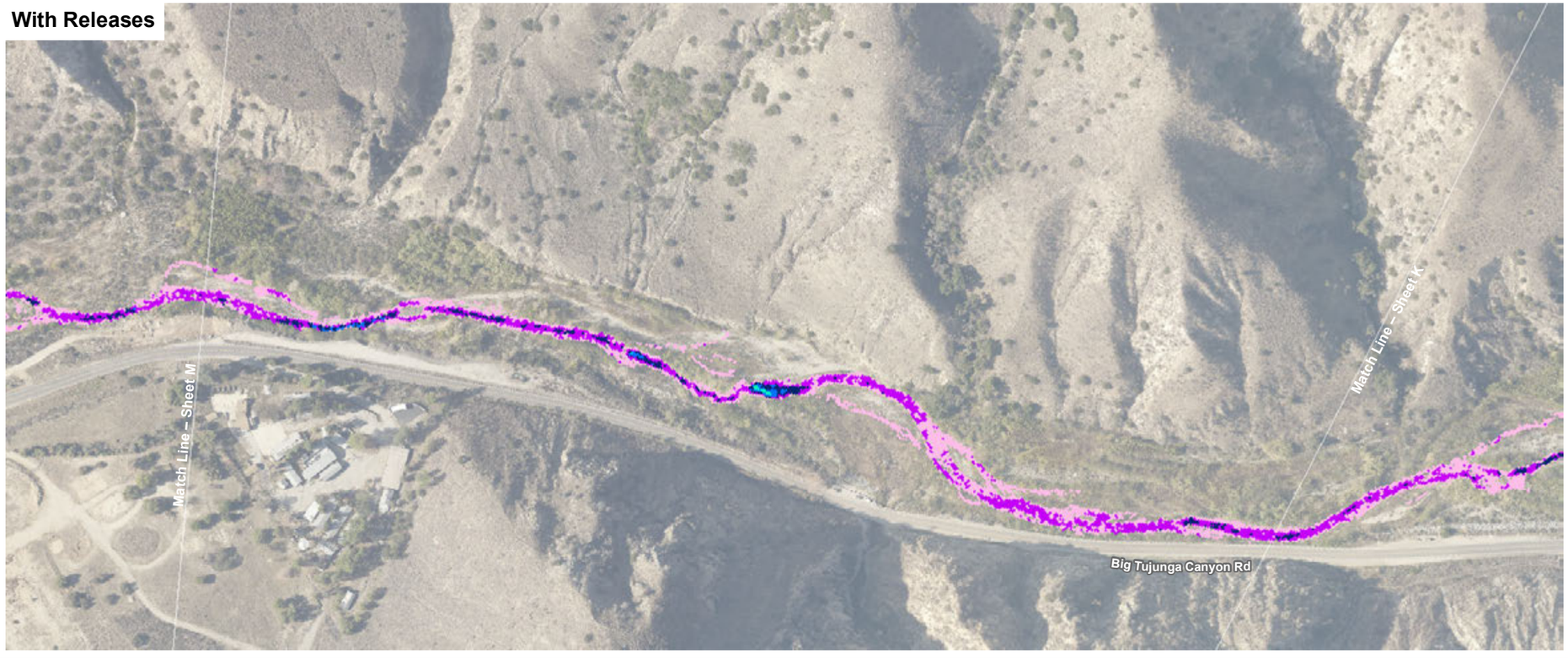
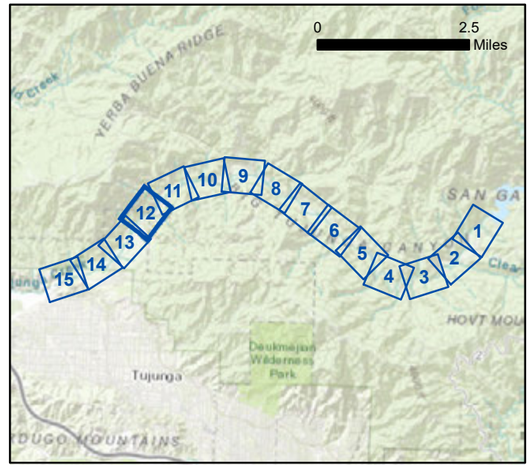
Without Releases



With Releases





Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24
- 24 - 30

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 3A
Sheet 12

Maximum Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

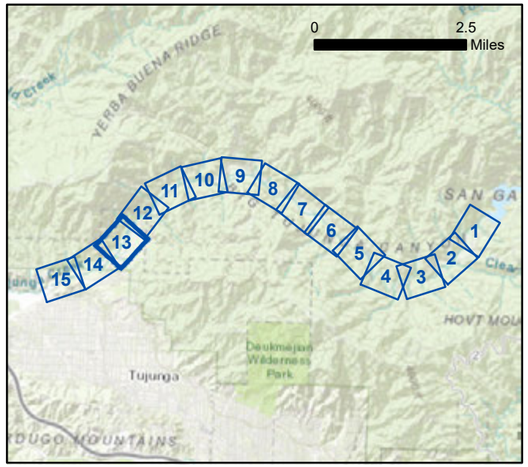
D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 3A
Sheet 13

Maximum Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

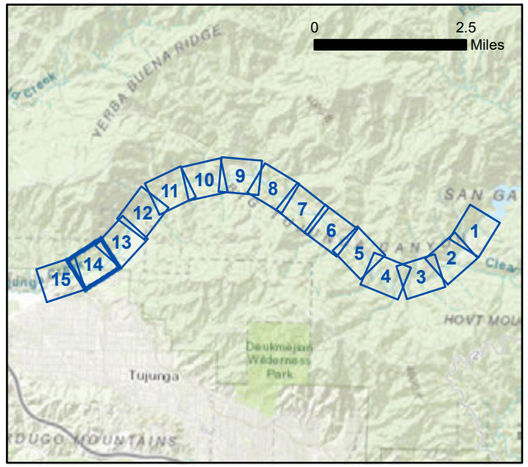
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24
- 24 - 30

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 3A
Sheet 14

Maximum Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

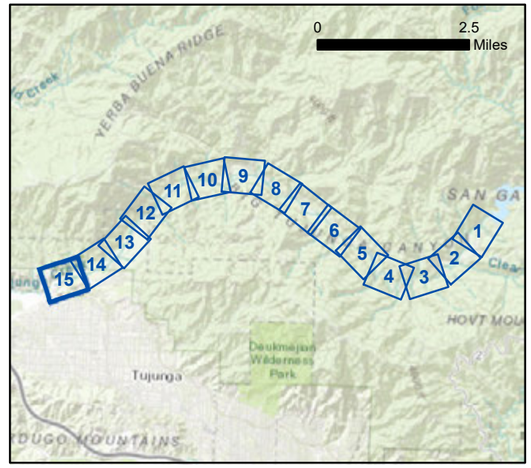
D:\Projects\COLADPW\J28\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Maximum Depth (inches)*

- 0 - 6
- 6 - 12
- 12 - 18
- 18 - 24
- 24 - 30
- 30 - 36
- 36 - 42

**This graphic shows the maximum depth over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 3A
Sheet 15

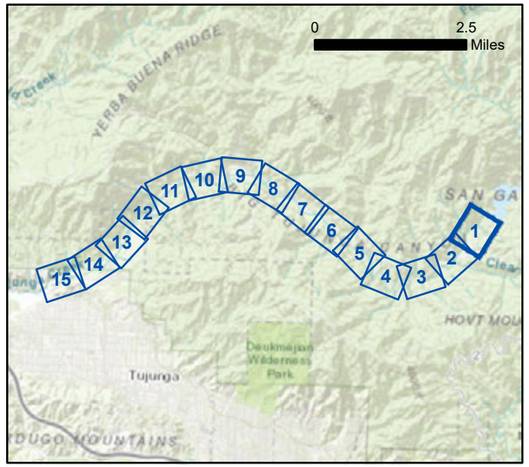
Maximum Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\





Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 0.7
- 0.7 - 1.0

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

N

300 150 0 300
Feet

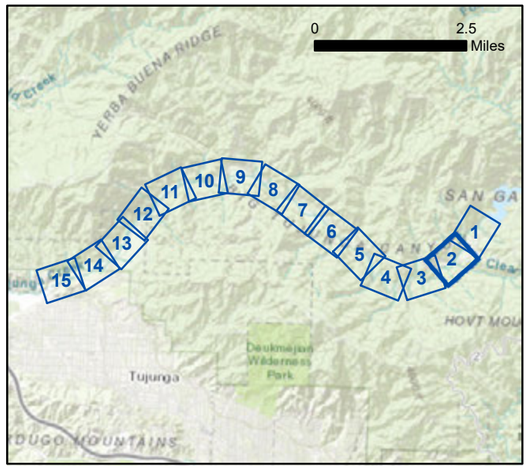
Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)	Exhibit 3B Sheet 1
Big Tujunga Dam – Supplemental Release Study	PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_single_DF_20190205.mxd





Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 0.7

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

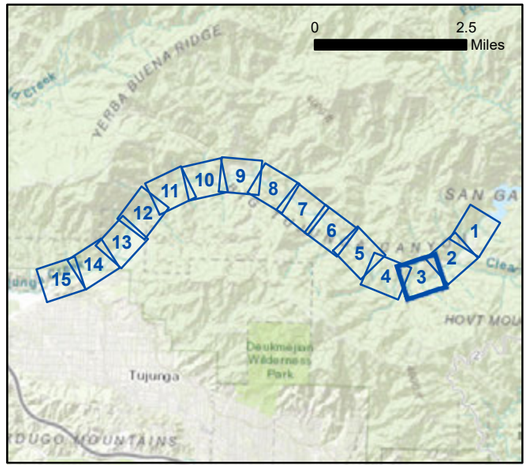
Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)	Exhibit 3B Sheet 2
Big Tujunga Dam – Supplemental Release Study	PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_single_DF_20190205.mxd





Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 0.7

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)	Exhibit 3B Sheet 3

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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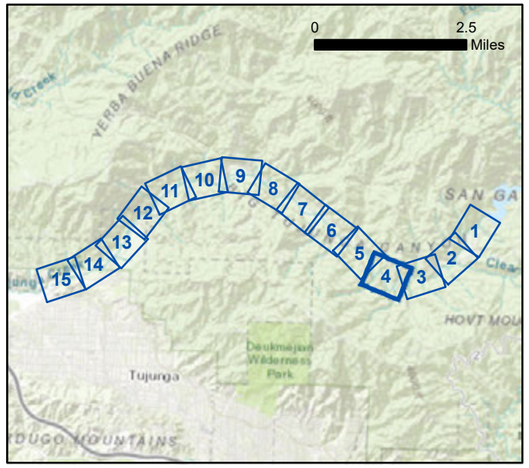

Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 0.7

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)	Exhibit 3B Sheet 4
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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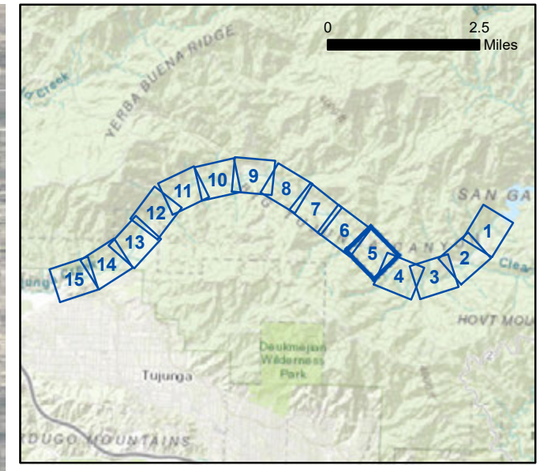
Big Tujunga Canyon Rd

Vogel Flat Rd

Match Line – Sheet D

Match Line – Sheet F

La Paloma Canyon Rd



Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 0.7

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)

Exhibit 3B Sheet 5

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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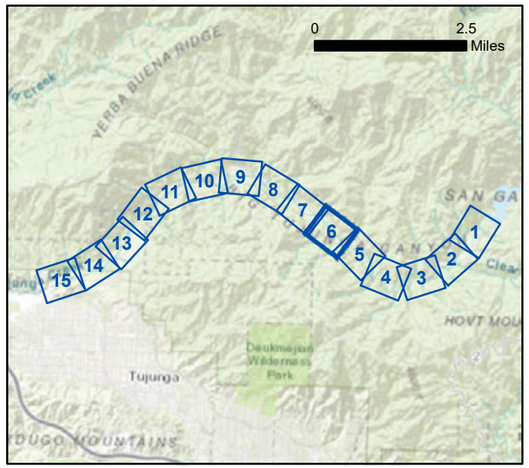

Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 0.7

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)	Exhibit 3B Sheet 6
Big Tujunga Dam – Supplemental Release Study	PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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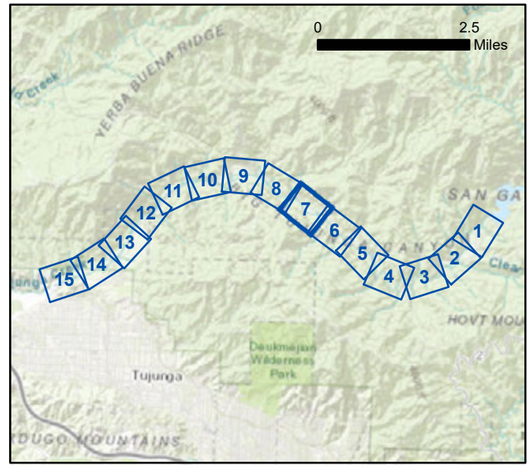
Match Line – Sheet H

Big Tujunga Canyon Rd

Doske Rd

Match Line – Sheet F

Match Line – Sheet H



Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)

Exhibit 3B
Sheet 7

Big Tujunga Dam – Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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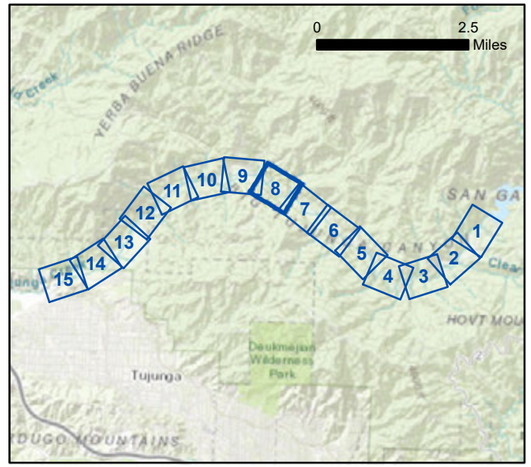

Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 0.7
- 0.7 - 1.0
- 1.0 - 1.2
- 1.2 - 1.5

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)

Exhibit 3B
Sheet 8

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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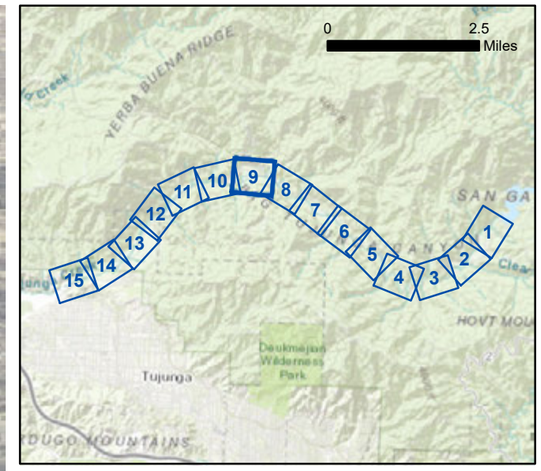
Big Tujunga Canyon Rd

Match Line – Sheet J

Match Line – Sheet H



Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 0.7
- 0.7 - 1.0

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)	Exhibit 3B Sheet 9

Big Tujunga Dam – Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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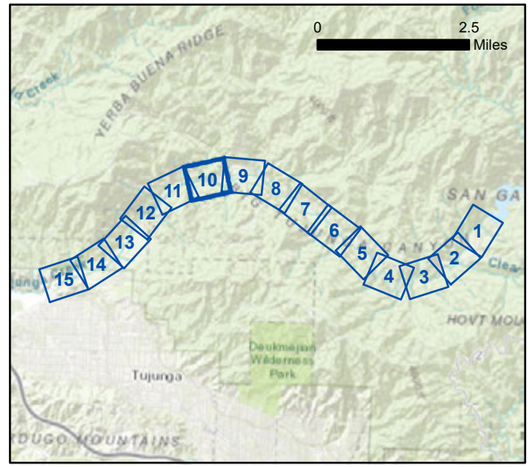

Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 0.7
- 0.7 - 1.0

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)	Exhibit 3B Sheet 10
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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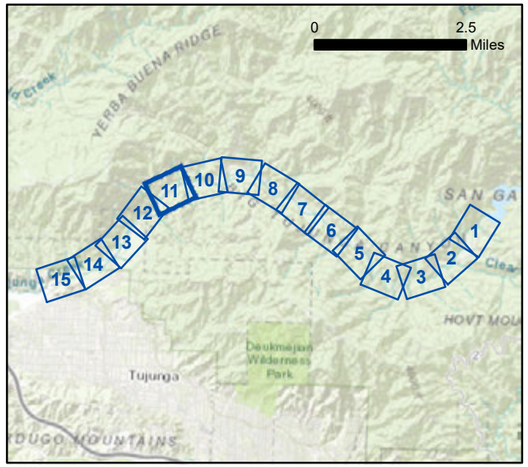

Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)	Exhibit 3B Sheet 11
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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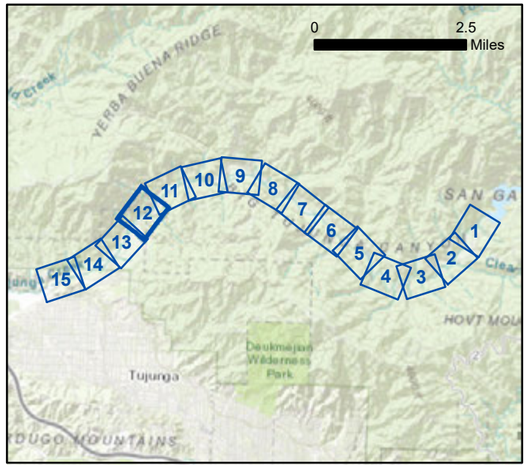


Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

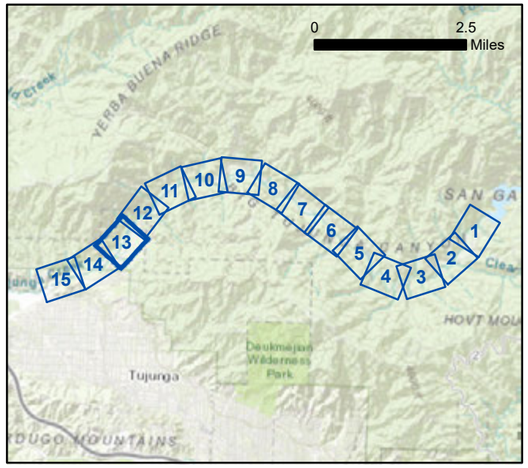
Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)	Exhibit 3B Sheet 12
Big Tujunga Dam – Supplemental Release Study	PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_single_DF_20190205.mxd





Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 0.7

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)	Exhibit 3B Sheet 13
Big Tujunga Dam – Supplemental Release Study	PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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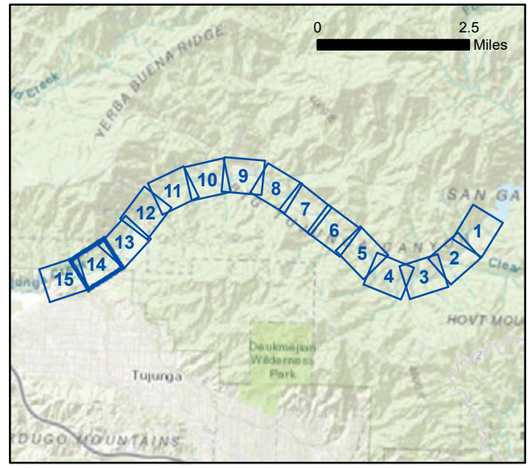


Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 0.7

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)

Exhibit 3B
Sheet 14

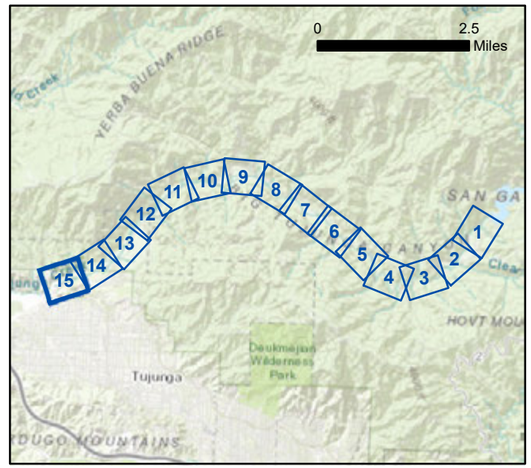
Big Tujunga Dam – Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_single_DF_20190205.mxd





Change in Maximum Depth (inches)*

- 0 - 0.2
- 0.2 - 0.5

**This graphic shows the maximum change in depth, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Depth (September)	Exhibit 3B Sheet 15
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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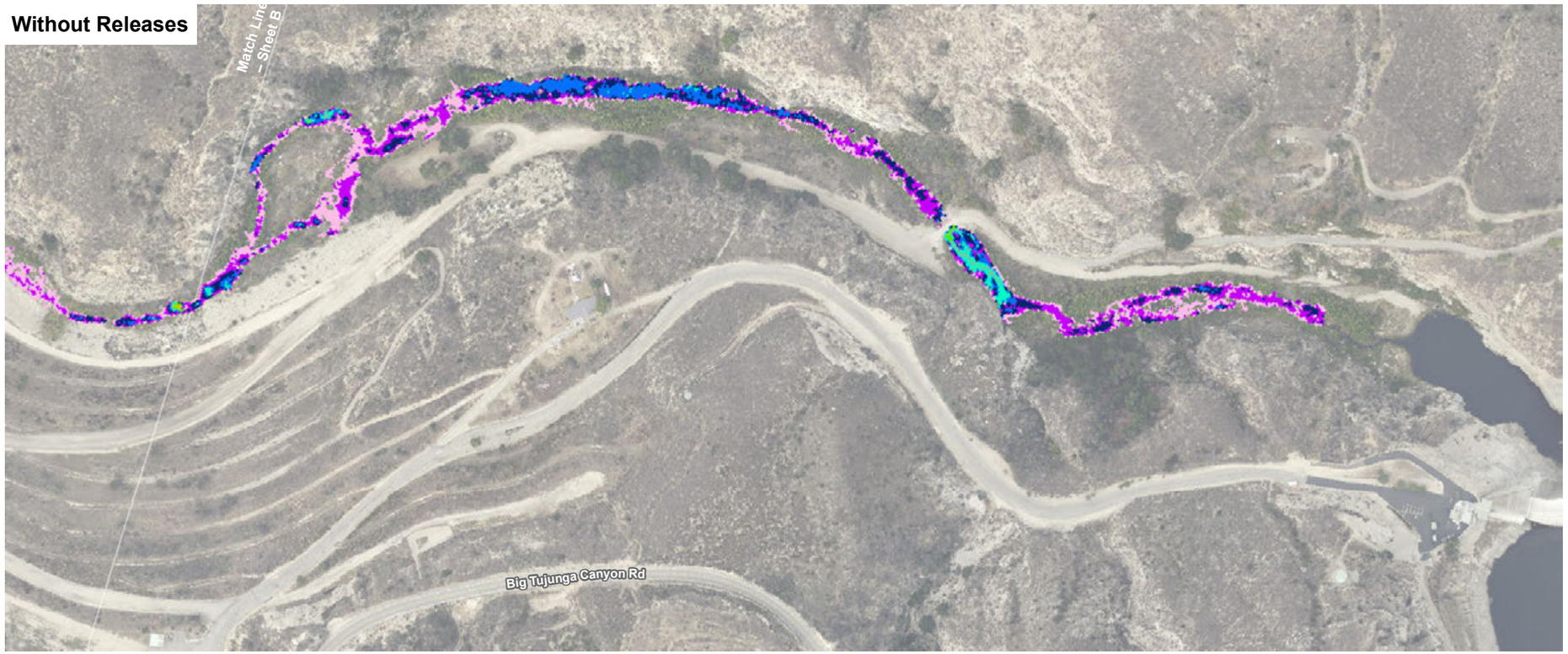
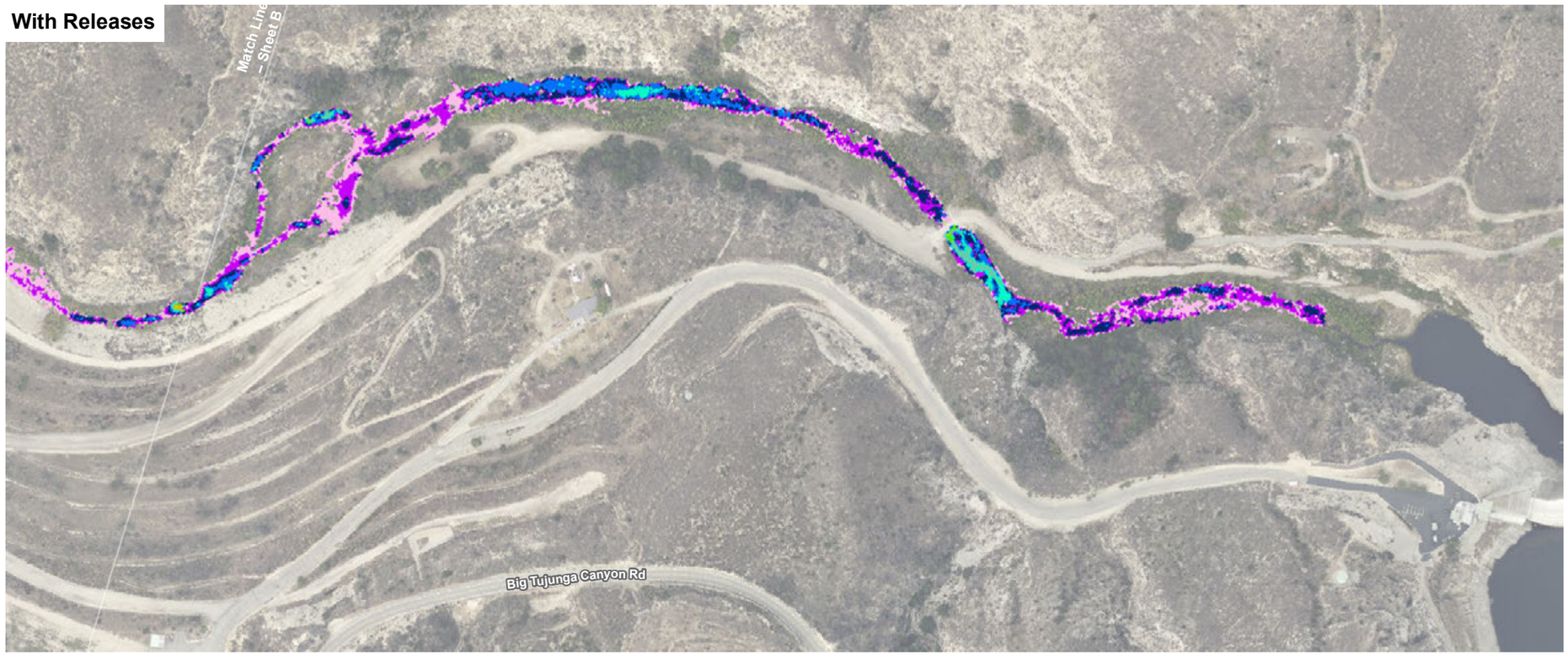
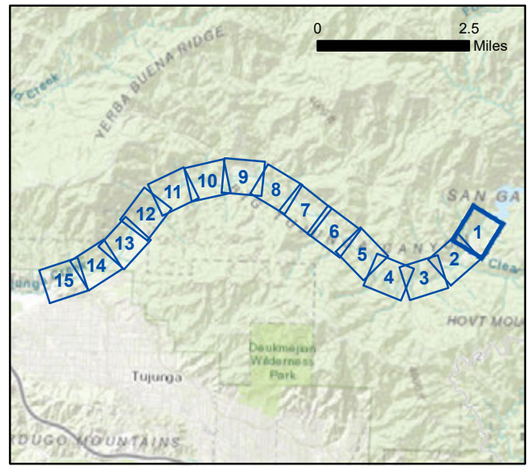
D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_single_DF_20190205.mxd

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0
- 24.0 - 30.0
- 30.0 - 36.0
- 36.0 - 42.0
- 42.0 - 48.0
- 48.0 - 54.1

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4A
Sheet 1

Average Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

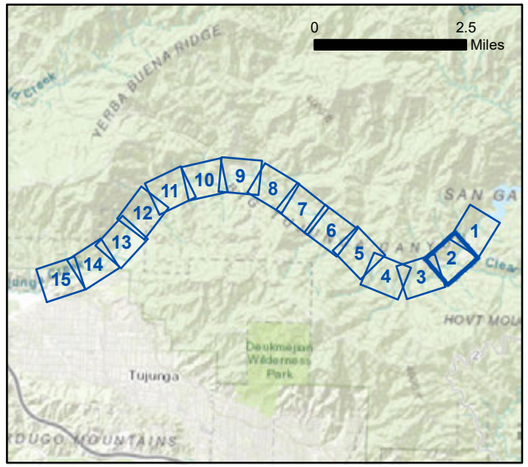
D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0
- 24.0 - 30.0
- 30.0 - 36.0
- 36.0 - 42.0
- 42.0 - 48.0
- 48.0 - 54.1
- 60.1 - 66.1

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4A
Sheet 2

Average Depth (April)

Big Tujunga Dam –
Supplemental Release Study

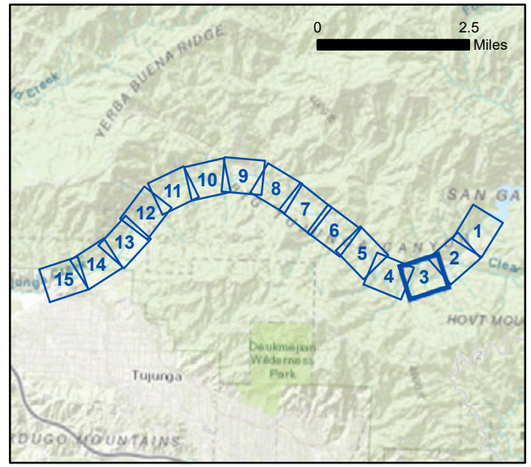
PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

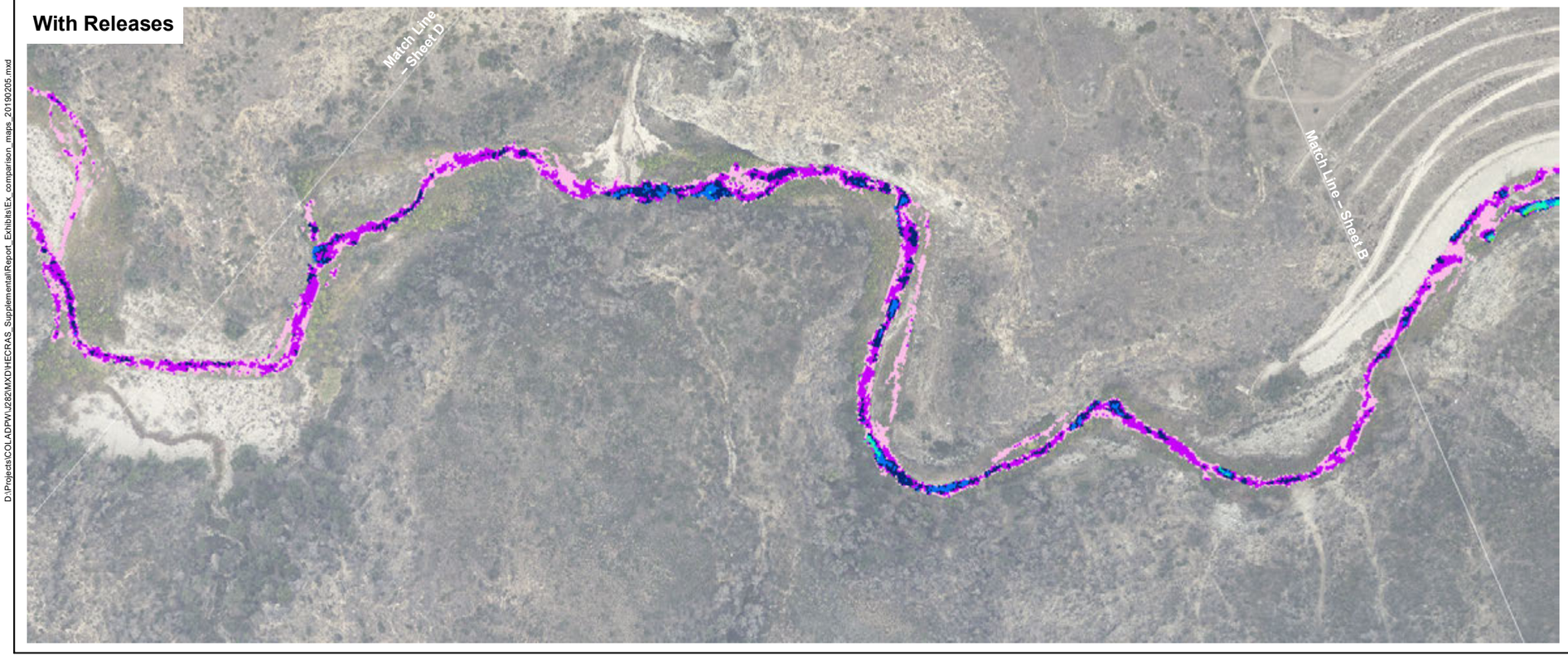
D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases





With Releases



Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0
- 24.0 - 30.0
- 30.0 - 36.0
- 36.0 - 42.0

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 4A
Sheet 3

Average Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

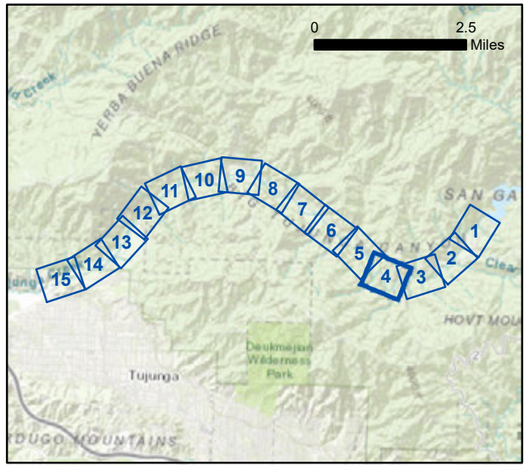
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0
- 24.0 - 30.0

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 4A
Sheet 4

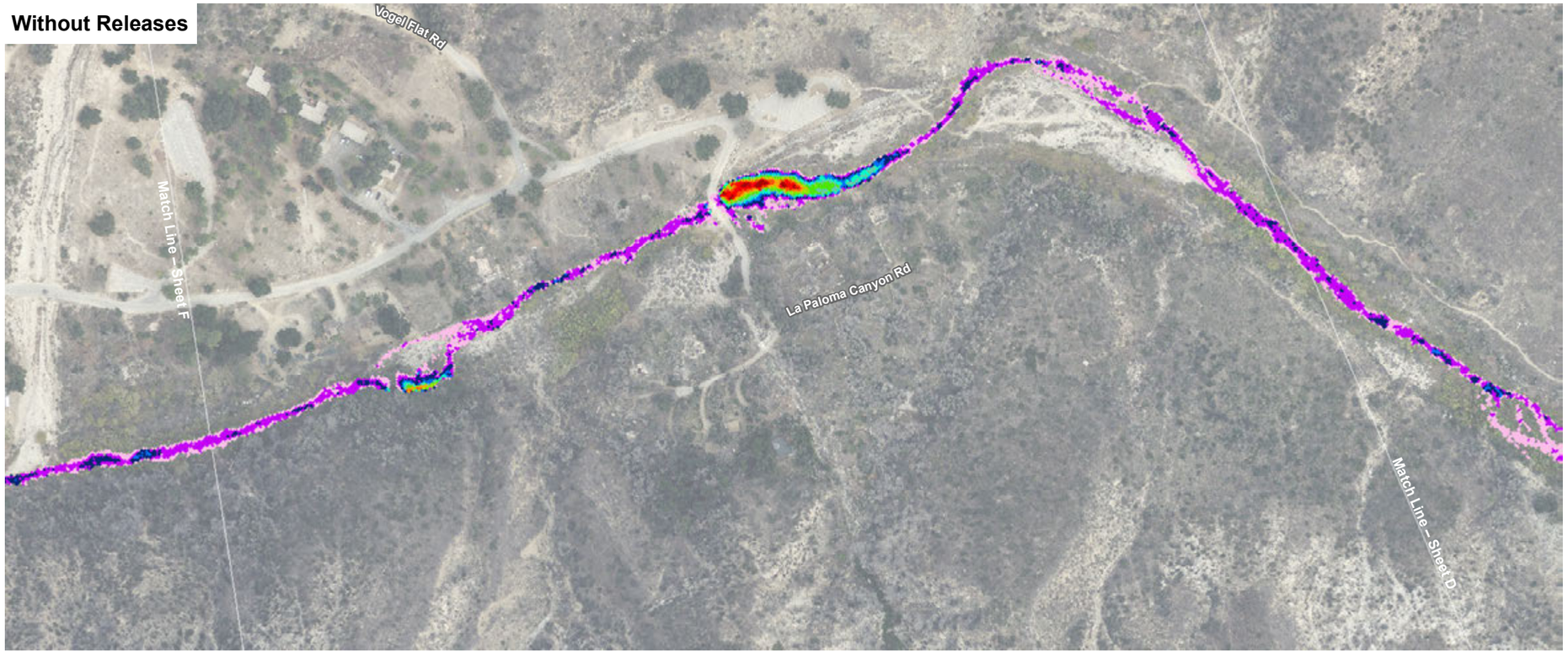
Average Depth (April)

Big Tujunga Dam –
Supplemental Release Study

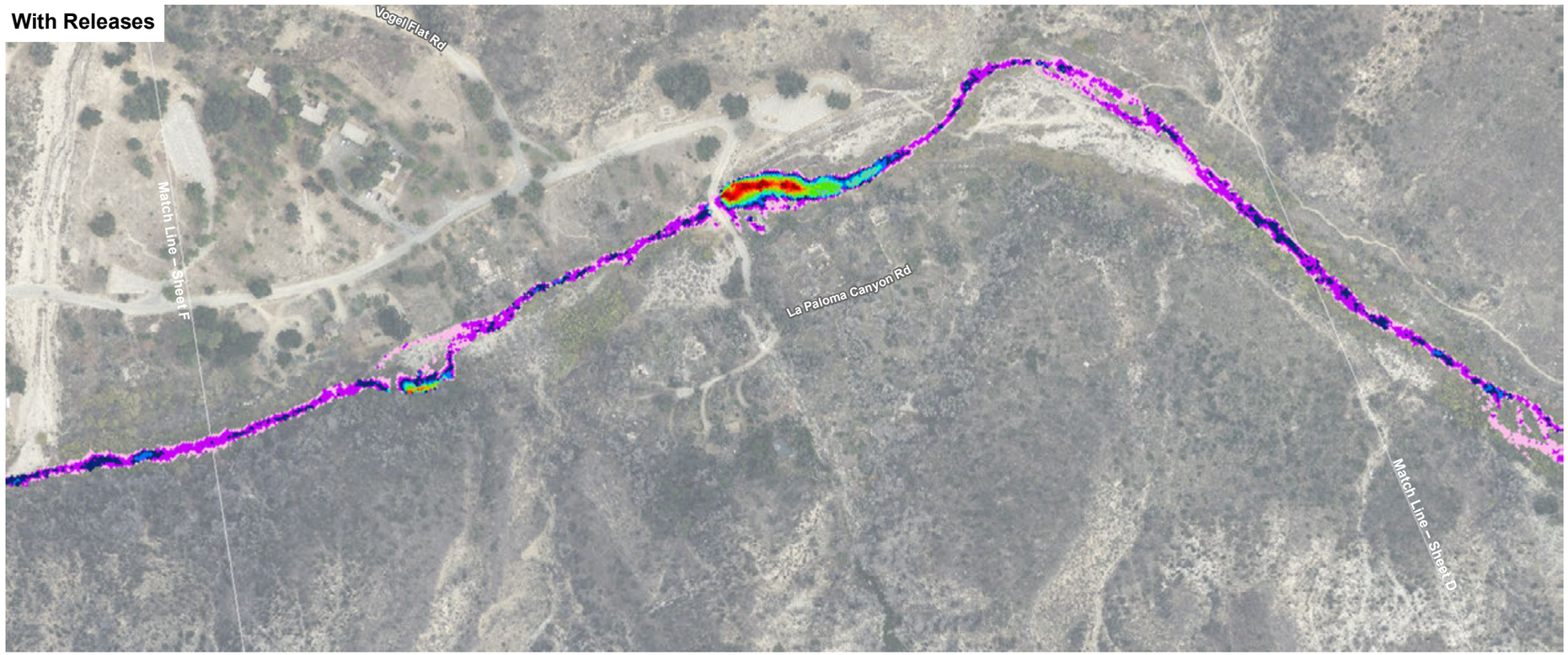
PSOMAS

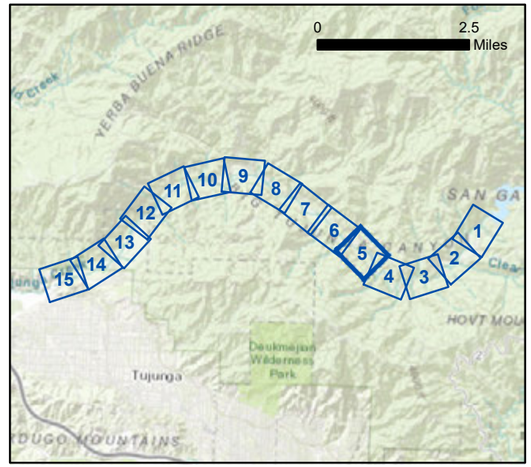
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0
- 24.0 - 30.0
- 30.0 - 36.0
- 36.0 - 42.0
- 42.0 - 48.0
- 48.0 - 54.1
- 54.1 - 60.1
- 60.1 - 66.1
- 66.1 - 72.1
- 72.1 - 78.1

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4A
Sheet 5

Average Depth (April)

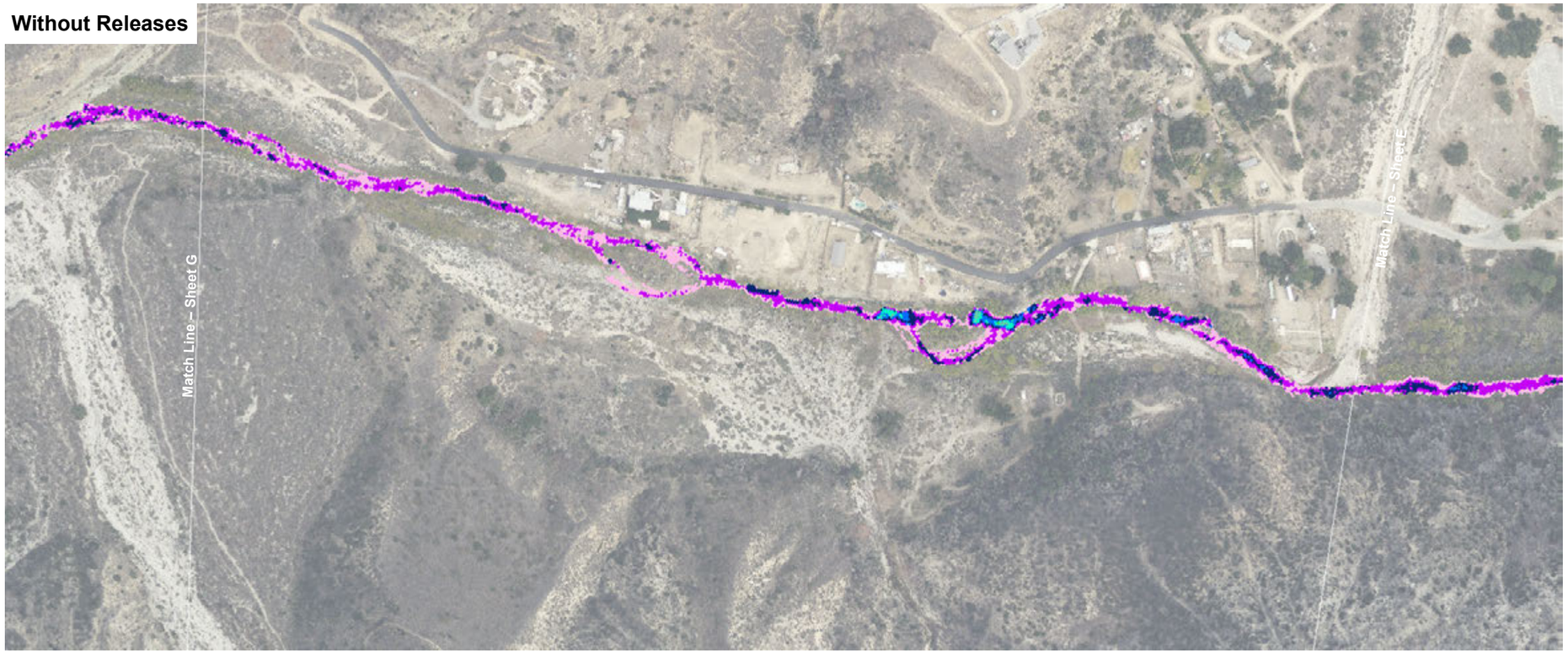
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

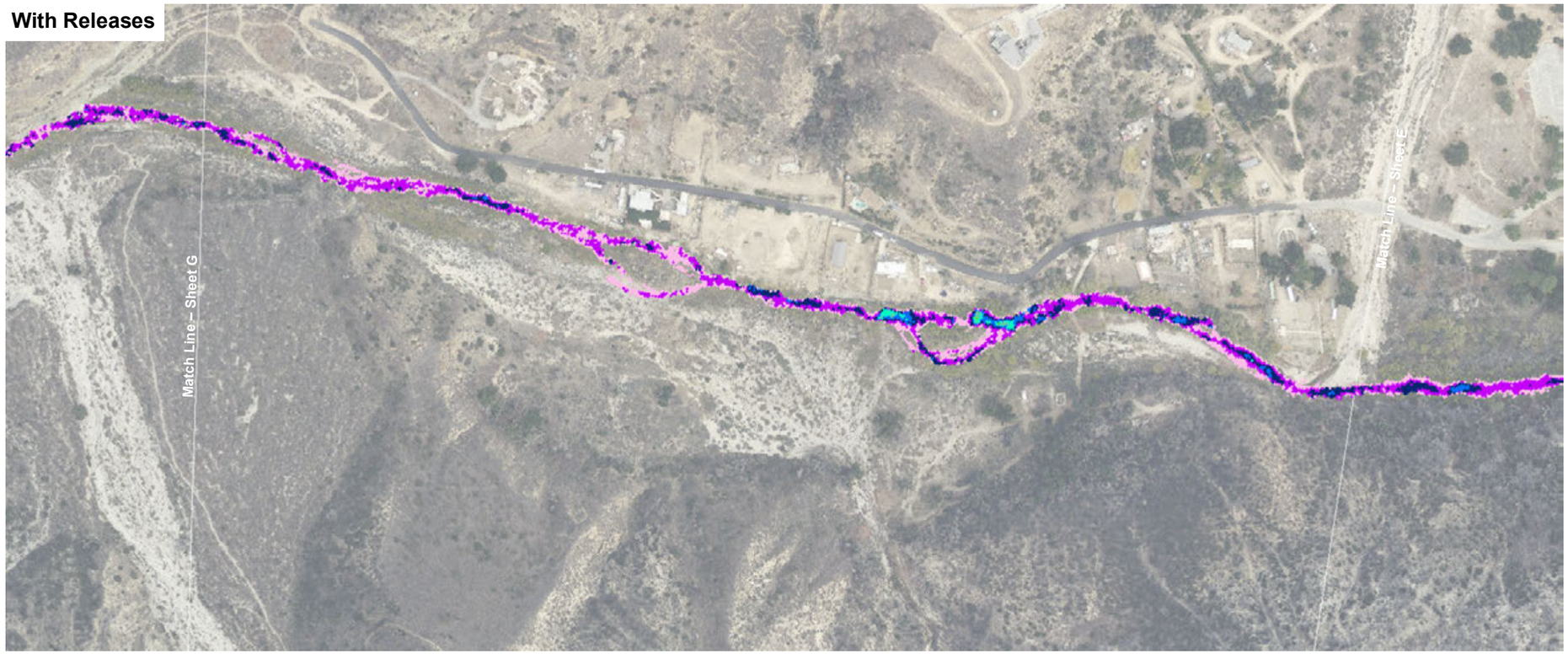
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

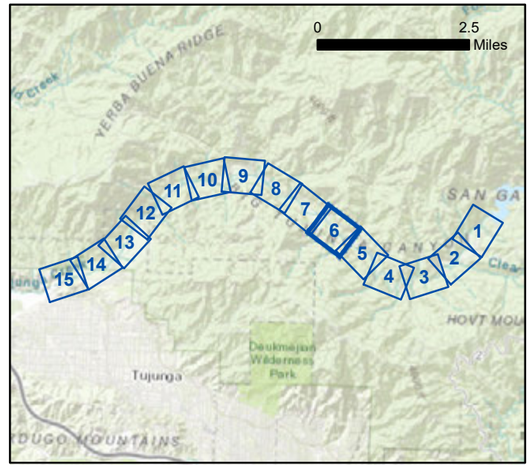
D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0
- 24.0 - 30.0
- 30.0 - 36.0
- 36.0 - 42.0

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 4A
Sheet 6

Average Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

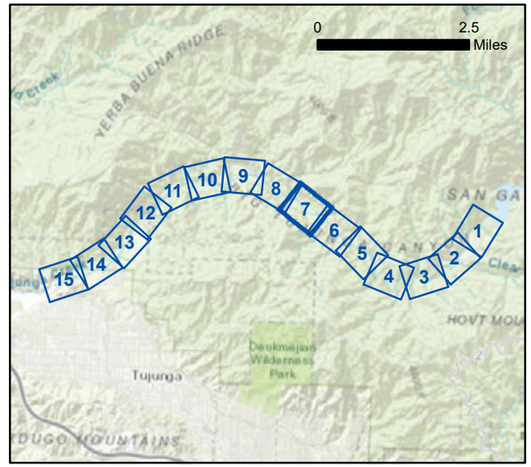
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0
- 24.0 - 30.0
- 30.0 - 36.0

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4A
Sheet 7

Average Depth (April)

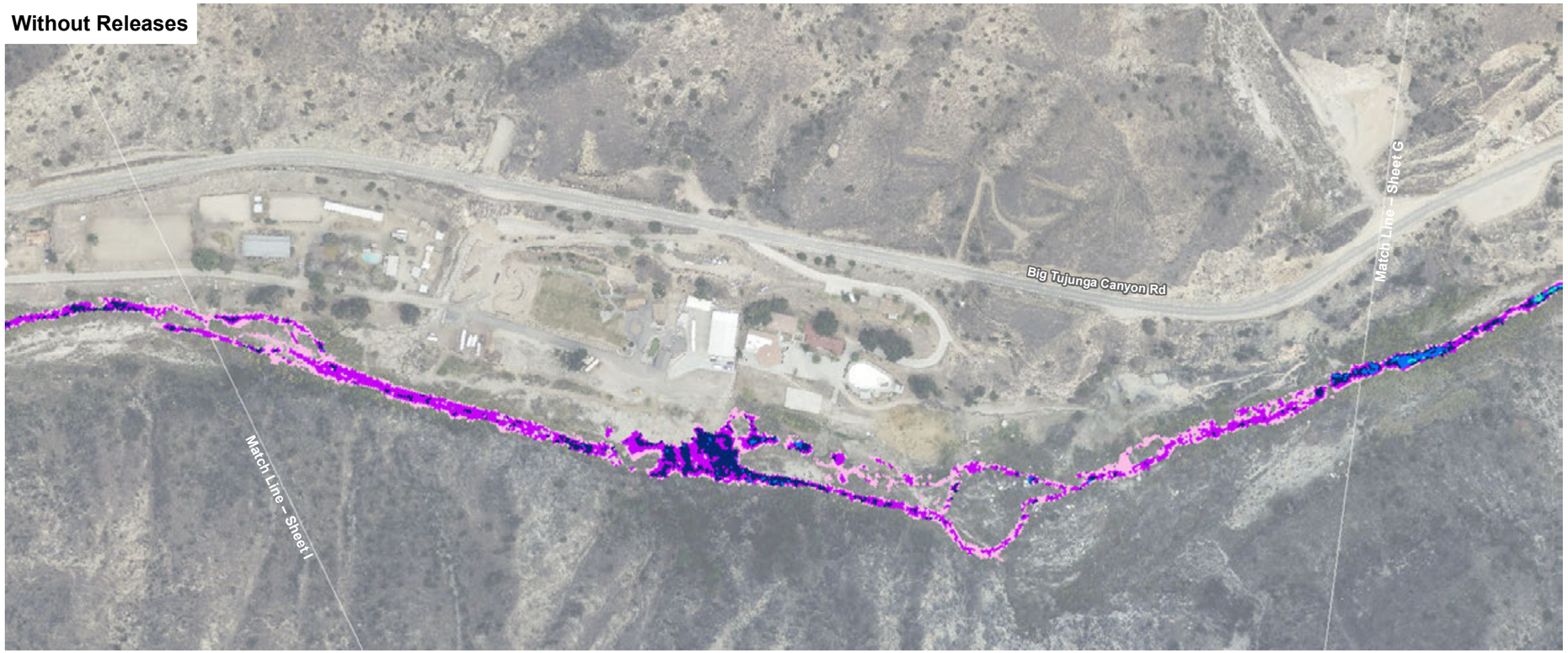
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

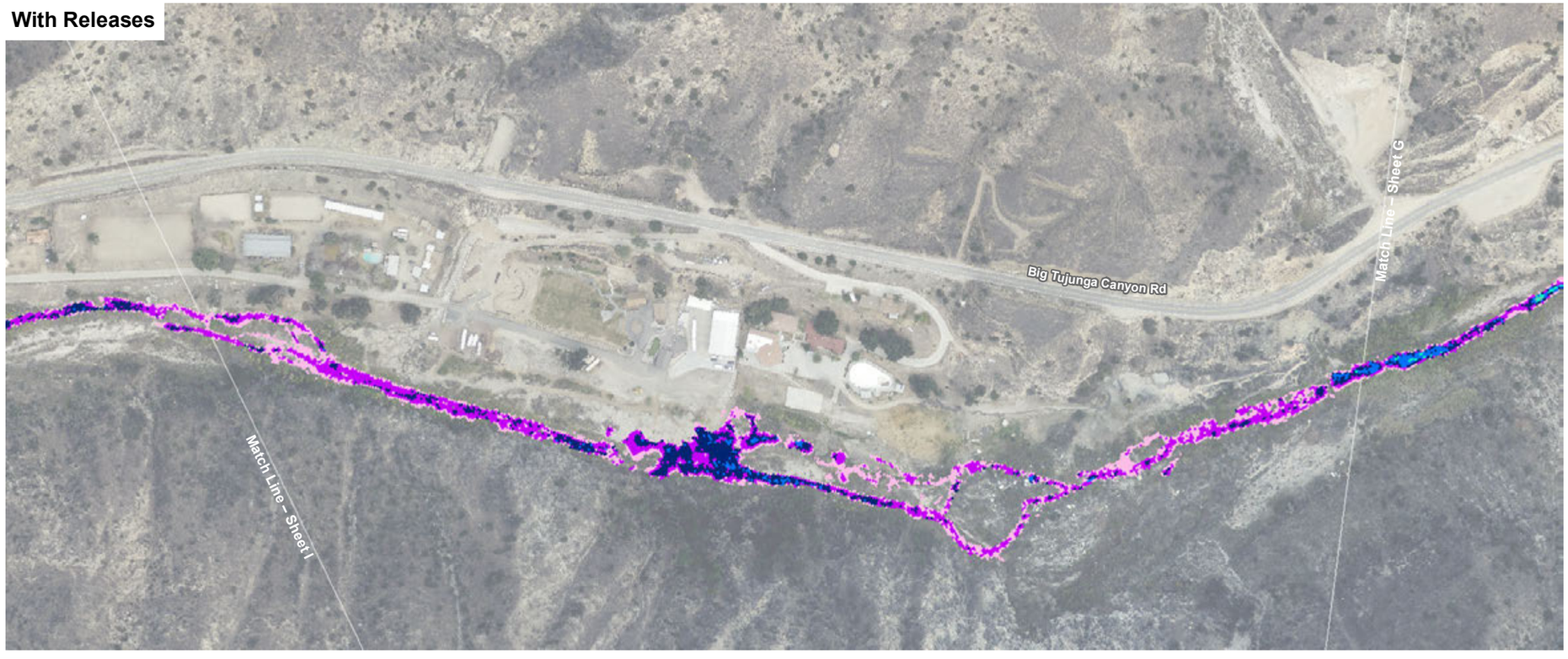
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

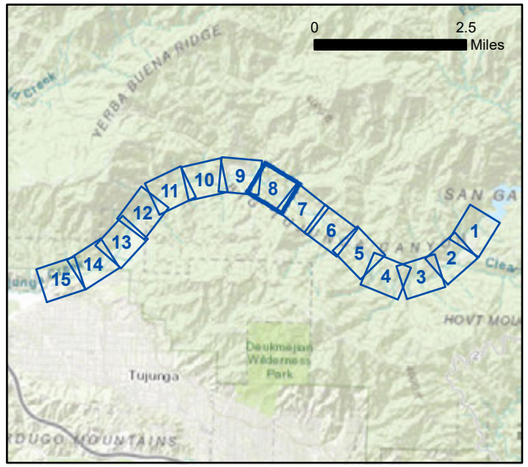
D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_ExhibitsIEx_comparison_maps_20190205.mxd

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0
- 24.0 - 30.0
- 30.0 - 36.0

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 4A
Sheet 8

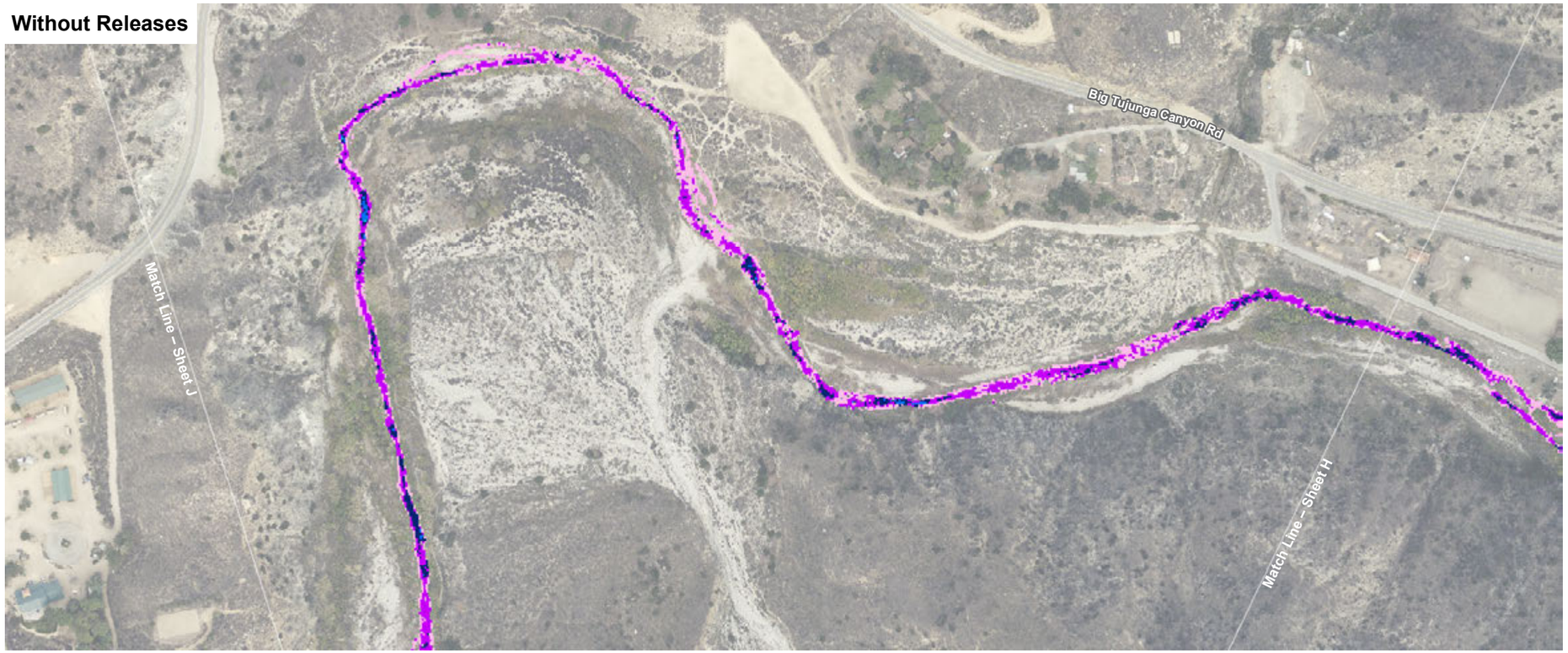
Average Depth (April)

Big Tujunga Dam –
Supplemental Release Study

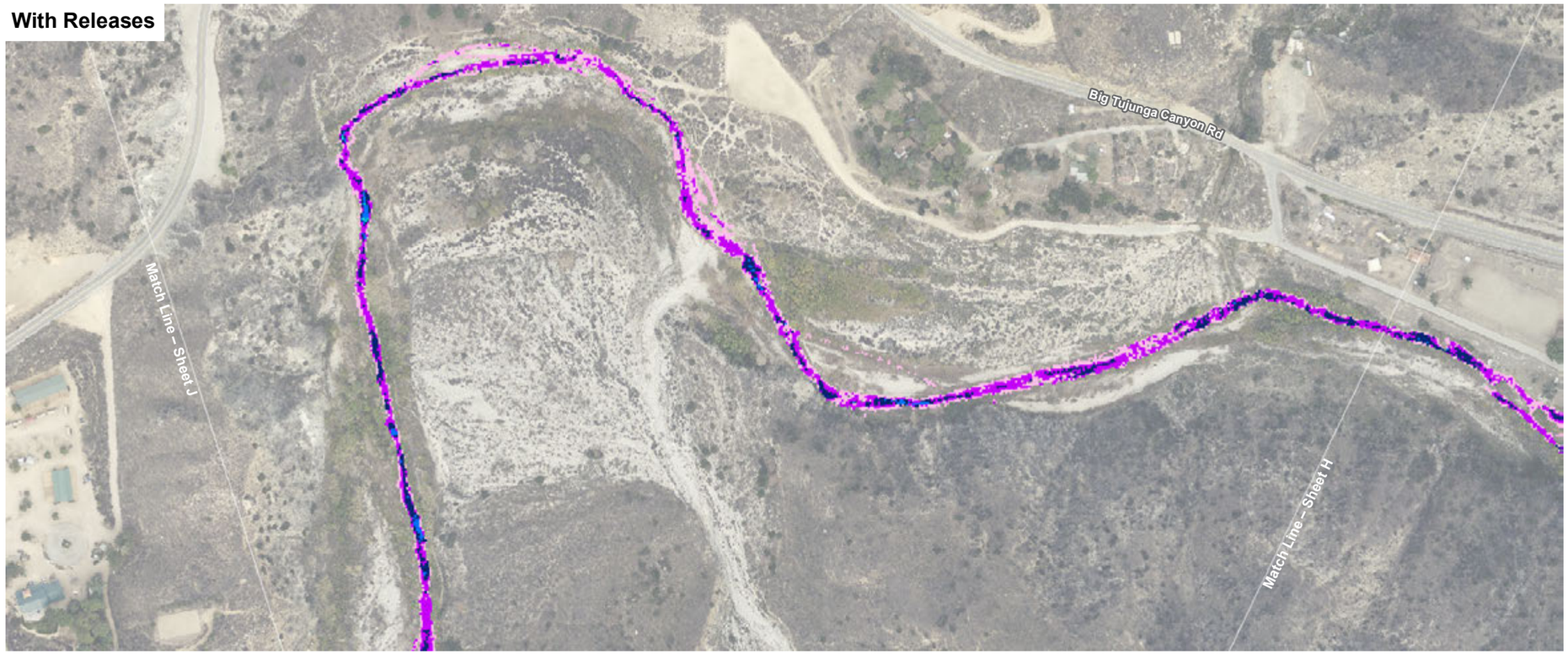
PSOMAS

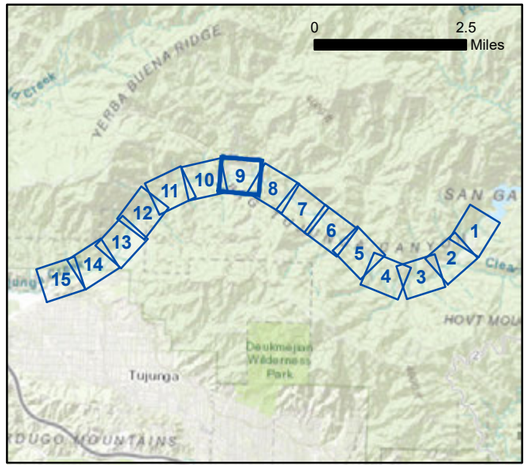
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0
- 24.0 - 30.0

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 4A
Sheet 9

Average Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

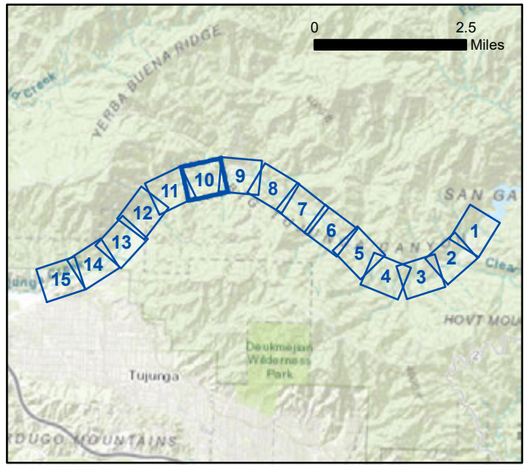
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



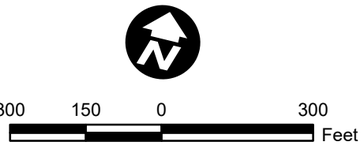
With Releases





Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0
- 24.0 - 30.0
- 30.0 - 36.0
- 36.0 - 42.0
- 42.0 - 48.0
- 48.0 - 54.1
- 54.1 - 60.1



Aerial Source: LAR-IAC 2014

Exhibit 4A
Sheet 10

Average Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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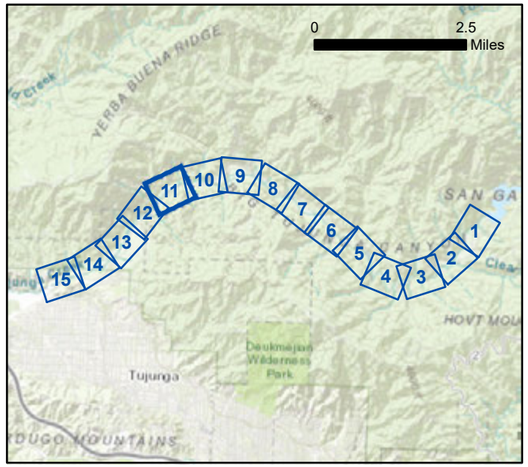
Without Releases



With Releases





Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 4A
Sheet 11

Average Depth (April)

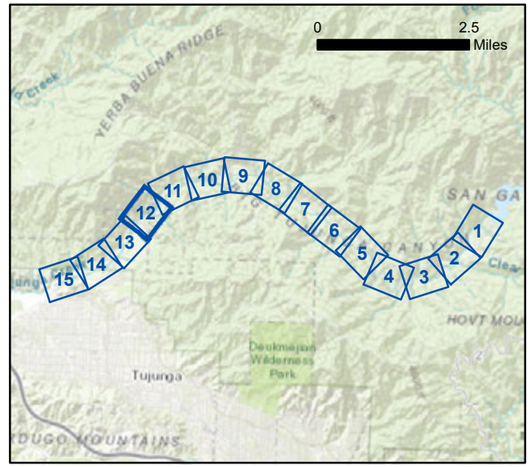
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0
- 24.0 - 30.0

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 4A
Sheet 12

Average Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

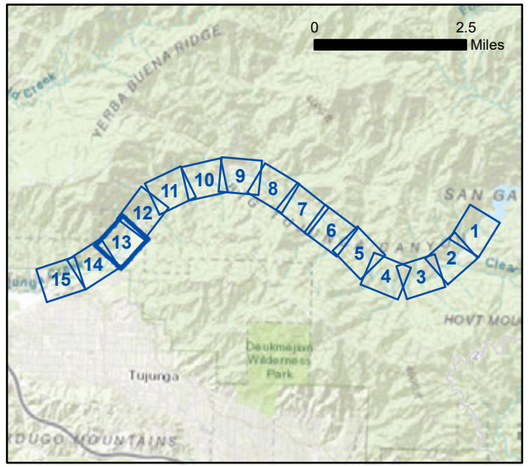
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4A
Sheet 13

Average Depth (April)

Big Tujunga Dam – Supplemental Release Study

PSOMAS

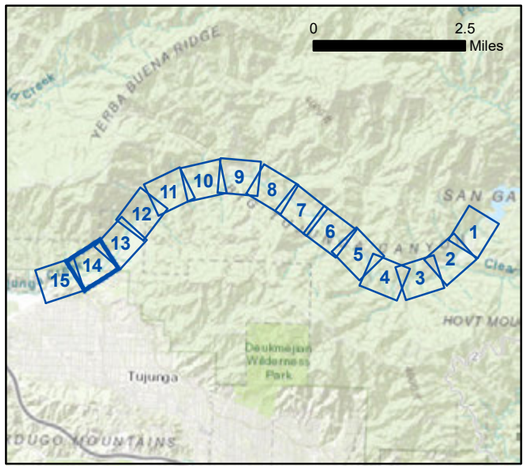
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases

Match Line – Sheet O

Match Line – Sheet M



With Releases

Match Line – Sheet O

Match Line – Sheet M

Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0
- 24.0 - 30.0

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 4A
Sheet 14

Average Depth (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

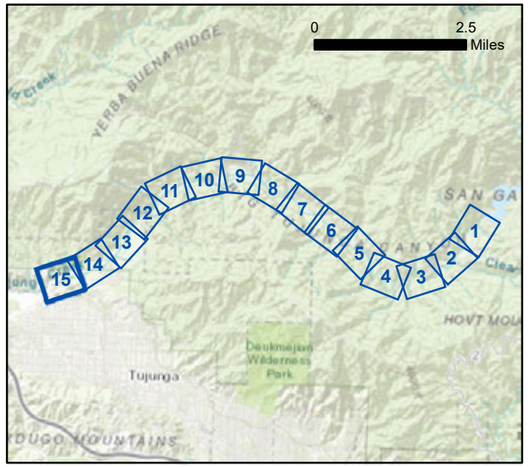
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 6.0
- 6.0 - 12.0
- 12.0 - 18.0
- 18.0 - 24.0
- 24.0 - 30.0
- 30.0 - 36.0
- 36.0 - 42.0

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4A
Sheet 15

Average Depth (April)

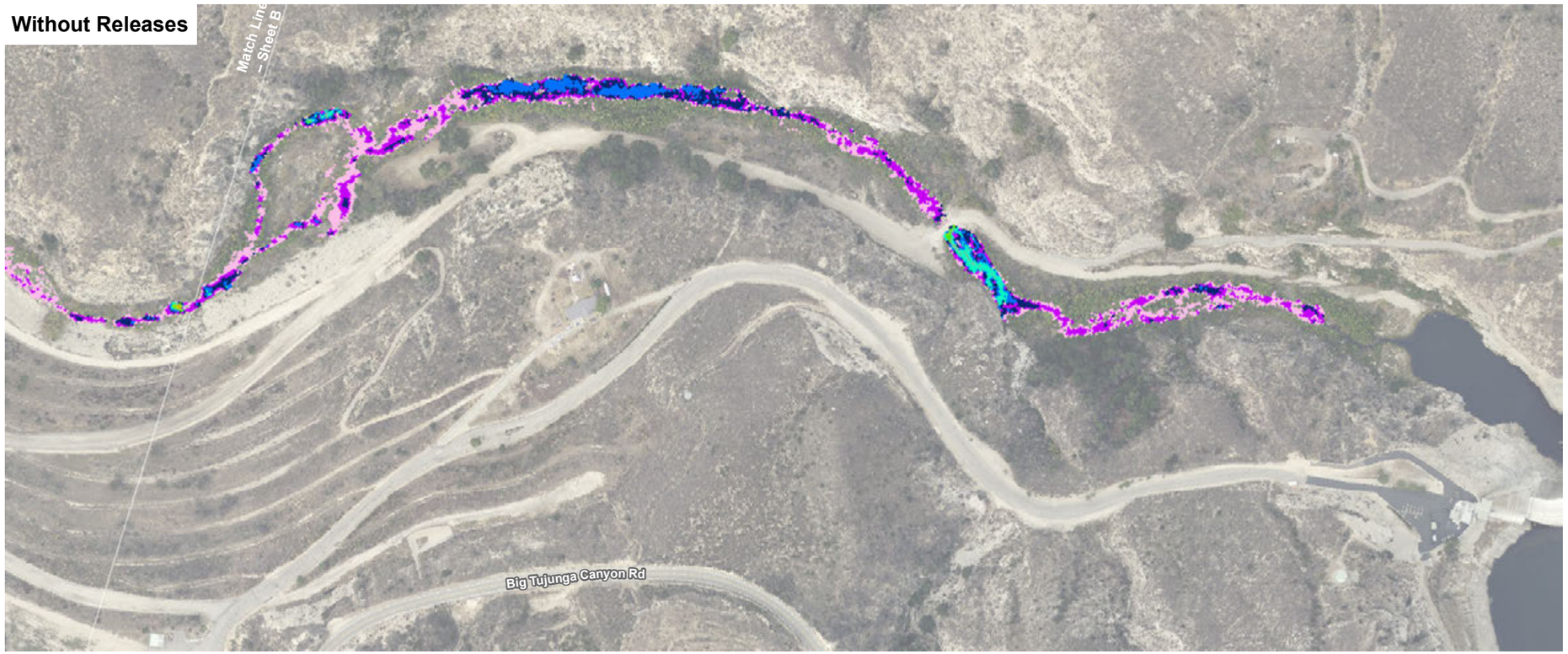
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

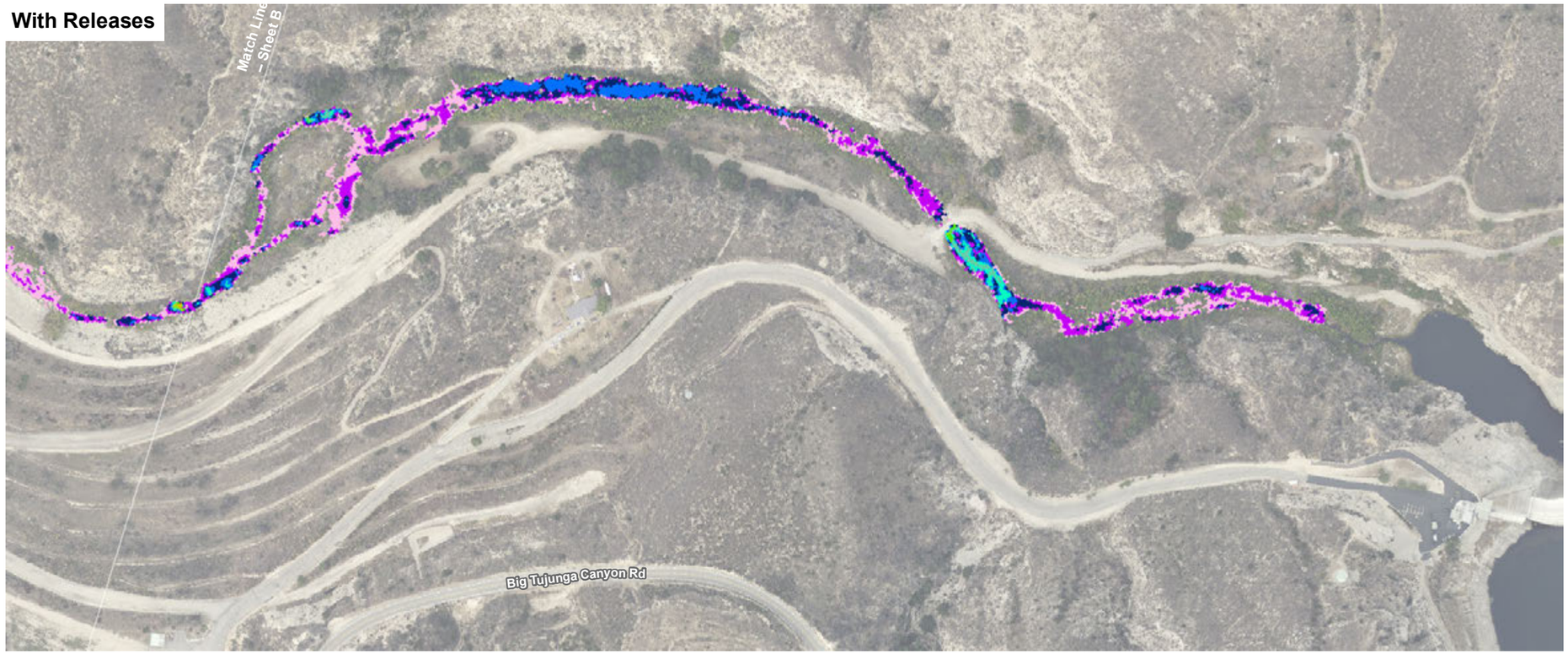
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

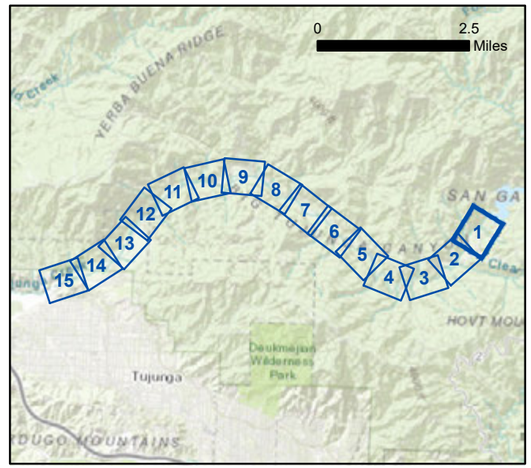
D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1
- 23.1 - 28.9
- 28.9 - 34.7
- 34.7 - 40.4
- 40.4 - 46.2
- 46.2 - 52.0

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 4B
Sheet 1

Average Depth (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

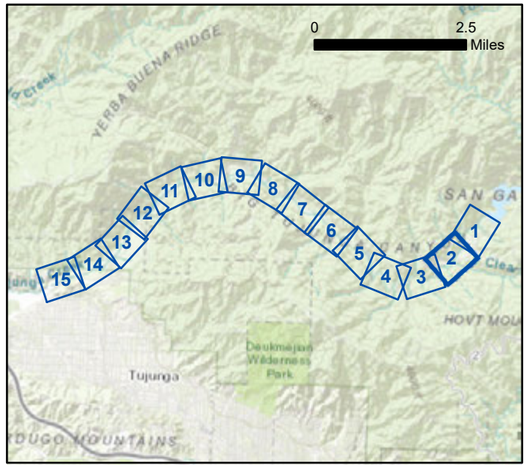
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1
- 23.1 - 28.9
- 28.9 - 34.7
- 34.7 - 40.4
- 40.4 - 46.2
- 46.2 - 52.0
- 57.8 - 63.5

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 4B
Sheet 2

Average Depth (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

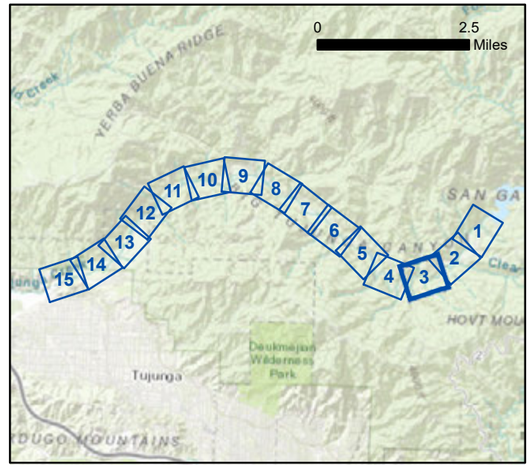
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1
- 23.1 - 28.9
- 28.9 - 34.7
- 34.7 - 40.4

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 4B
Sheet 3

Average Depth (June)

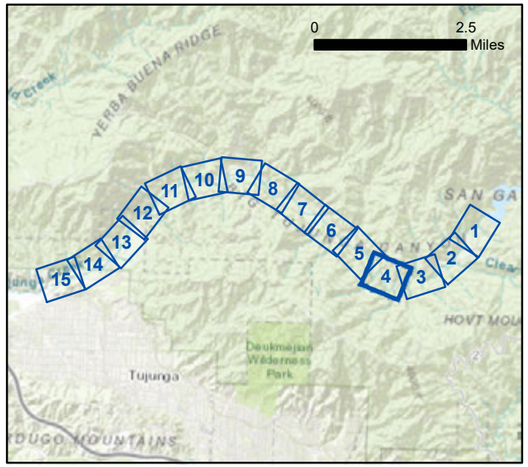
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4B
Sheet 4

Average Depth (June)

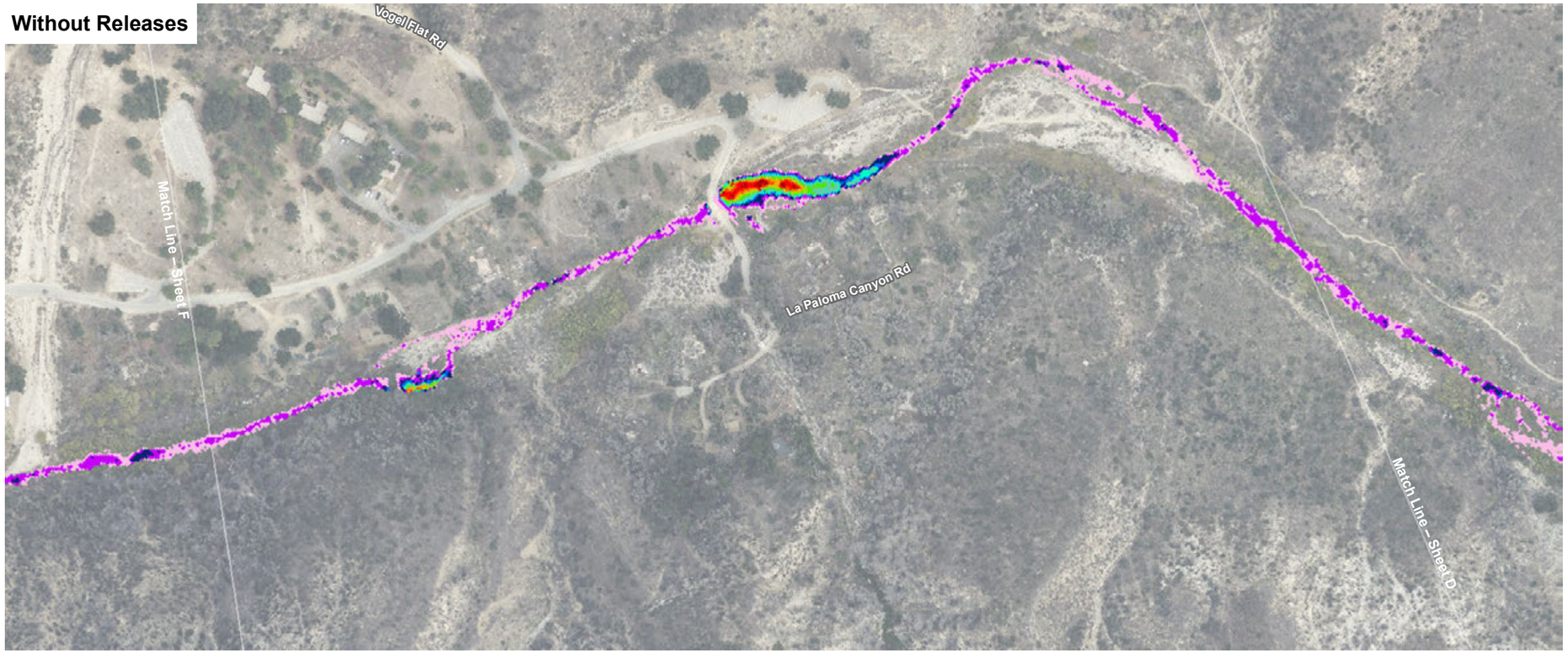
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

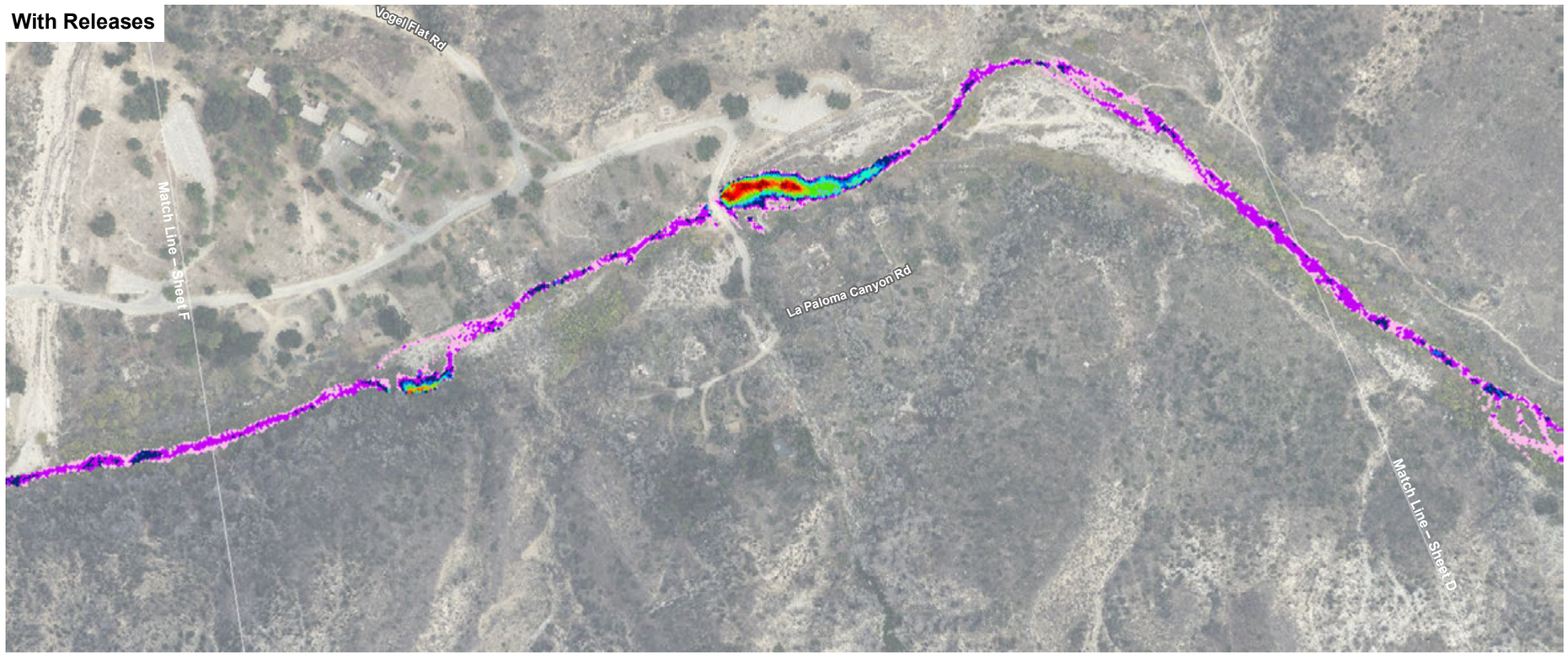
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

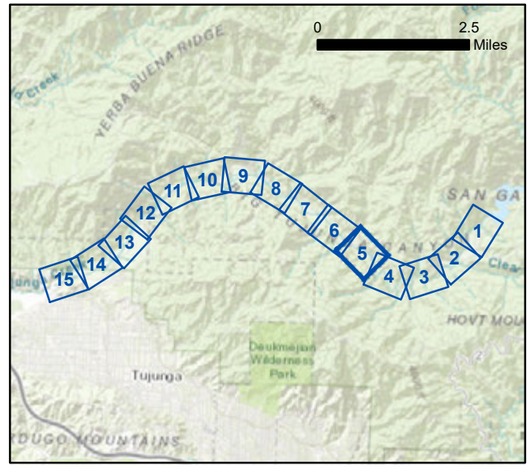
D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1
- 23.1 - 28.9
- 28.9 - 34.7
- 34.7 - 40.4
- 40.4 - 46.2
- 46.2 - 52.0
- 52.0 - 57.8
- 57.8 - 63.5
- 63.5 - 69.3
- 69.3 - 75.1

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 4B
Sheet 5

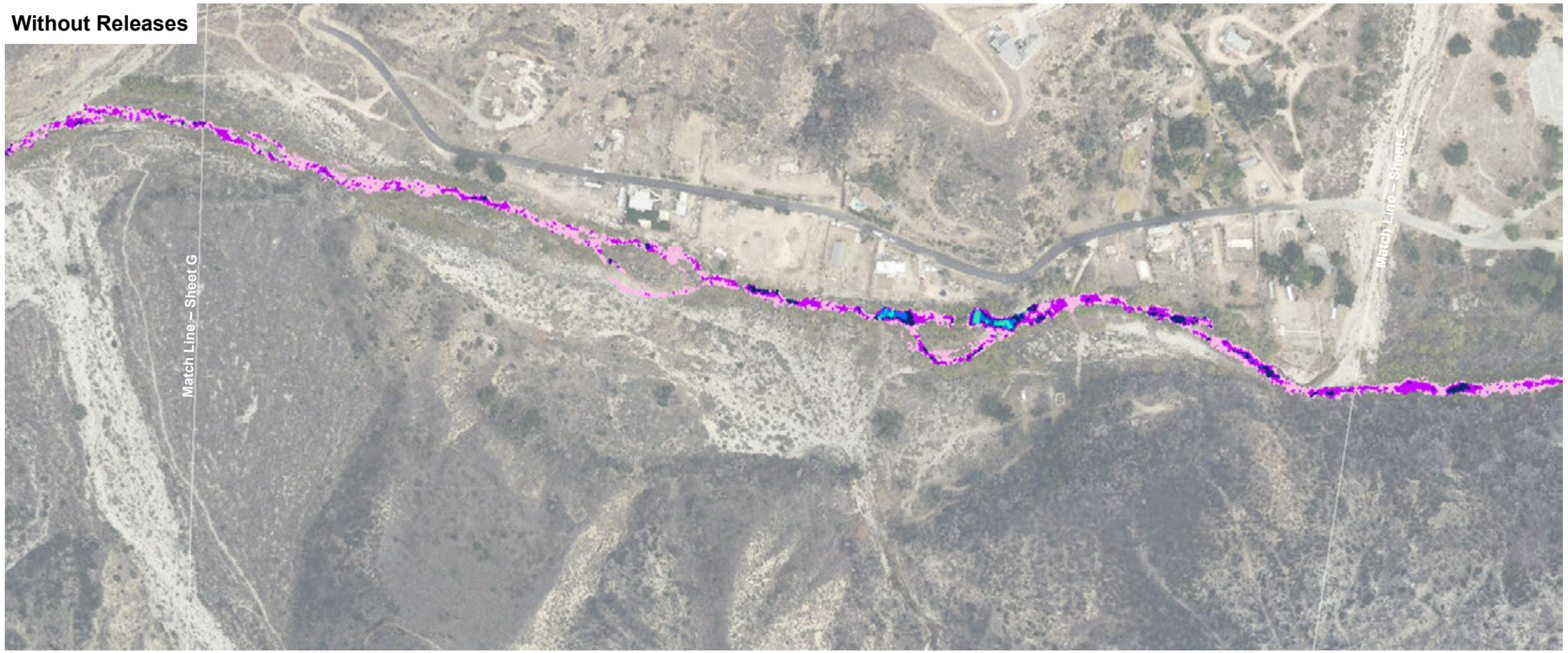
Average Depth (June)

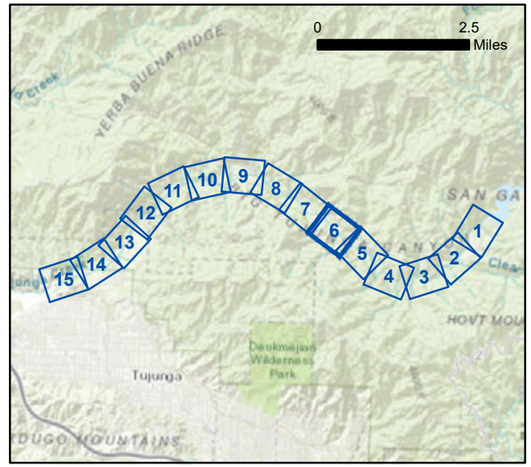
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

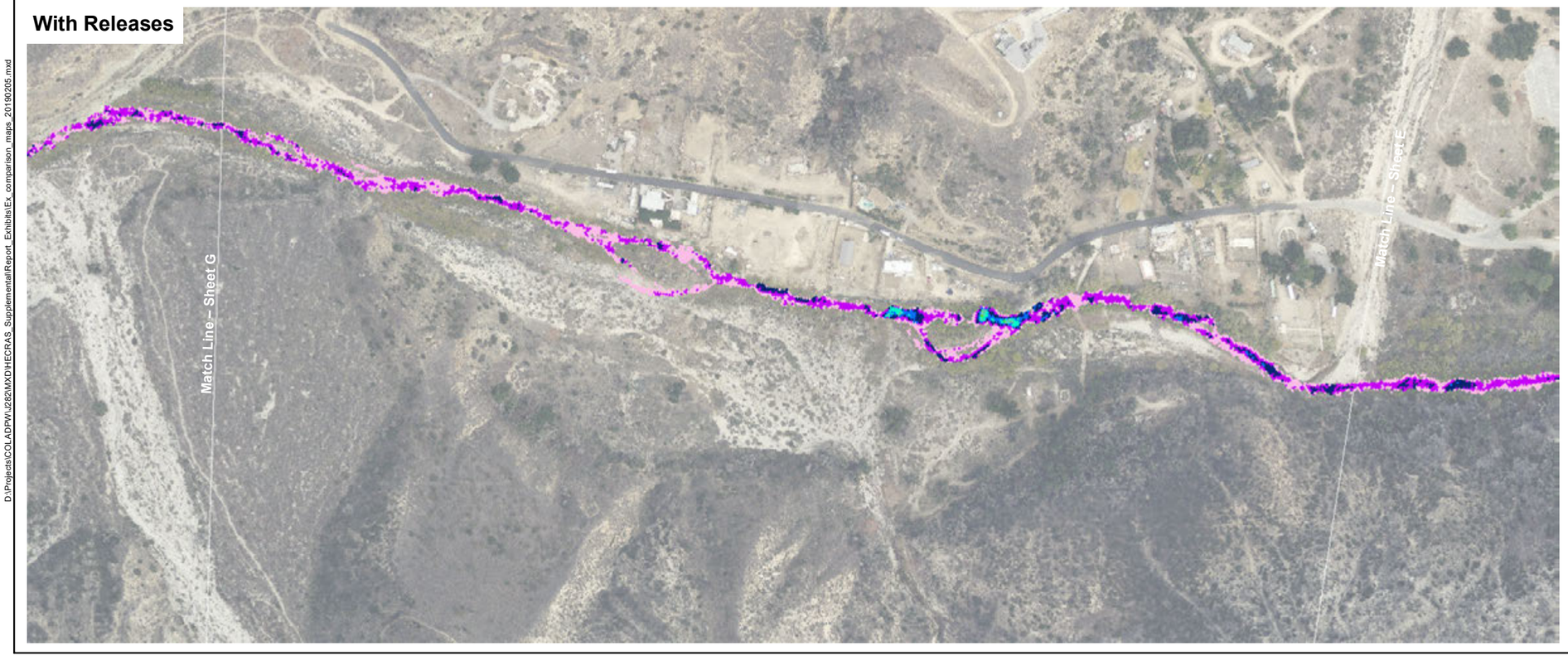
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1
- 23.1 - 28.9
- 28.9 - 34.7
- 34.7 - 40.4

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 4B
Sheet 6

Average Depth (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

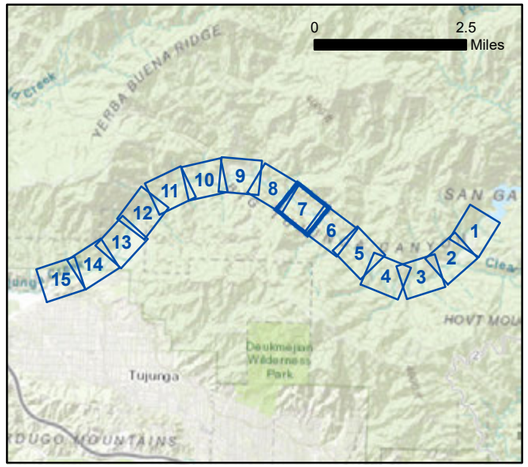
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1
- 23.1 - 28.9
- 28.9 - 34.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 4B
Sheet 7

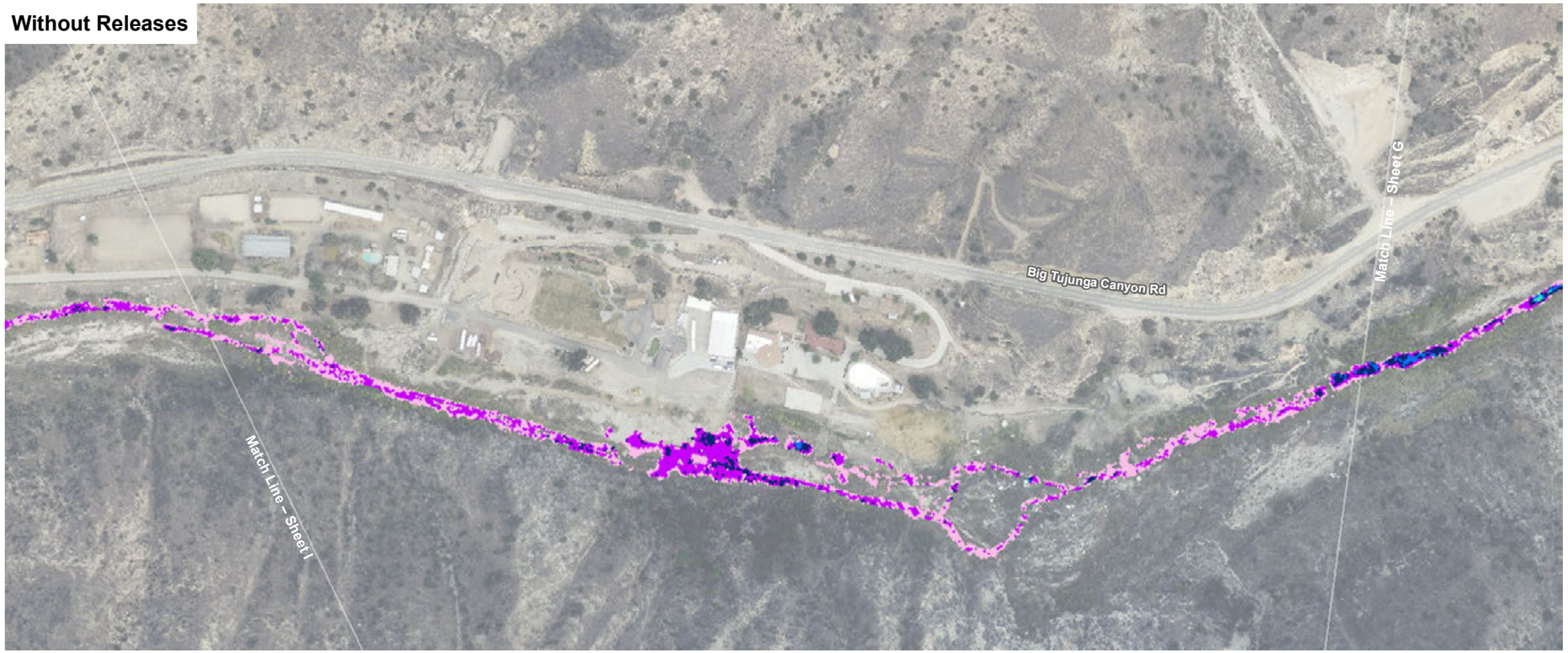
Average Depth (June)

Big Tujunga Dam –
Supplemental Release Study

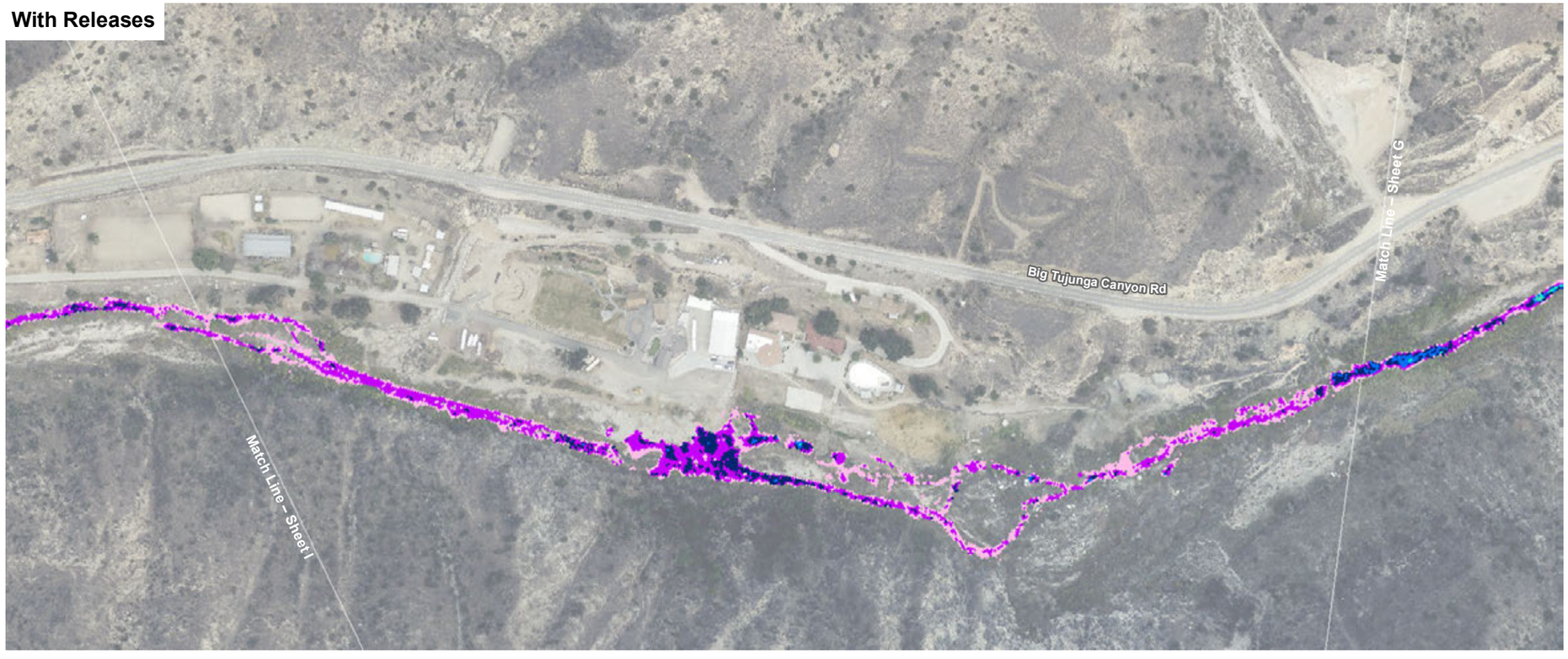
PSOMAS

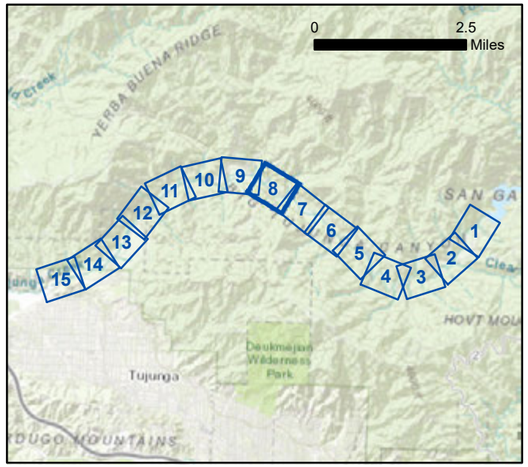
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1
- 23.1 - 28.9
- 28.9 - 34.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4B
Sheet 8

Average Depth (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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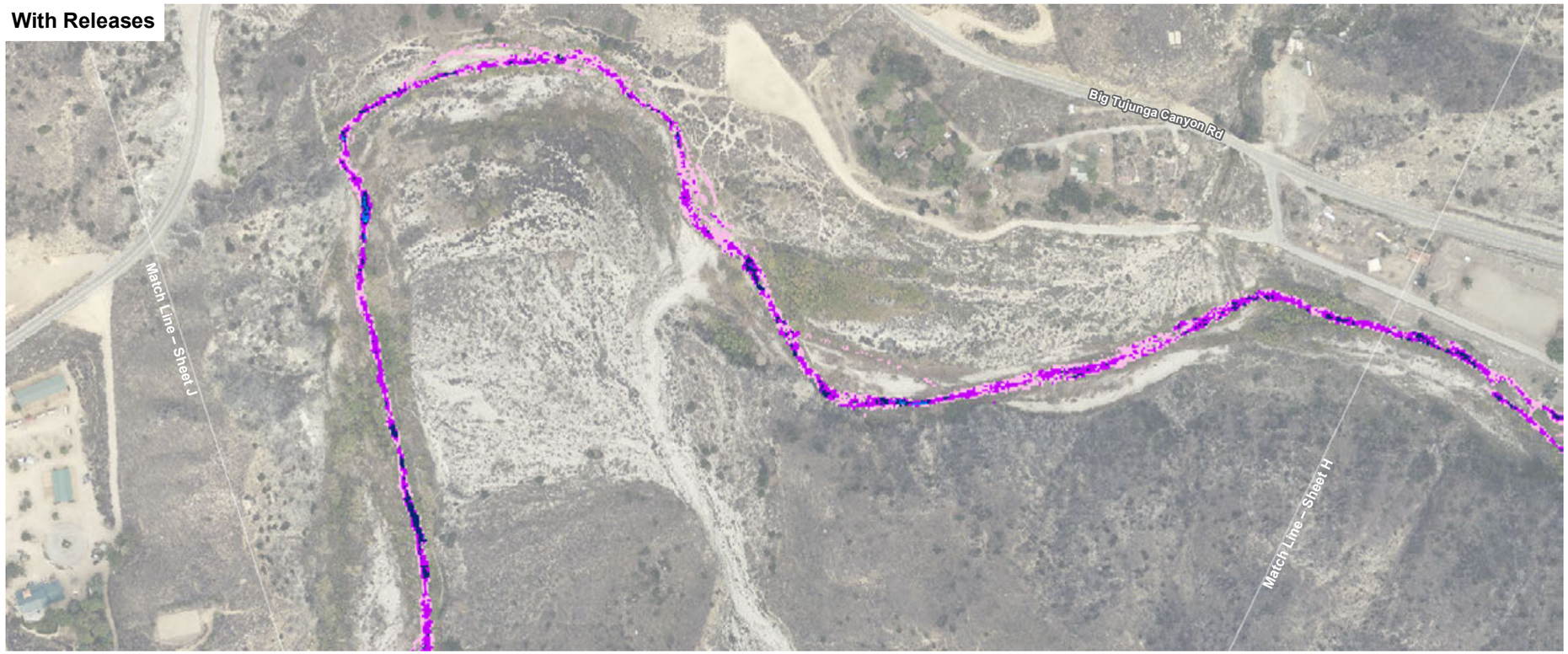
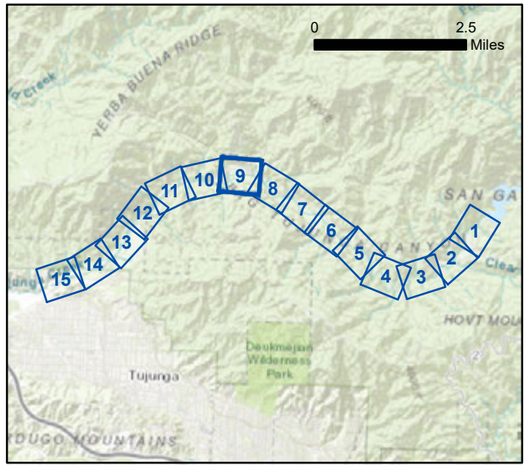
Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1
- 23.1 - 28.9

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 4B
Sheet 9

Average Depth (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

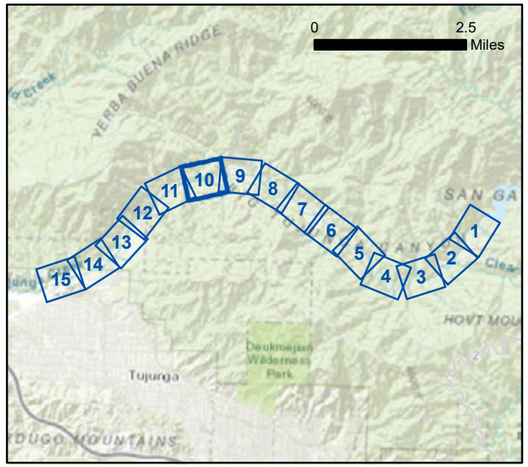
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1
- 23.1 - 28.9
- 28.9 - 34.7
- 34.7 - 40.4
- 40.4 - 46.2
- 46.2 - 52.0
- 52.0 - 57.8

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4B
Sheet 10

Average Depth (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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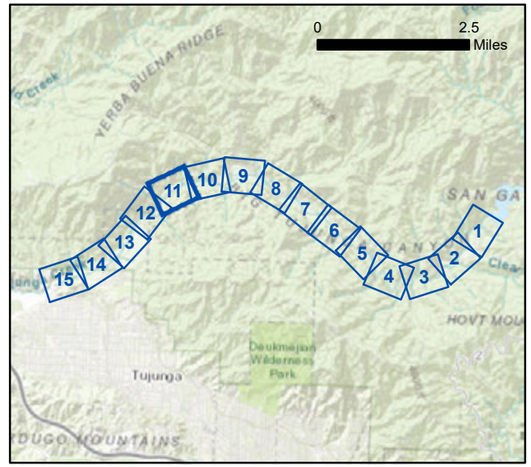
Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3

300 150 0 300 Feet

Aerial Source: LAR-IAC 2014

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Exhibit 4B
Sheet 11

Average Depth (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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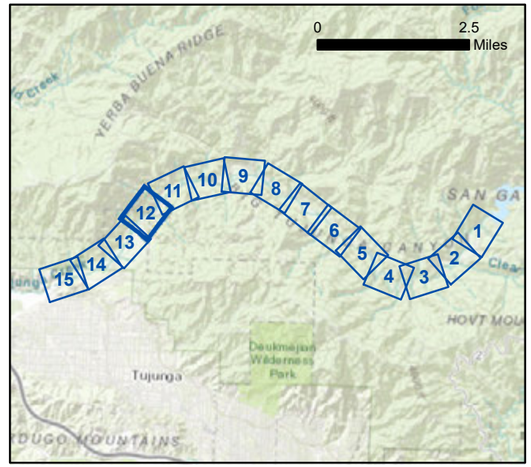
Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1
- 23.1 - 28.9

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 4B
Sheet 12

Average Depth (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

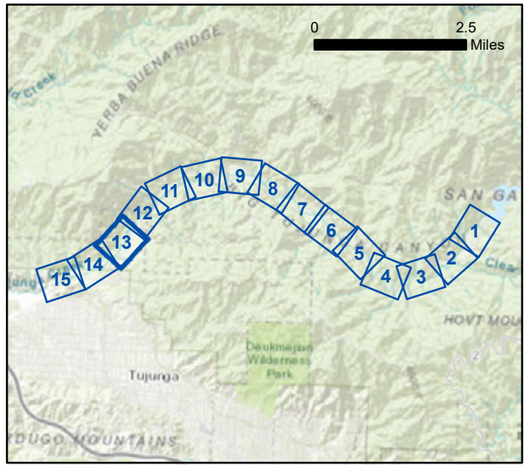
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 4B
Sheet 13

Average Depth (June)

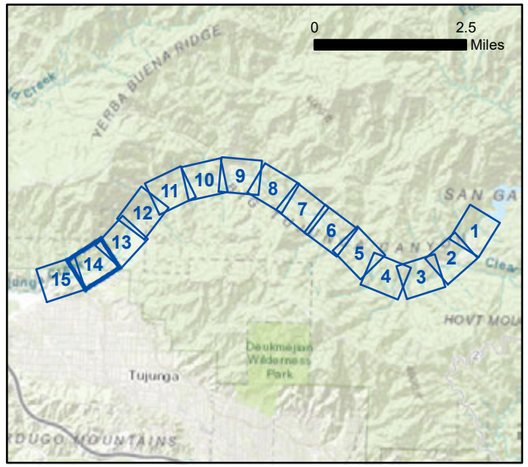
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1
- 23.1 - 28.9



300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 4B
Sheet 14

Average Depth (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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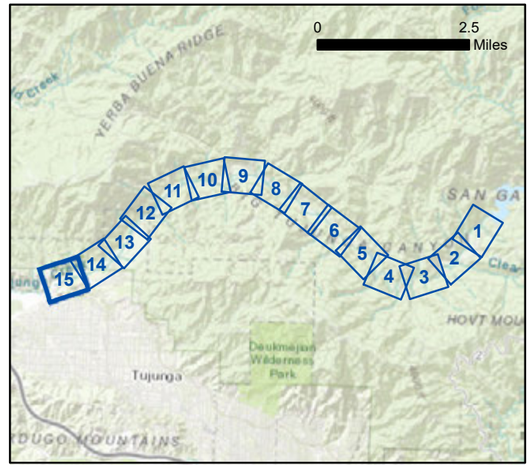
Without Releases





With Releases



Average Depth (inches)

- 0.0 - 5.8
- 5.8 - 11.6
- 11.6 - 17.3
- 17.3 - 23.1
- 23.1 - 28.9
- 28.9 - 34.7
- 34.7 - 40.4

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4B
Sheet 15

Average Depth (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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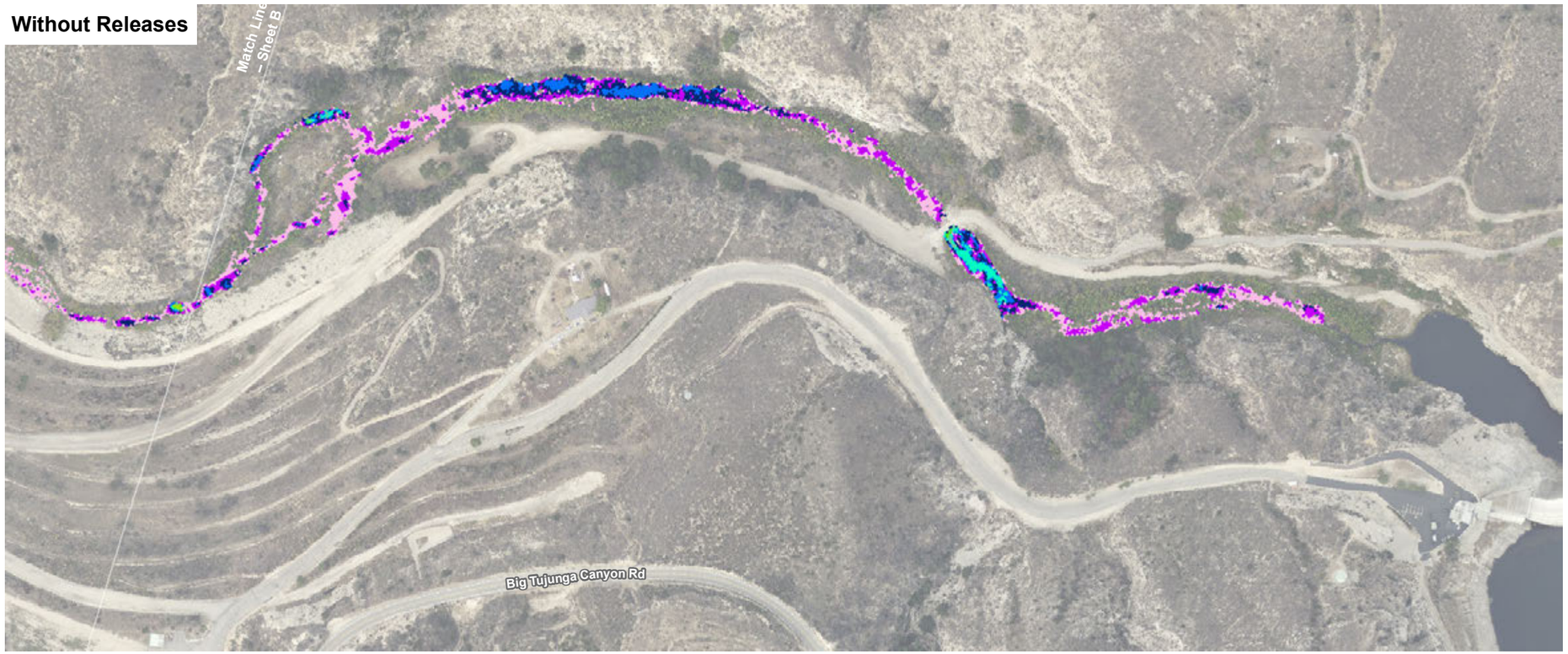
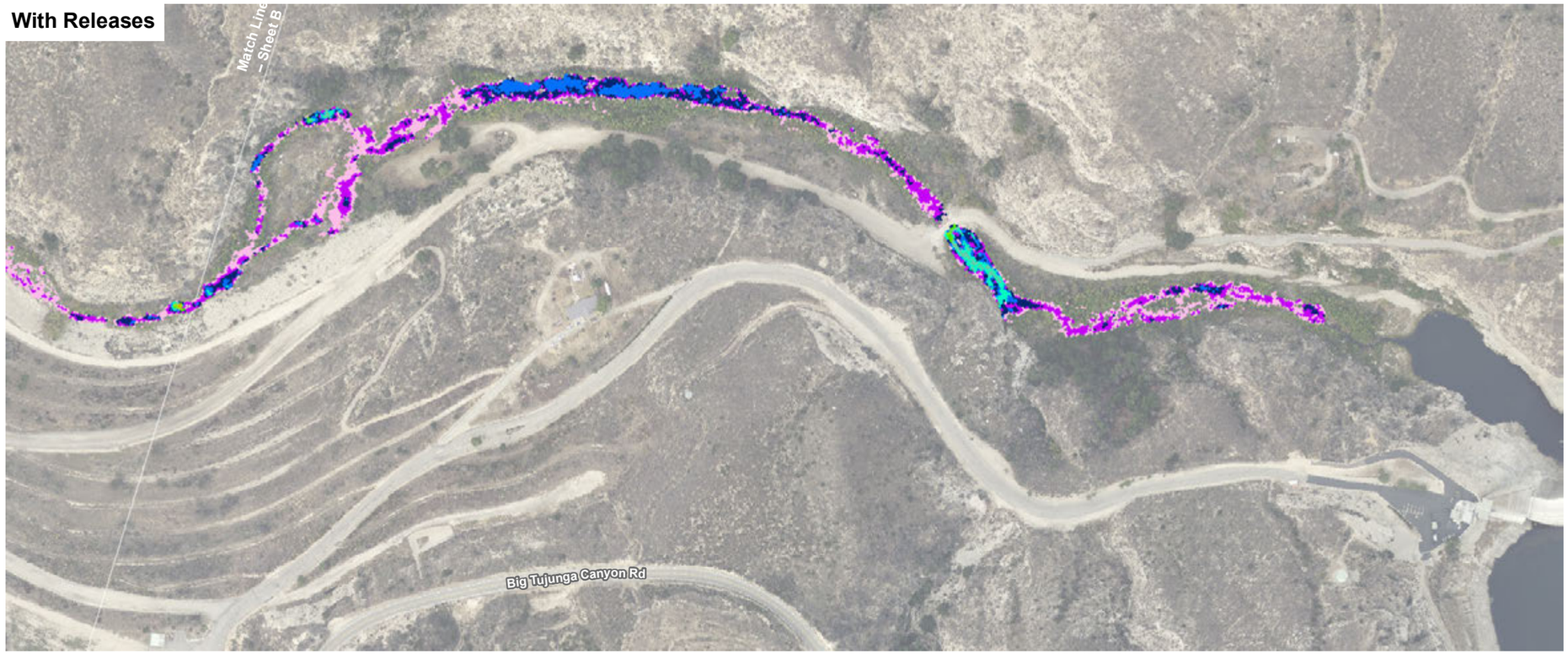
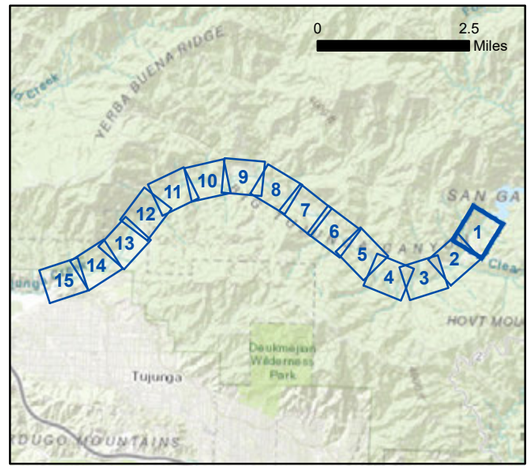
Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7
- 22.7 - 28.3
- 28.3 - 34.0
- 34.0 - 39.7
- 39.7 - 45.3
- 45.3 - 51.0

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4C
Sheet 1

Average Depth (September)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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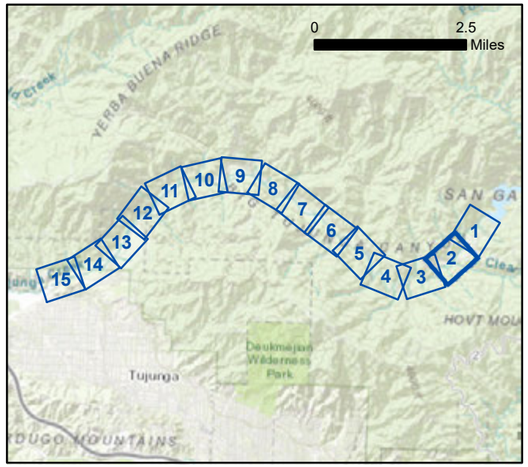
Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7
- 22.7 - 28.3
- 28.3 - 34.0
- 34.0 - 39.7
- 39.7 - 45.3
- 45.3 - 51.0
- 56.7 - 62.3

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4C
Sheet 2

Average Depth (September)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

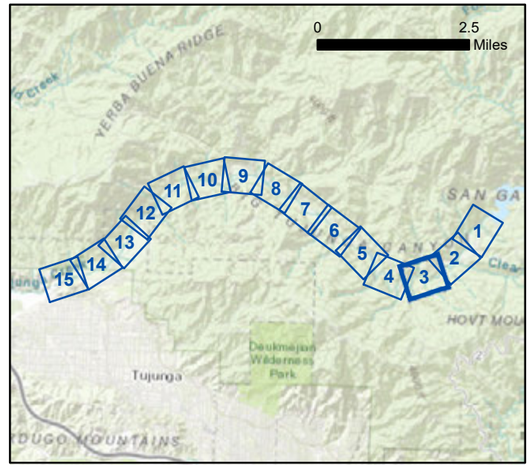
D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7
- 22.7 - 28.3
- 28.3 - 34.0
- 34.0 - 39.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4C
Sheet 3

Average Depth (September)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

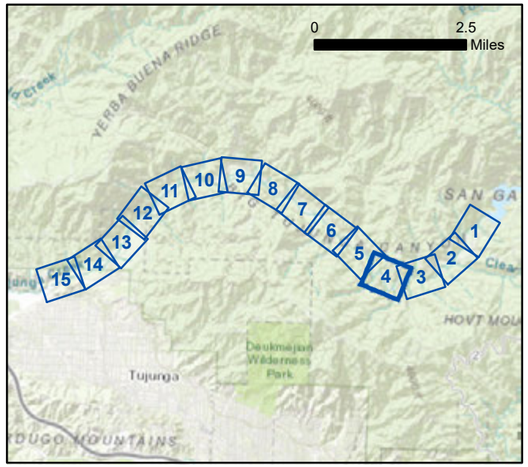
D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 4C
Sheet 4

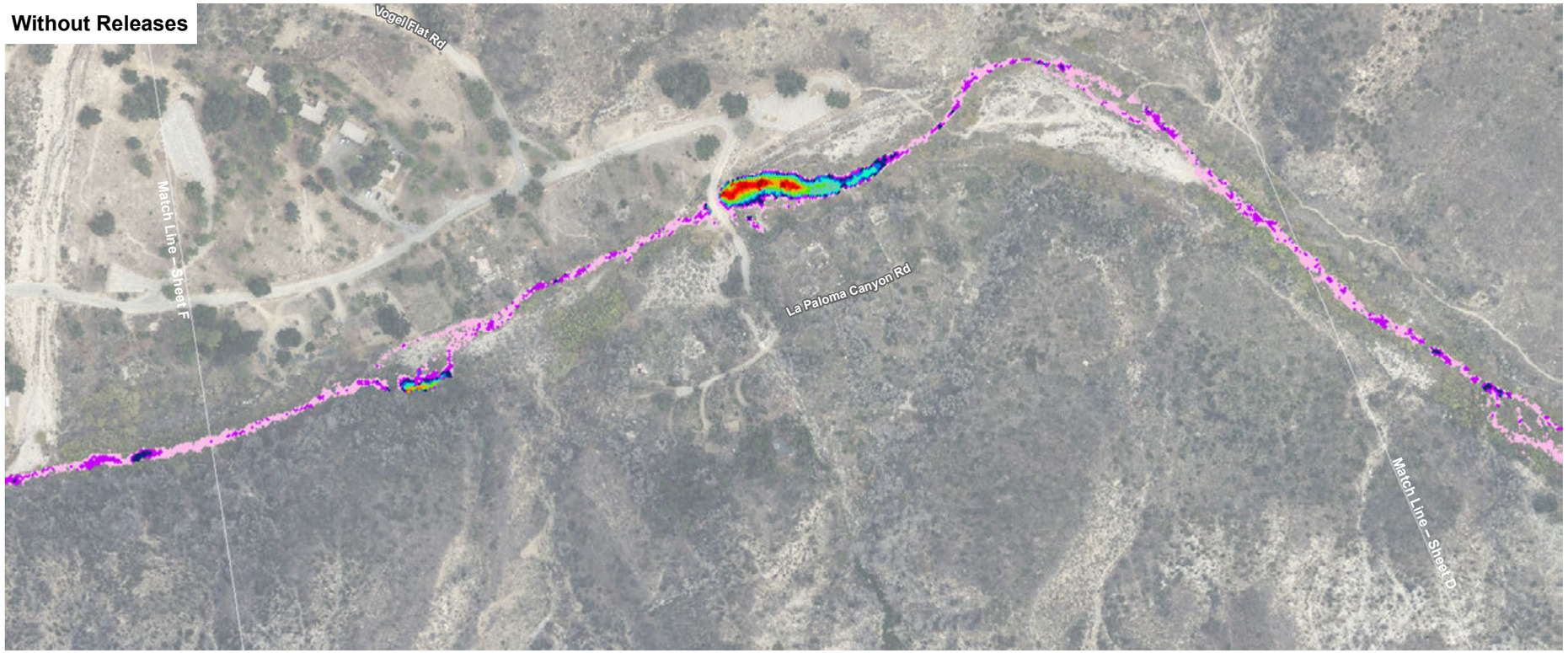
Average Depth (September)

Big Tujunga Dam –
Supplemental Release Study

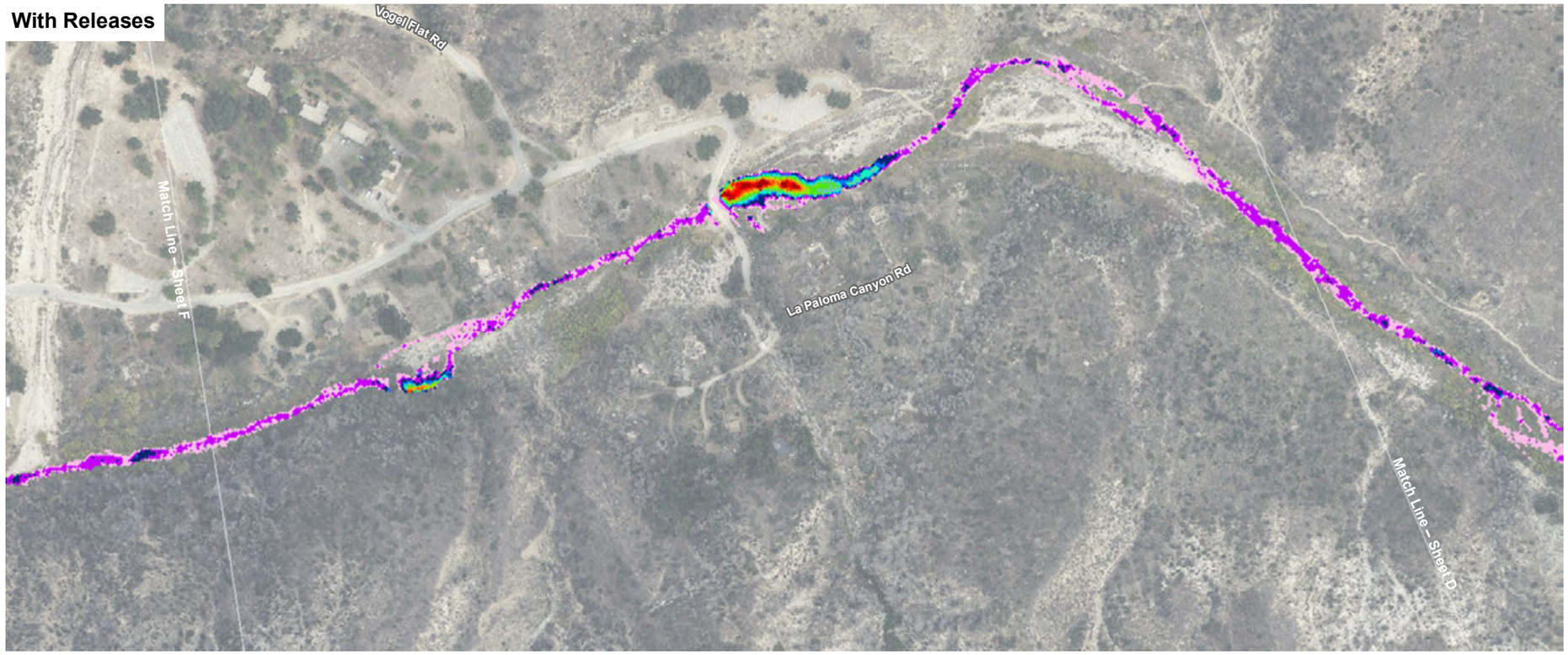
PSOMAS

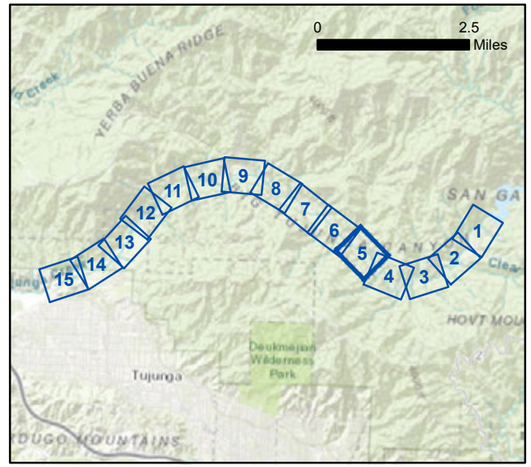
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7
- 22.7 - 28.3
- 28.3 - 34.0
- 34.0 - 39.7
- 39.7 - 45.3
- 45.3 - 51.0
- 51.0 - 56.7
- 56.7 - 62.3
- 62.3 - 68.0
- 68.0 - 73.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4C
Sheet 5

Average Depth (September)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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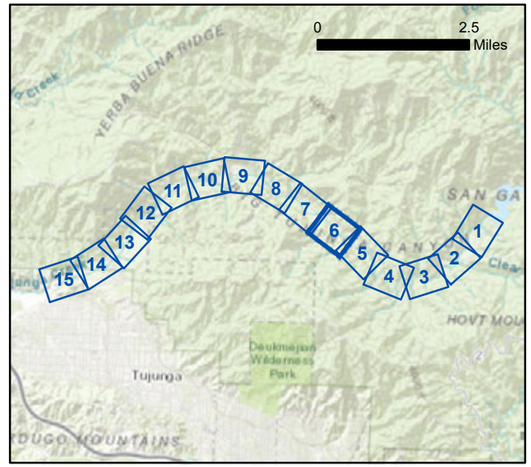
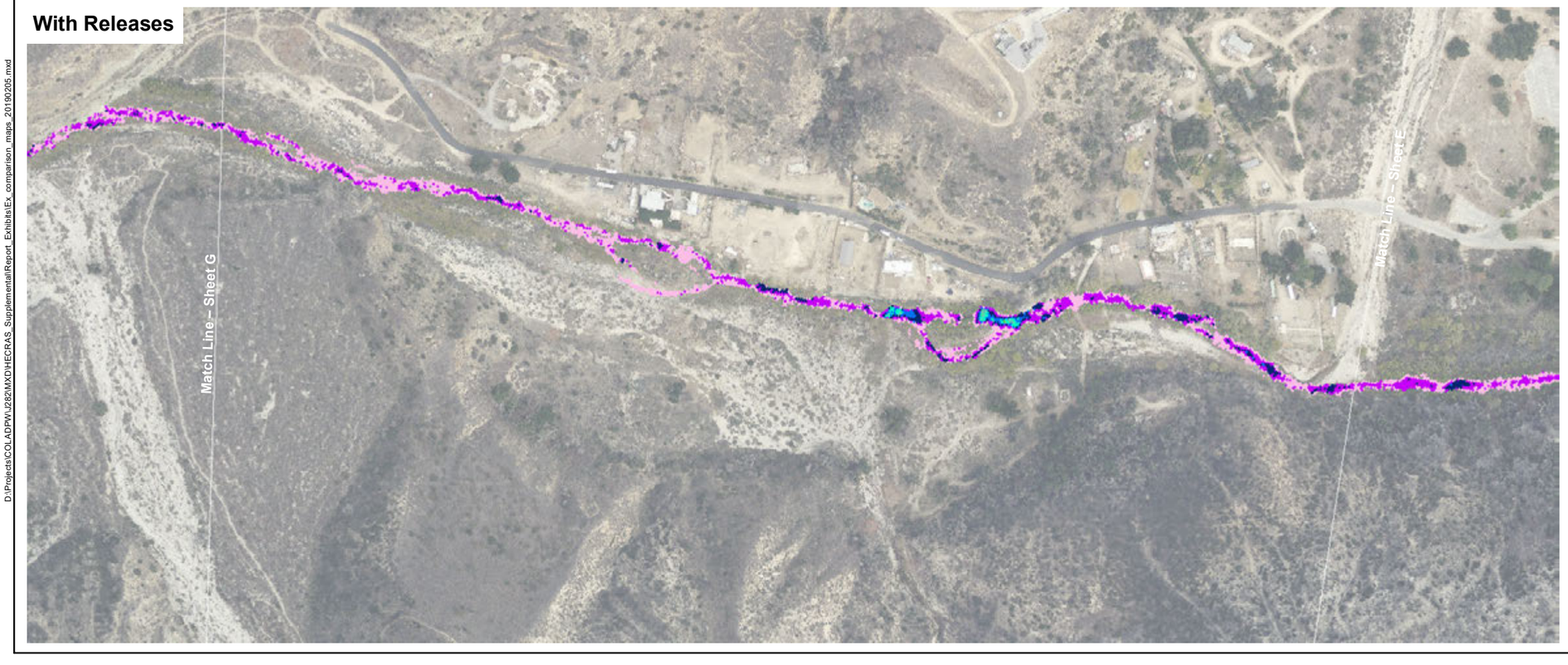
Without Releases





With Releases



Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7
- 22.7 - 28.3
- 28.3 - 34.0
- 34.0 - 39.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 4C
Sheet 6

Average Depth (September)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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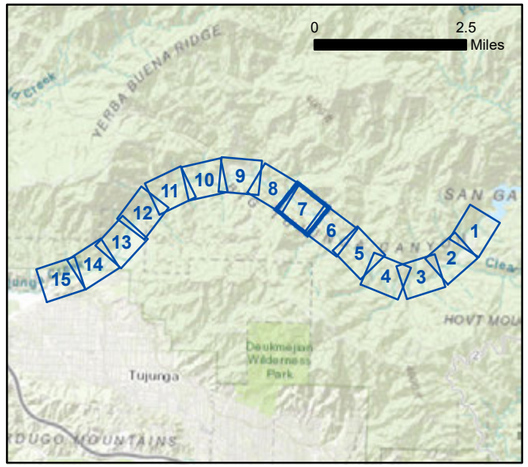
Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7
- 22.7 - 28.3
- 28.3 - 34.0

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4C
Sheet 7

Average Depth (September)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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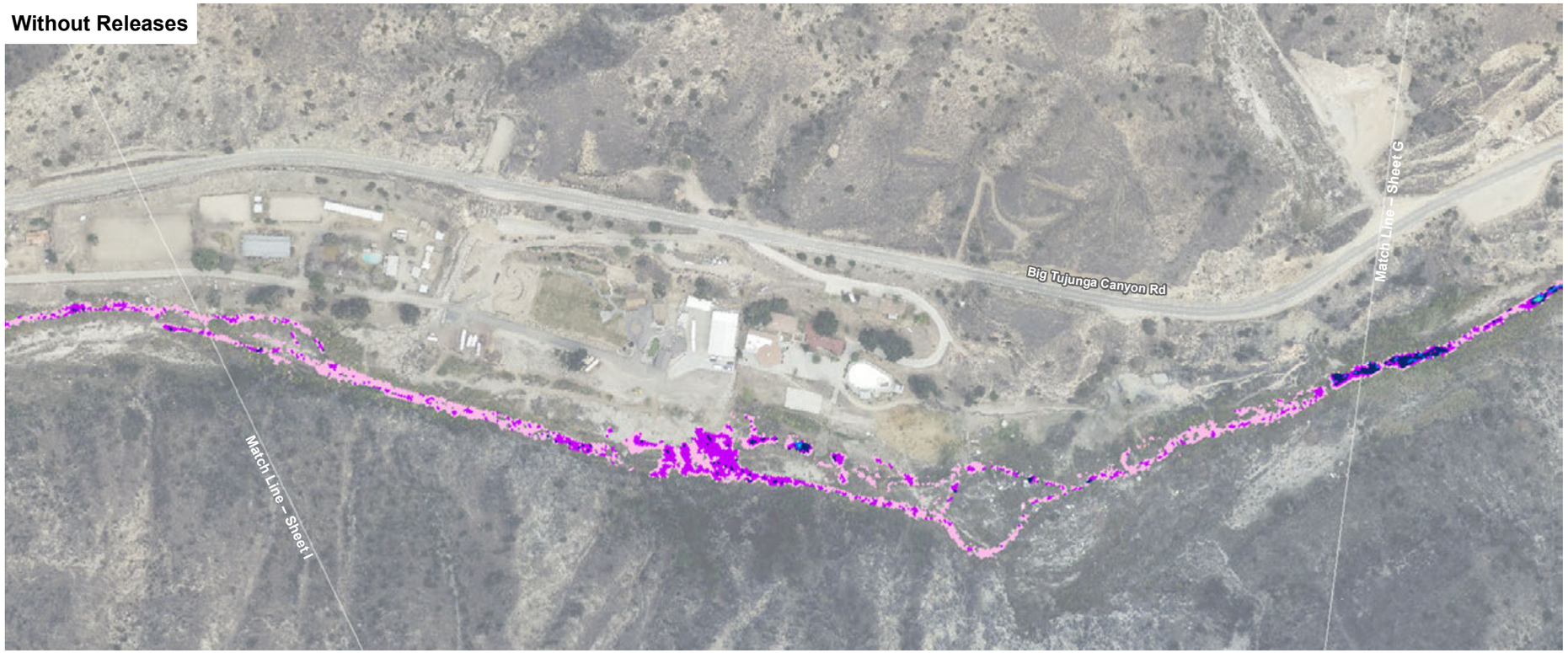
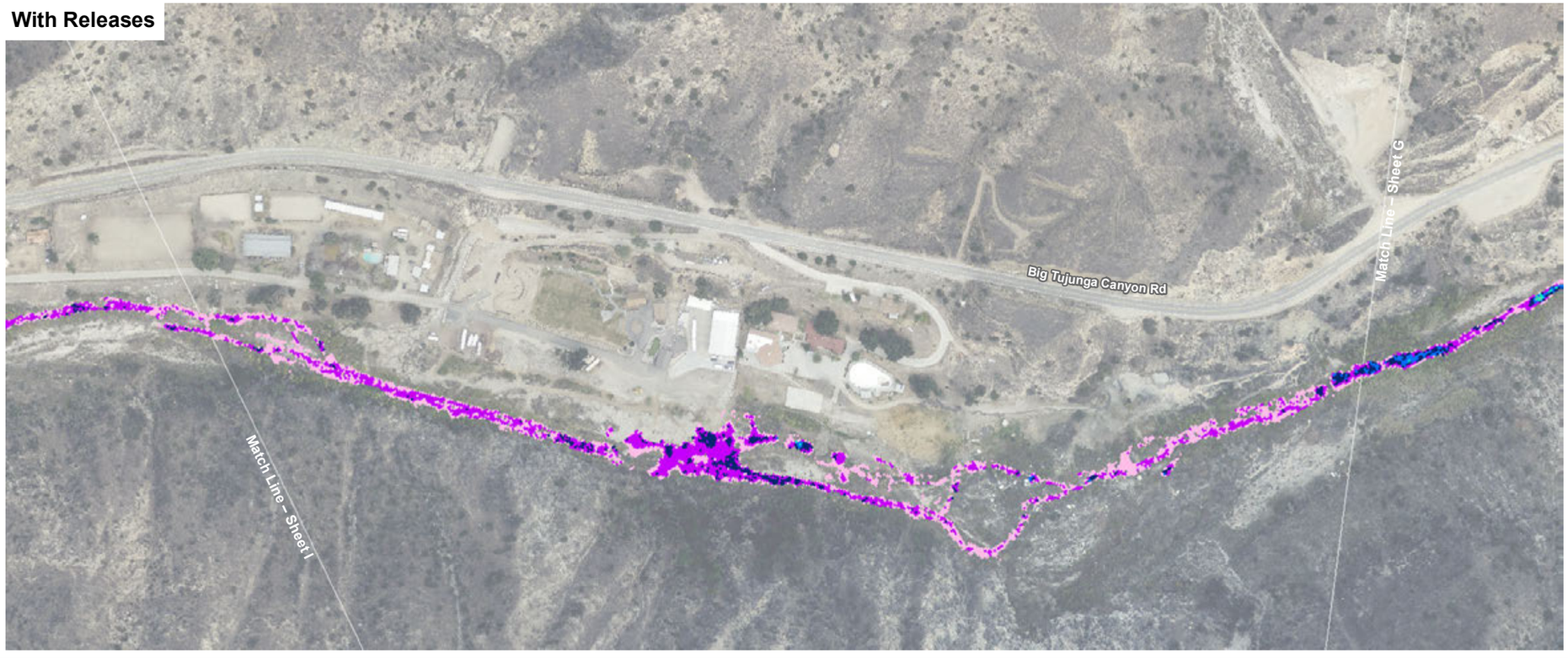
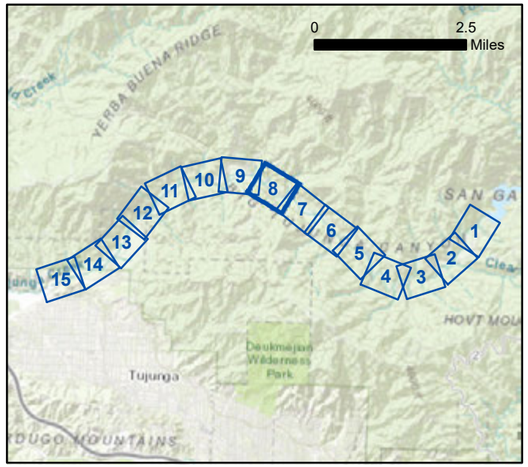
Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7
- 22.7 - 28.3
- 28.3 - 34.0

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 4C
Sheet 8

Average Depth (September)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

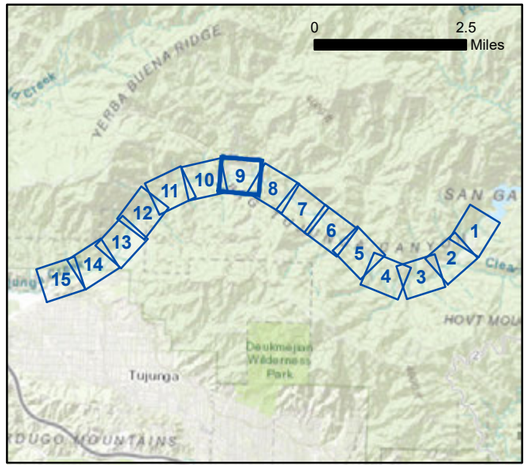
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7

N

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 4C

Average Depth (September) Sheet 9

Big Tujunga Dam – Supplemental Release Study

PSOMAS

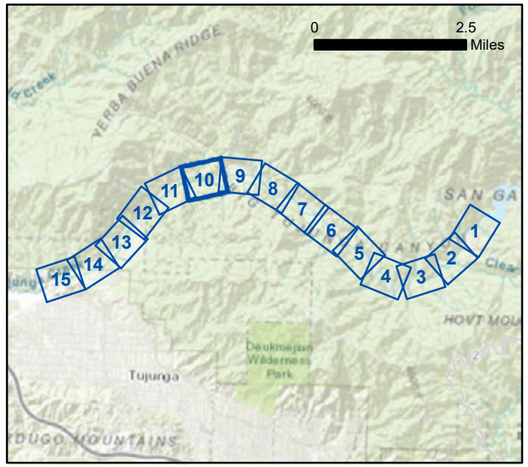
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7
- 22.7 - 28.3
- 28.3 - 34.0
- 34.0 - 39.7
- 39.7 - 45.3
- 45.3 - 51.0
- 51.0 - 56.7

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4C
Sheet 10

Average Depth (September)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

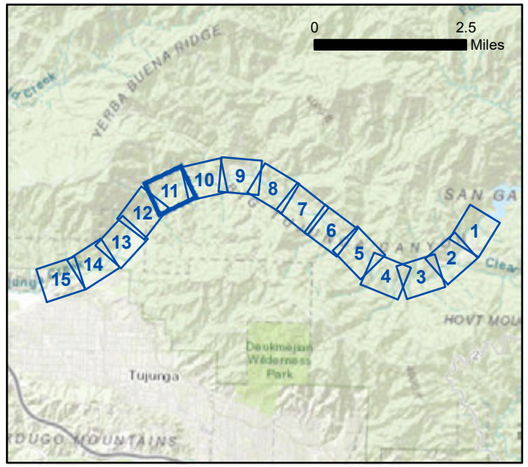
D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0

300 150 0 300 Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 4C
Sheet 11

Average Depth (September)

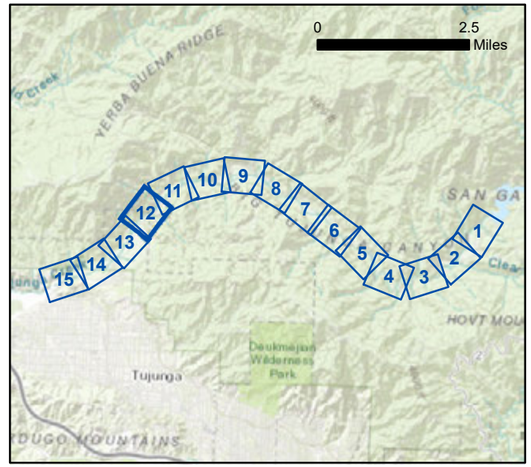
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7
- 22.7 - 28.3

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 4C
Sheet 12

Average Depth (September)

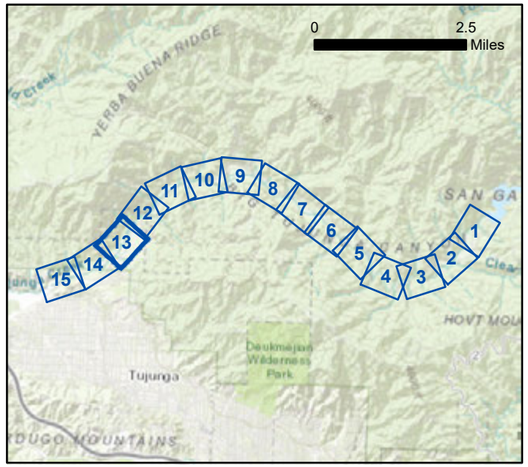
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 4C
Sheet 13

Average Depth (September)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

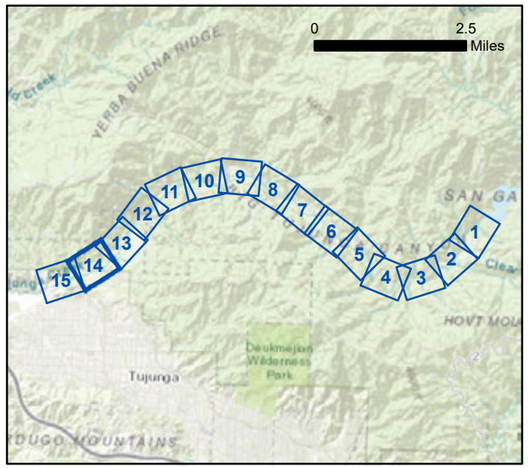
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases

Match Line – Sheet O

Match Line – Sheet M



With Releases

Match Line – Sheet O

Match Line – Sheet M

Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7
- 22.7 - 28.3

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 4C
Sheet 14

Average Depth (September)

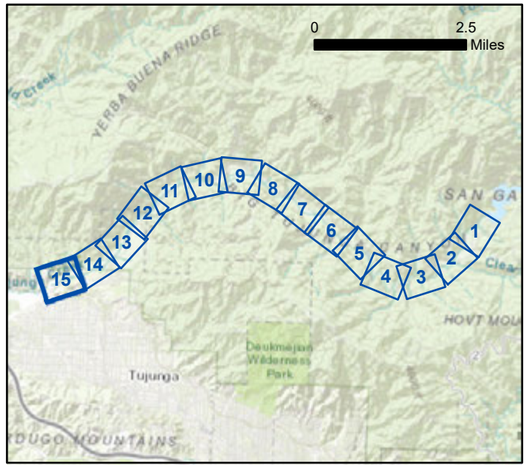
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Depth (inches)

- 0.0 - 5.7
- 5.7 - 11.3
- 11.3 - 17.0
- 17.0 - 22.7
- 22.7 - 28.3
- 28.3 - 34.0
- 34.0 - 39.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

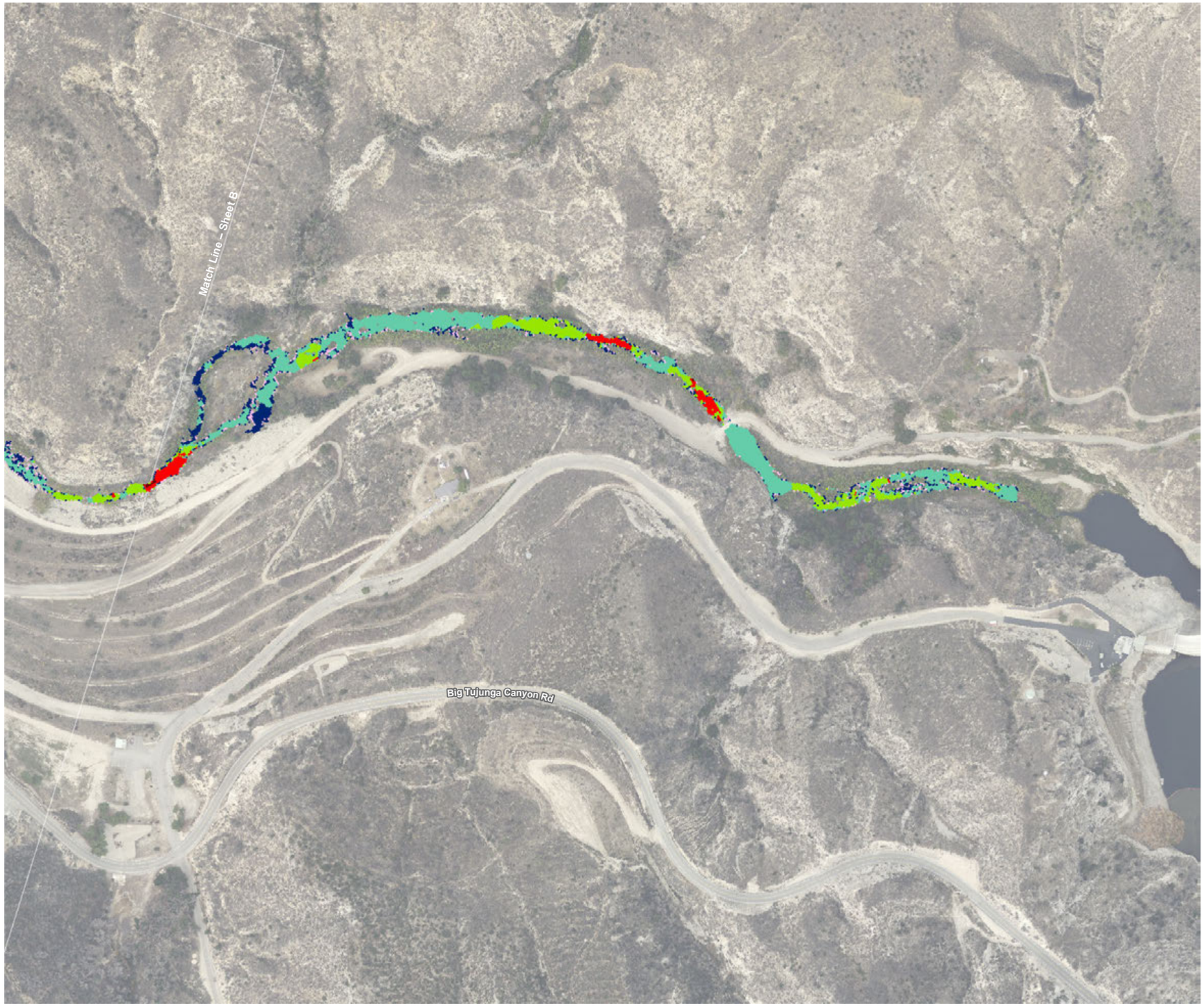
Exhibit 4C
Sheet 15

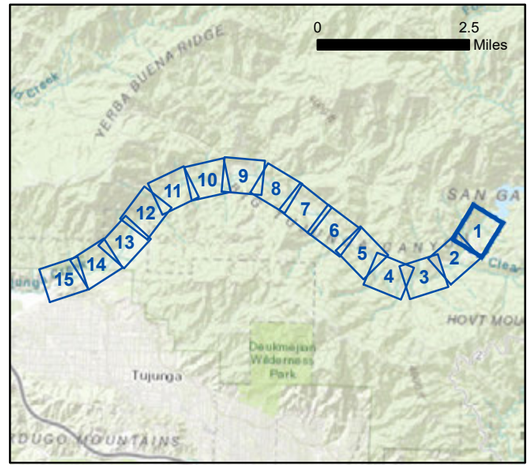
Average Depth (September)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\





Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 1

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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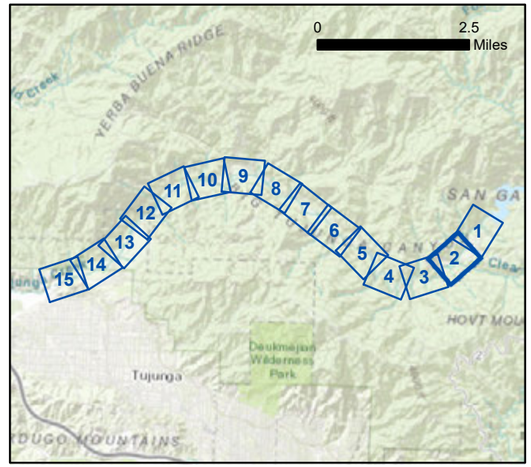

Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 2

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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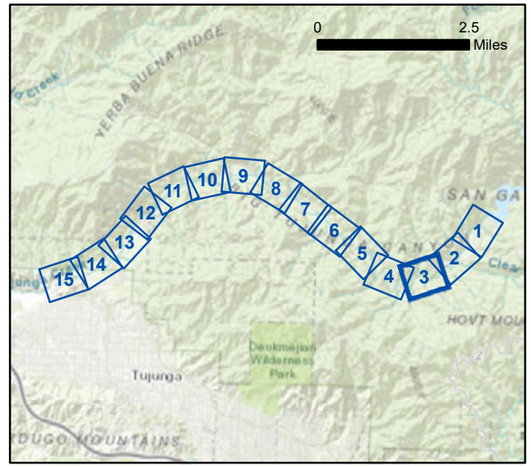
D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_single_DF_20190205.mxd





Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 3

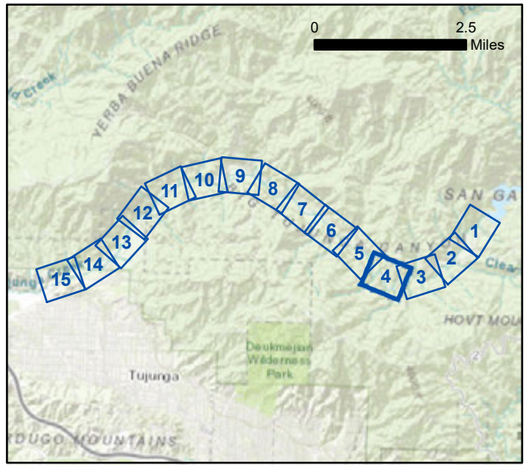
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_single_DF_20190205.mxd





Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 4

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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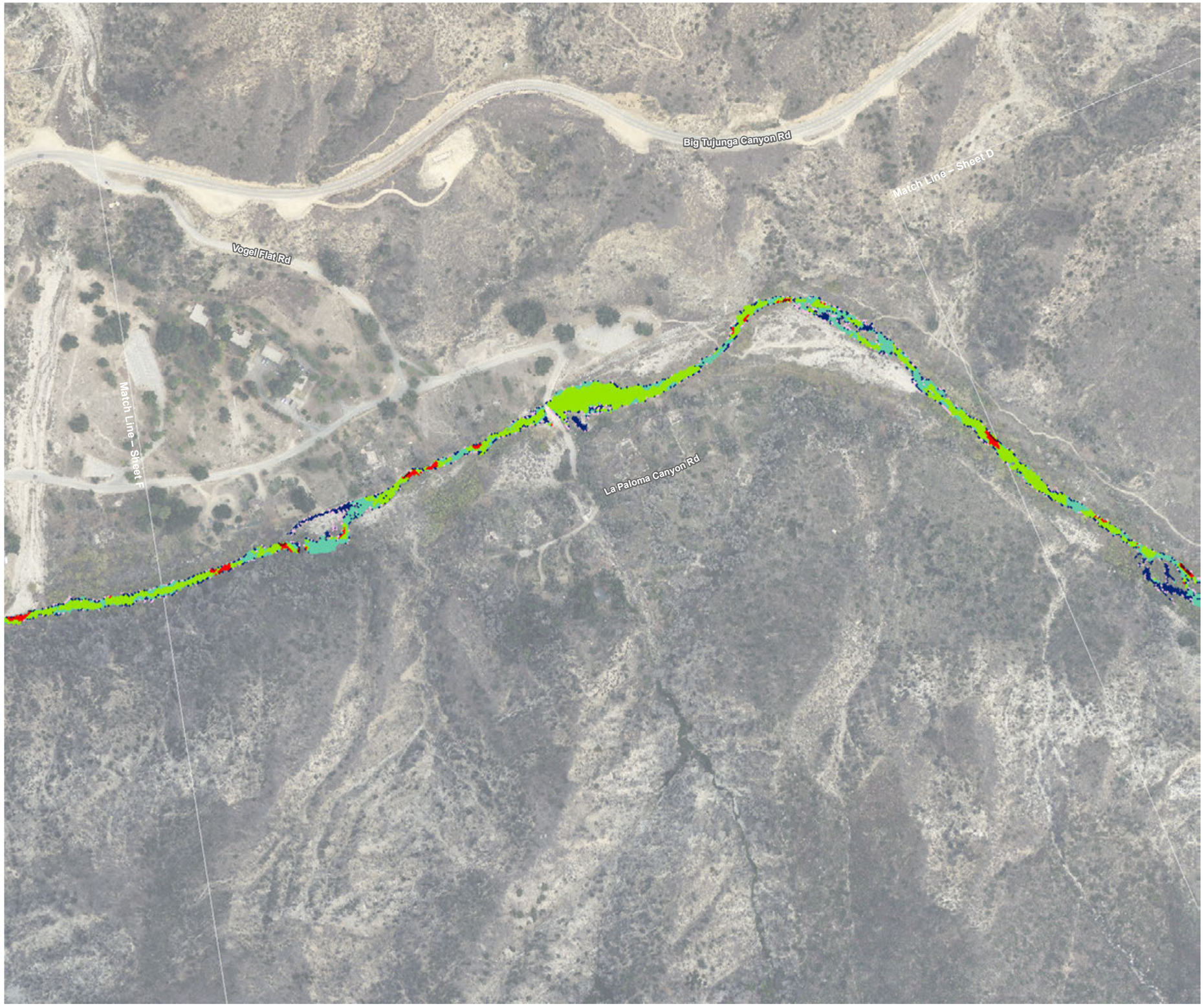

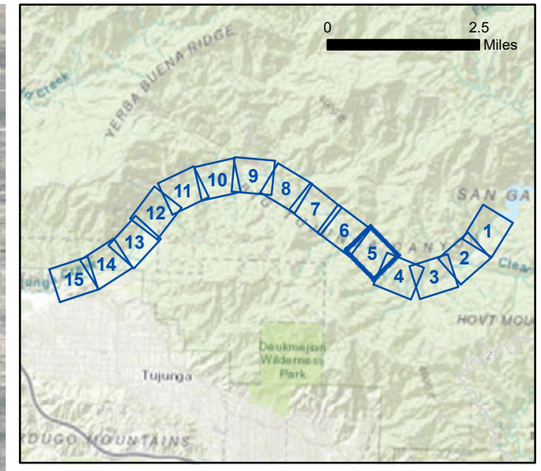

Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 5

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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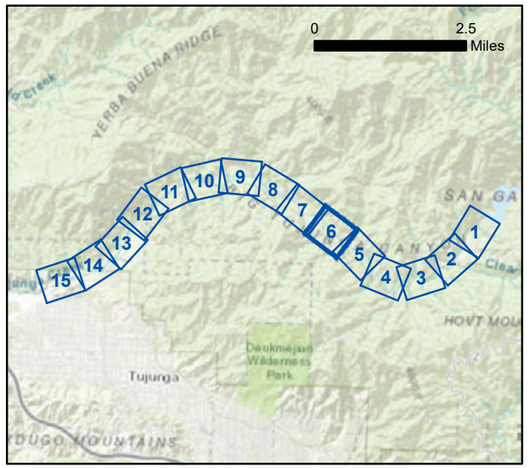
Big Tujunga Canyon Rd

Match Line – Sheet G

Match Line – Sheet E



Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 6

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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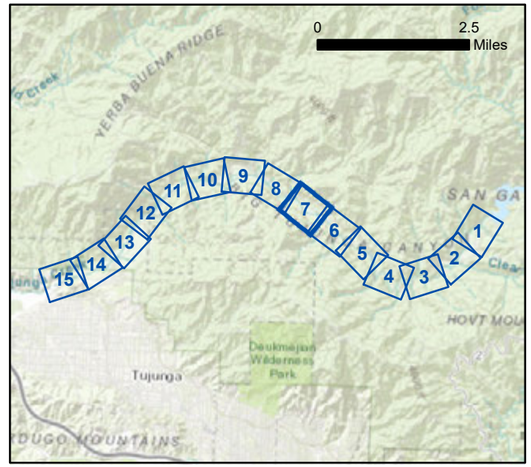
Match Line – Sheet H

Big Tujunga Canyon Rd

Doske Rd

Match Line – Sheet F

Match Line – Sheet H



Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2

**This graphic shows the change in average depth over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 7

Big Tujunga Dam – Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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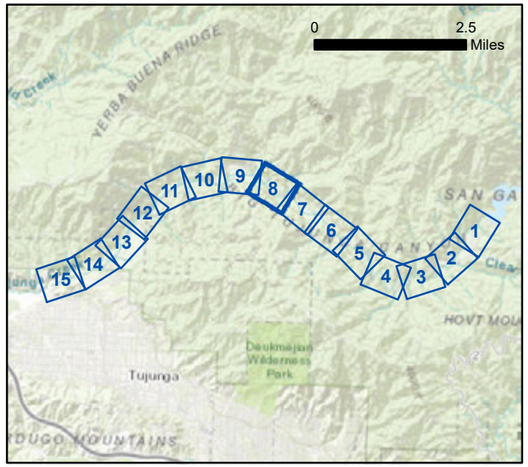

Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 8

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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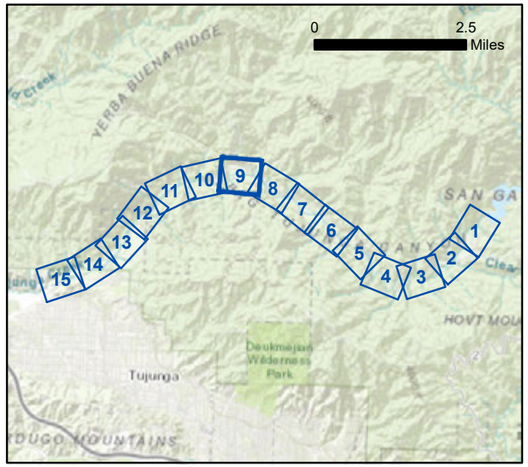

Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 9

Big Tujunga Dam – Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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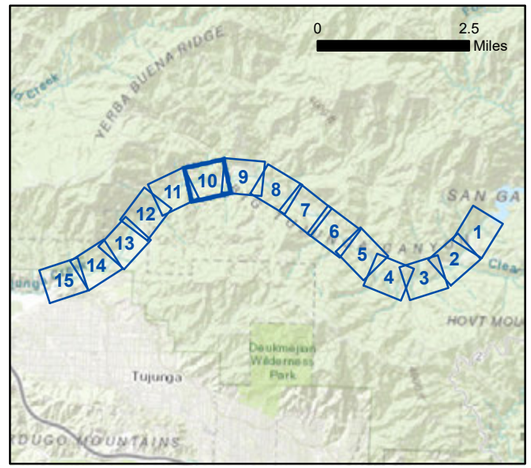

Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 10

Big Tujunga Dam – Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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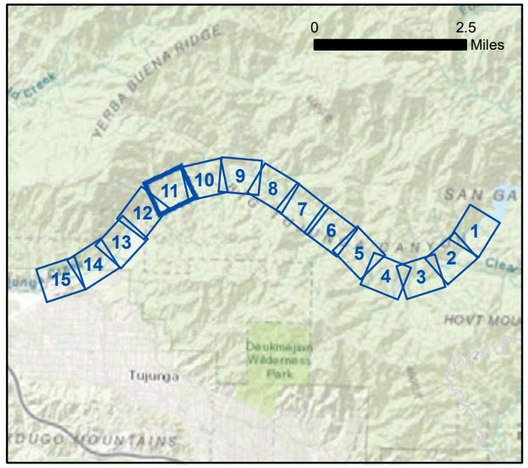

Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 11

Big Tujunga Dam – Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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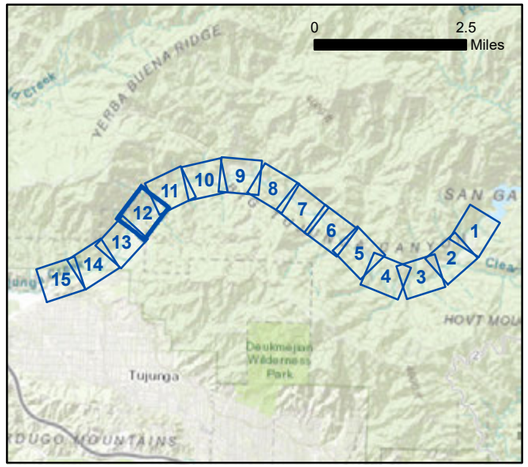

Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 12

Big Tujunga Dam – Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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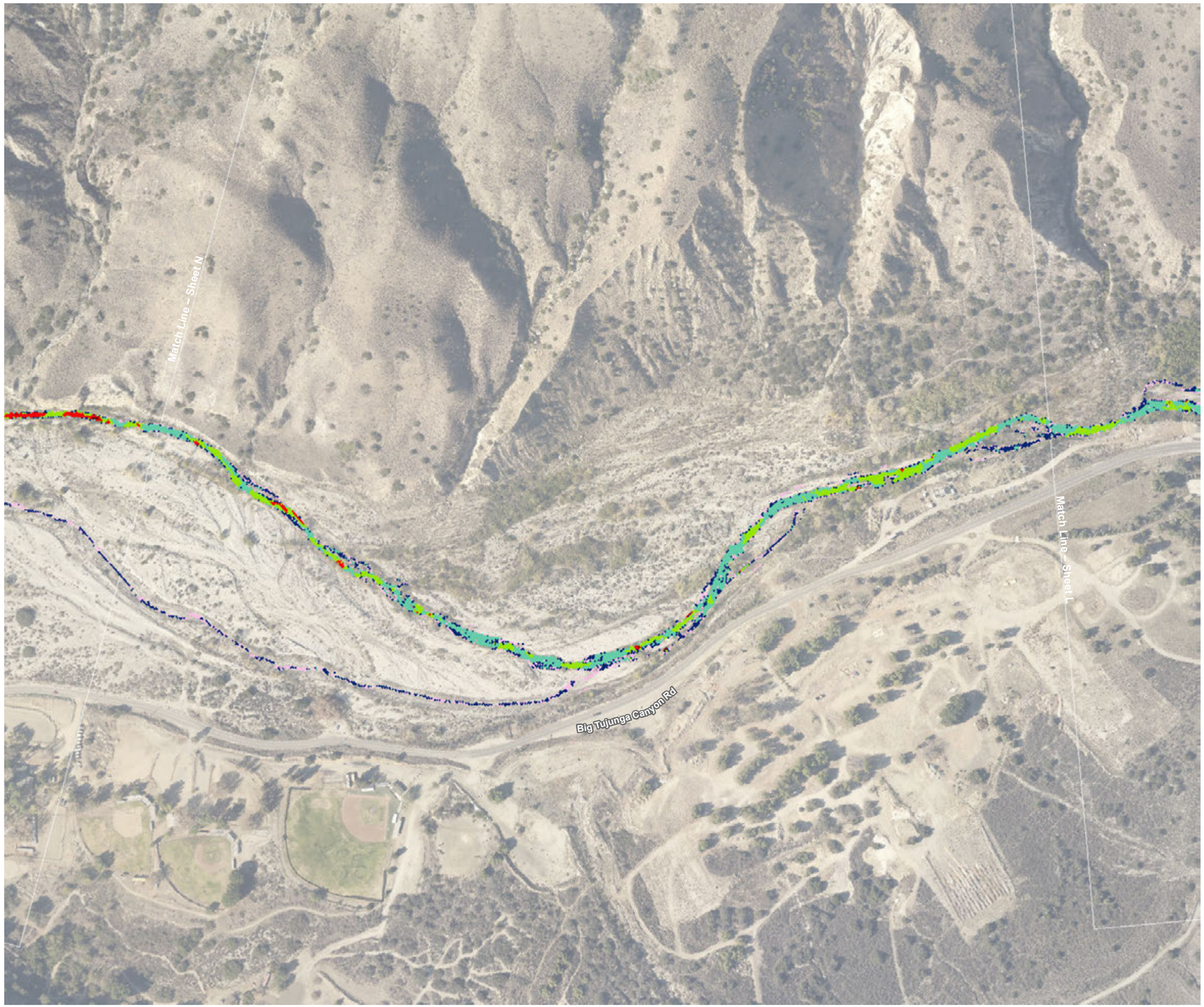

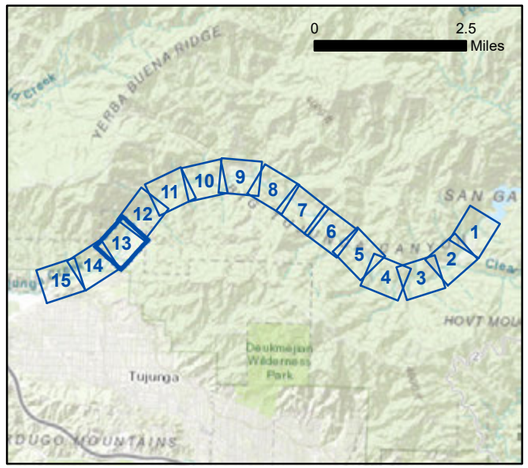

Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 13

Big Tujunga Dam – Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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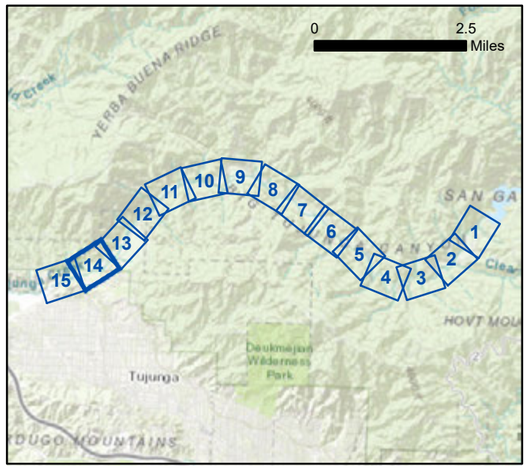

Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 14

Big Tujunga Dam – Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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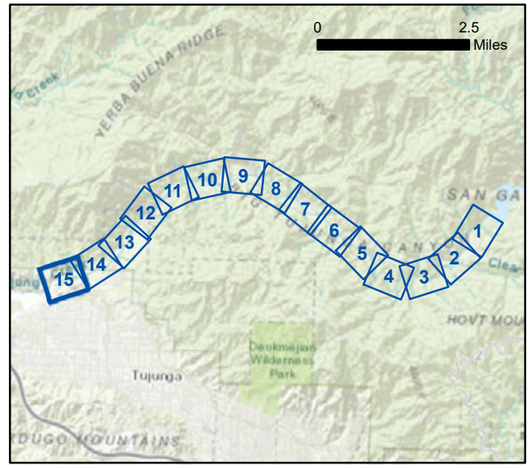

Change in Average Depth (inches)*

- 0.0 - 0.2
- 0.2 - 1.0
- 1.0 - 1.7
- 1.7 - 2.4
- 2.4 - 3.2
- > 3.2

**This graphic shows the change in average depth over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Depth (Overall)

Exhibit 4D
Sheet 15

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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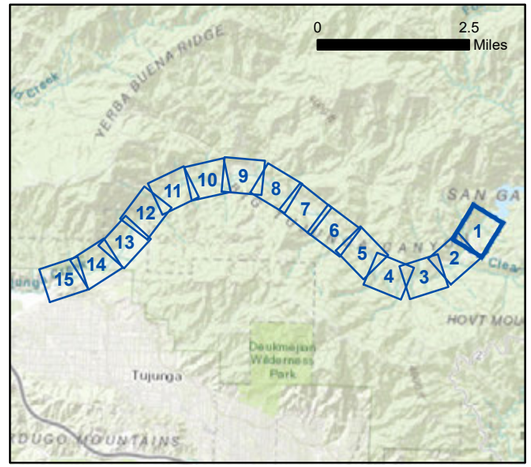
D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_single_DF_20190205.mxd

Without Releases



With Releases





Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6
- 2.6 - 3.2
- 3.2 - 3.8

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 5A
Sheet 1

Maximum Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

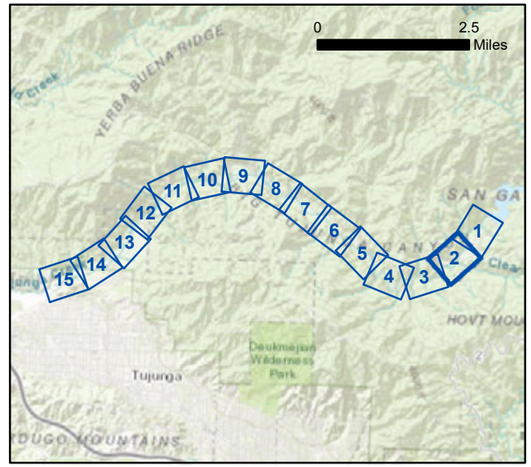
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6
- 2.6 - 3.2
- 3.2 - 3.8

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 5A
Sheet 2

Maximum Velocity (April)

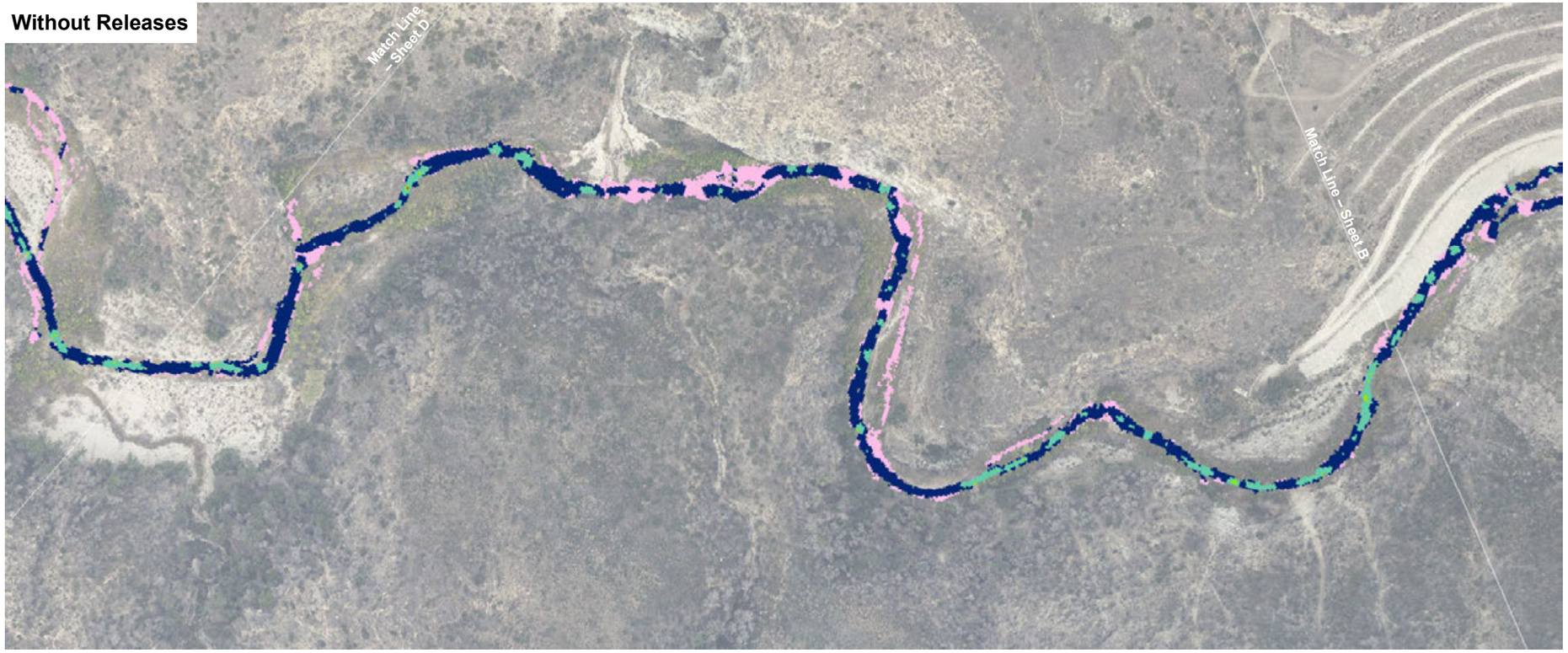
Big Tujunga Dam –
Supplemental Release Study

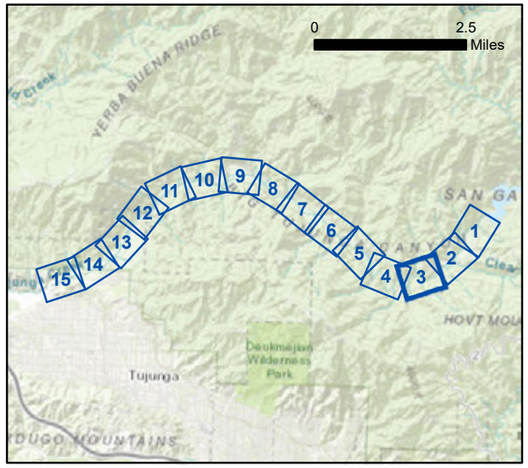
PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

D:\Projects\COLADPW\282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases





With Releases



Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6
- 2.6 - 3.2

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 5A
Sheet 3

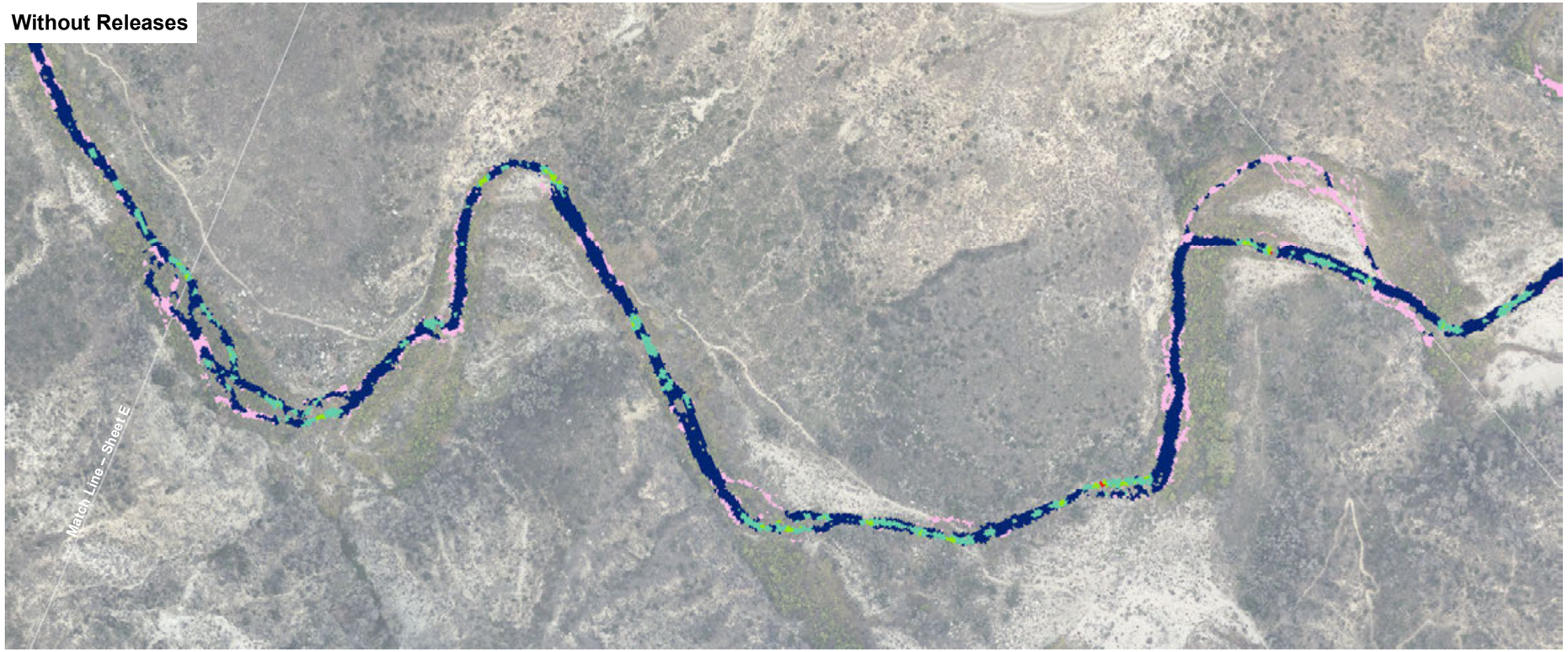
Maximum Velocity (April)

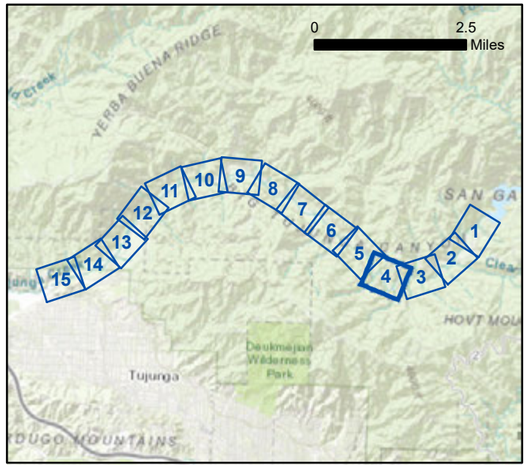
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

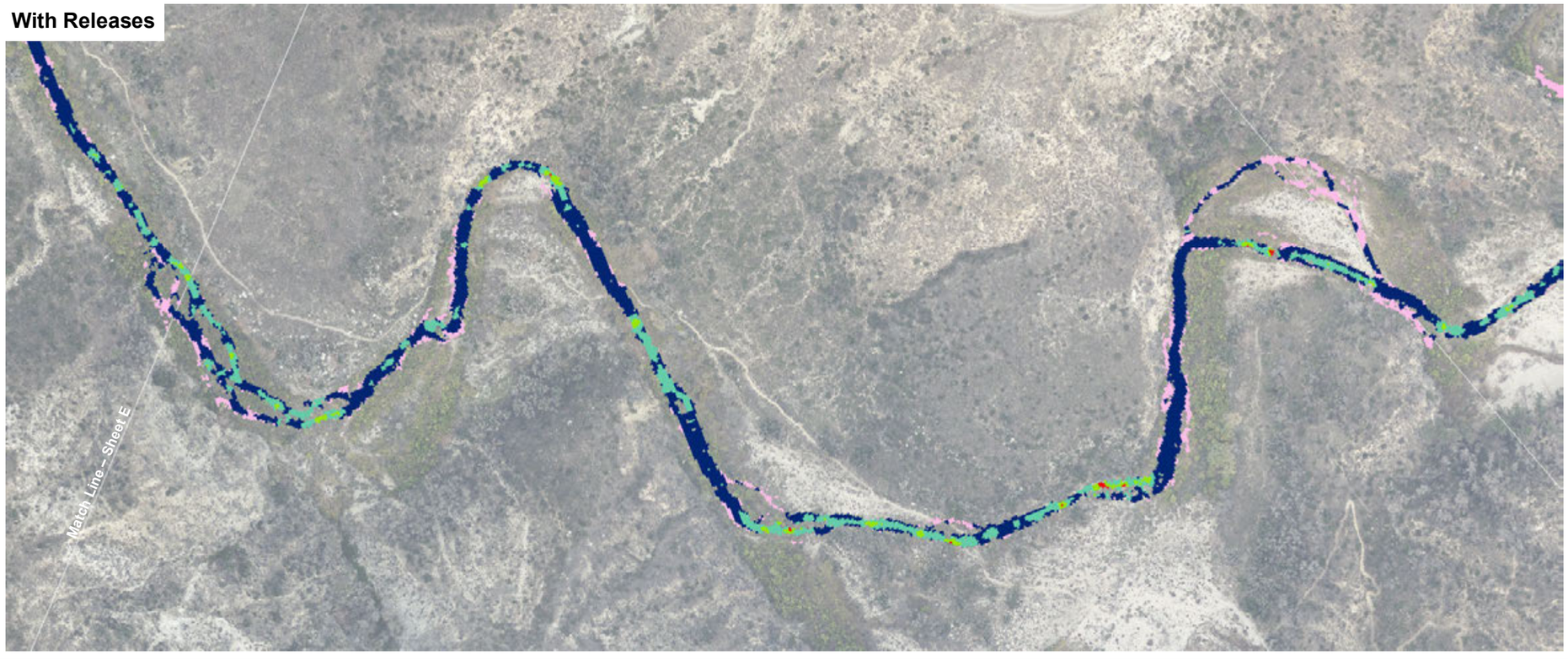
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6
- 2.6 - 3.2

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 5A
Sheet 4

Maximum Velocity (April)

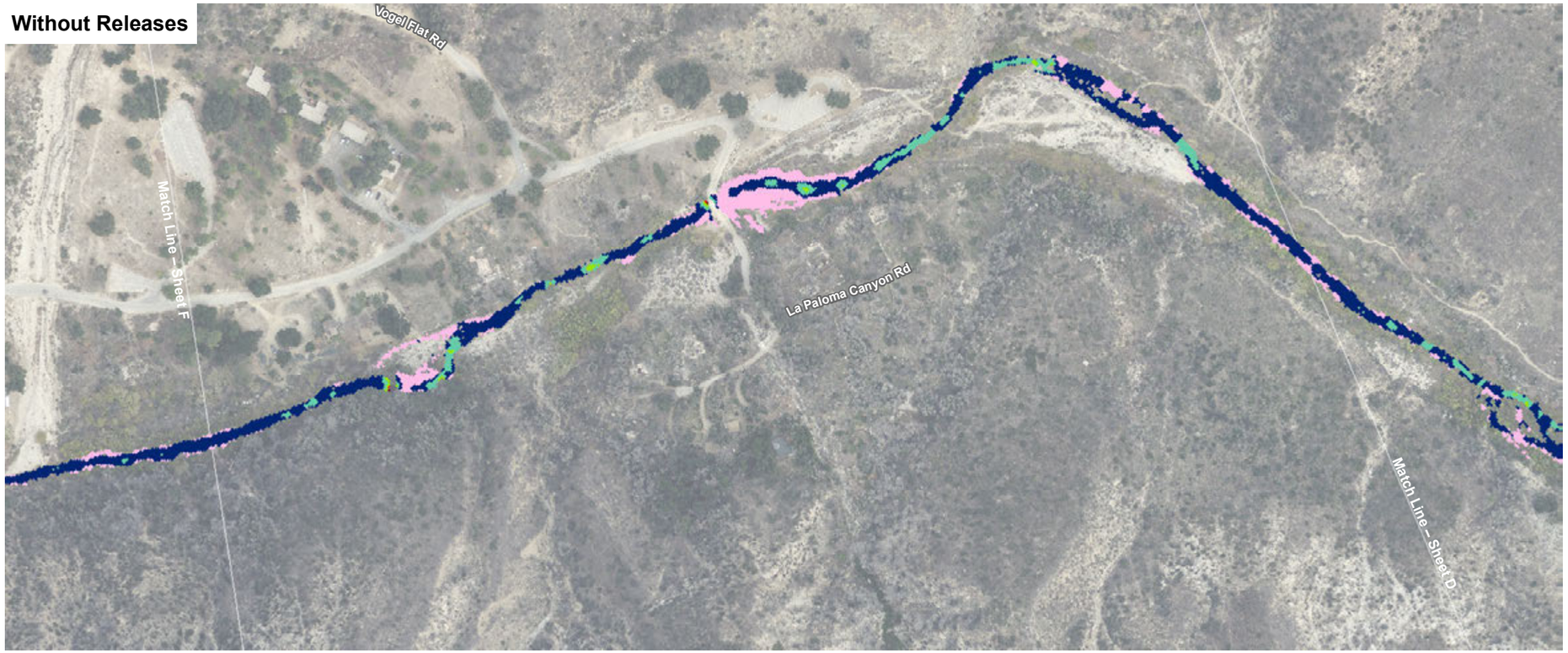
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

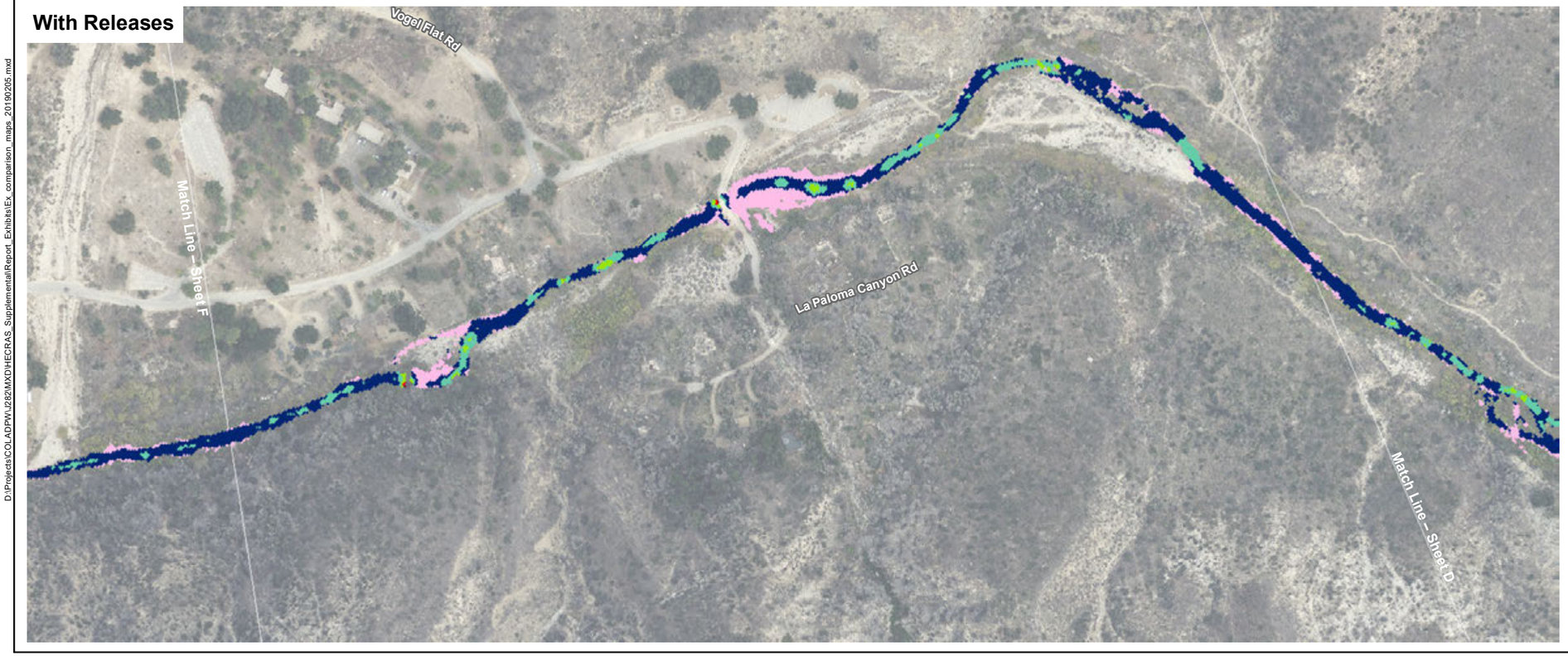
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

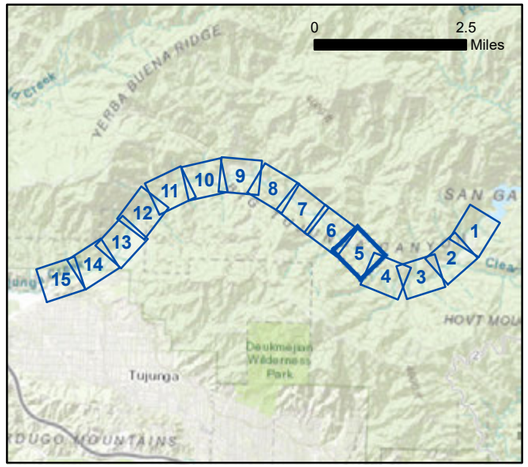
D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6
- 2.6 - 3.2
- 3.2 - 3.8

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 5A
Sheet 5

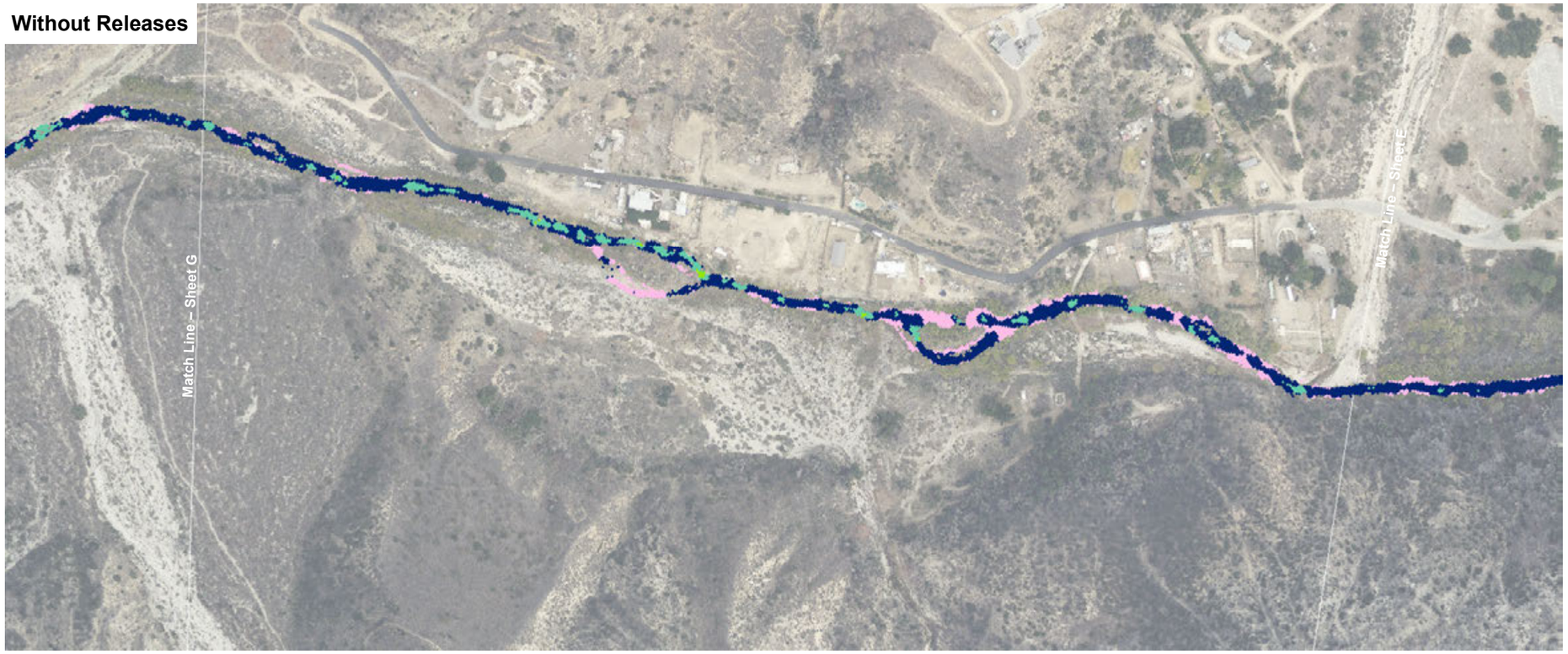
Maximum Velocity (April)

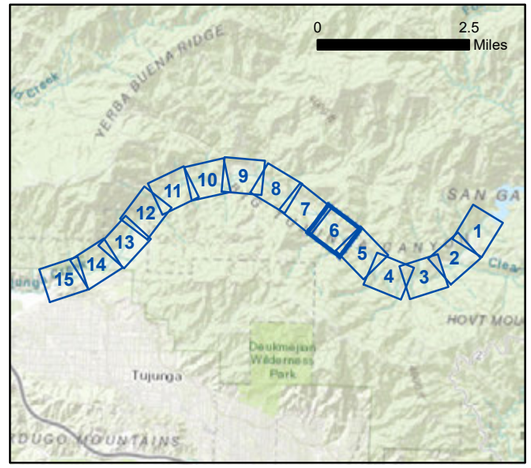
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

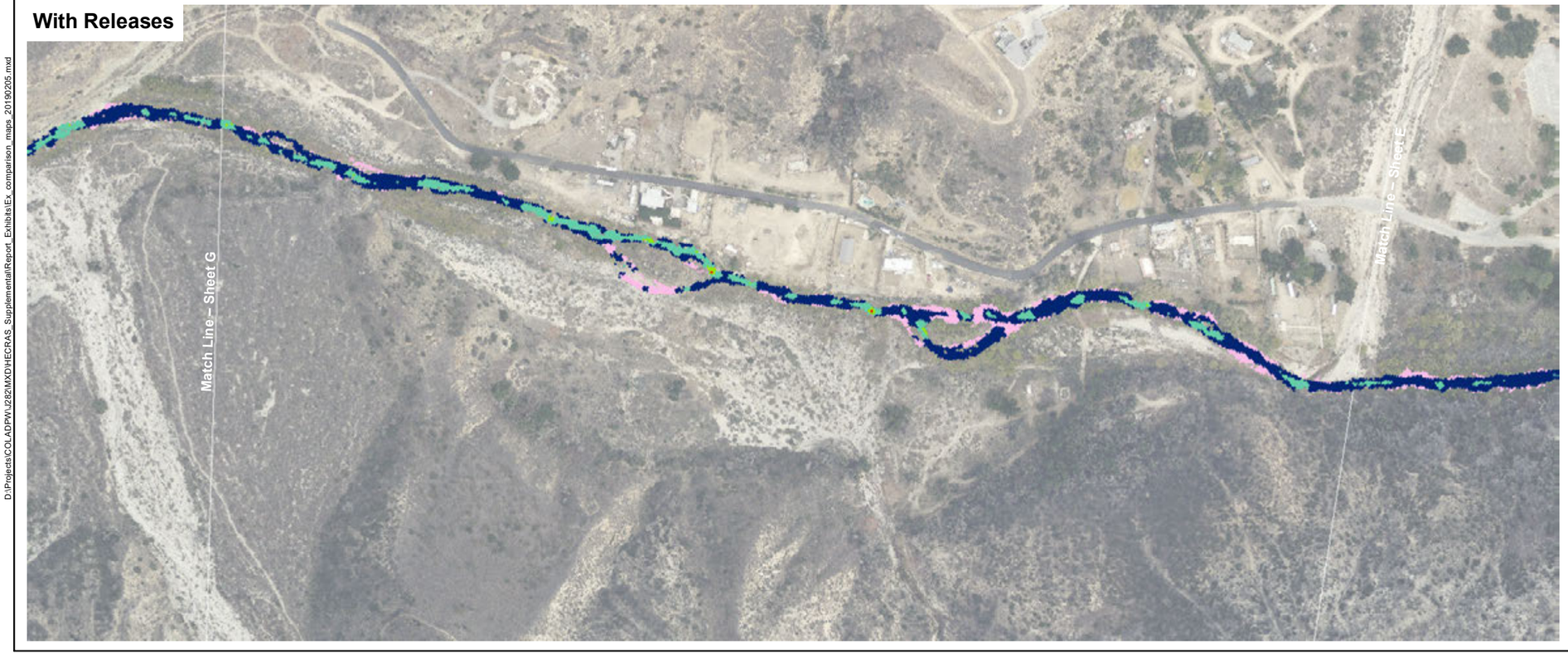
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6
- 2.6 - 3.2

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 5A
Sheet 6

Maximum Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

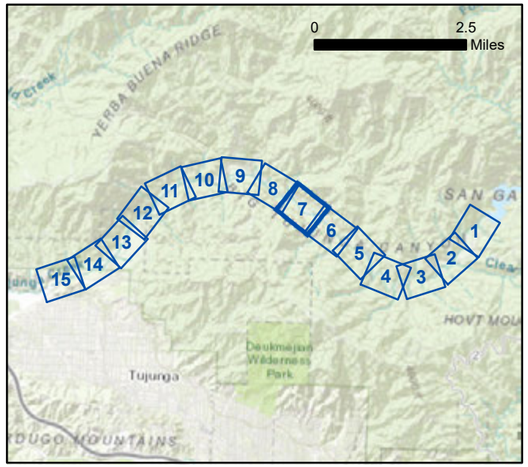
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6
- 2.6 - 3.2

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 5A
Sheet 7

Maximum Velocity (April)

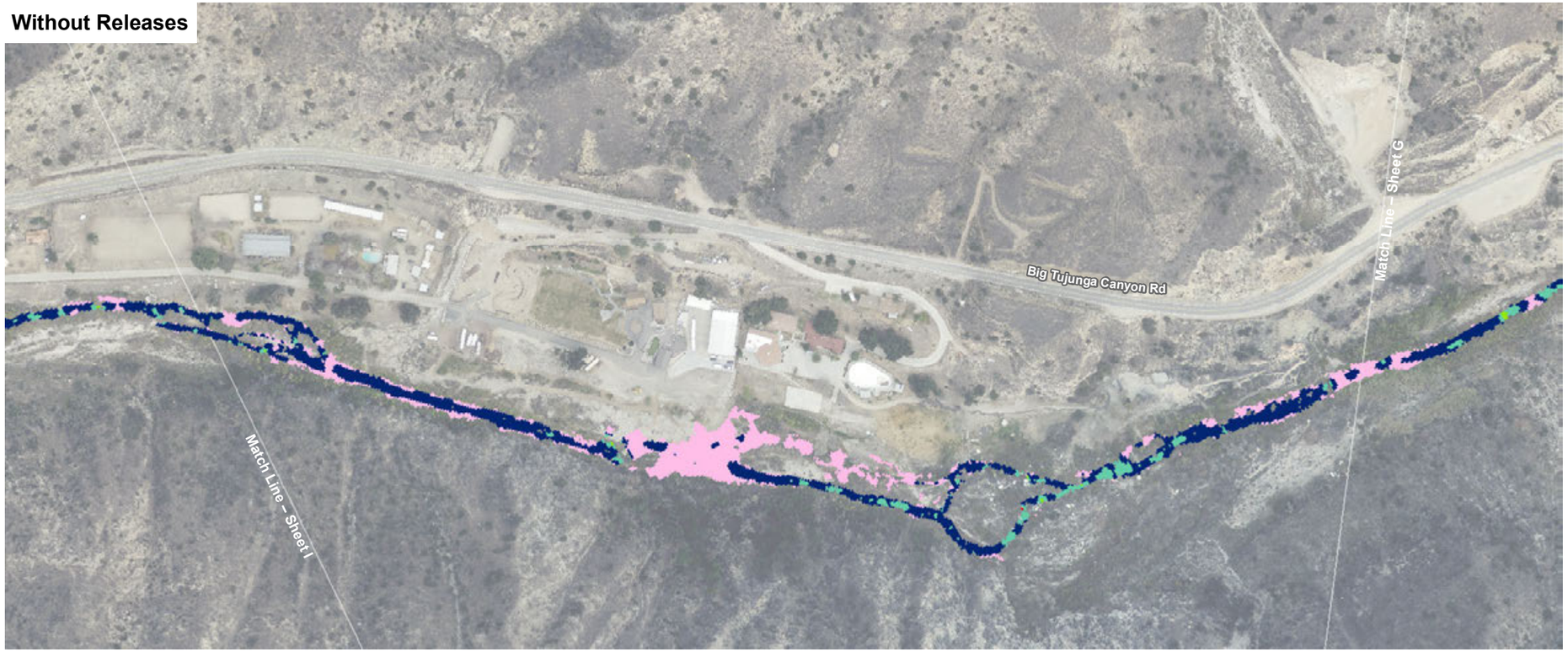
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



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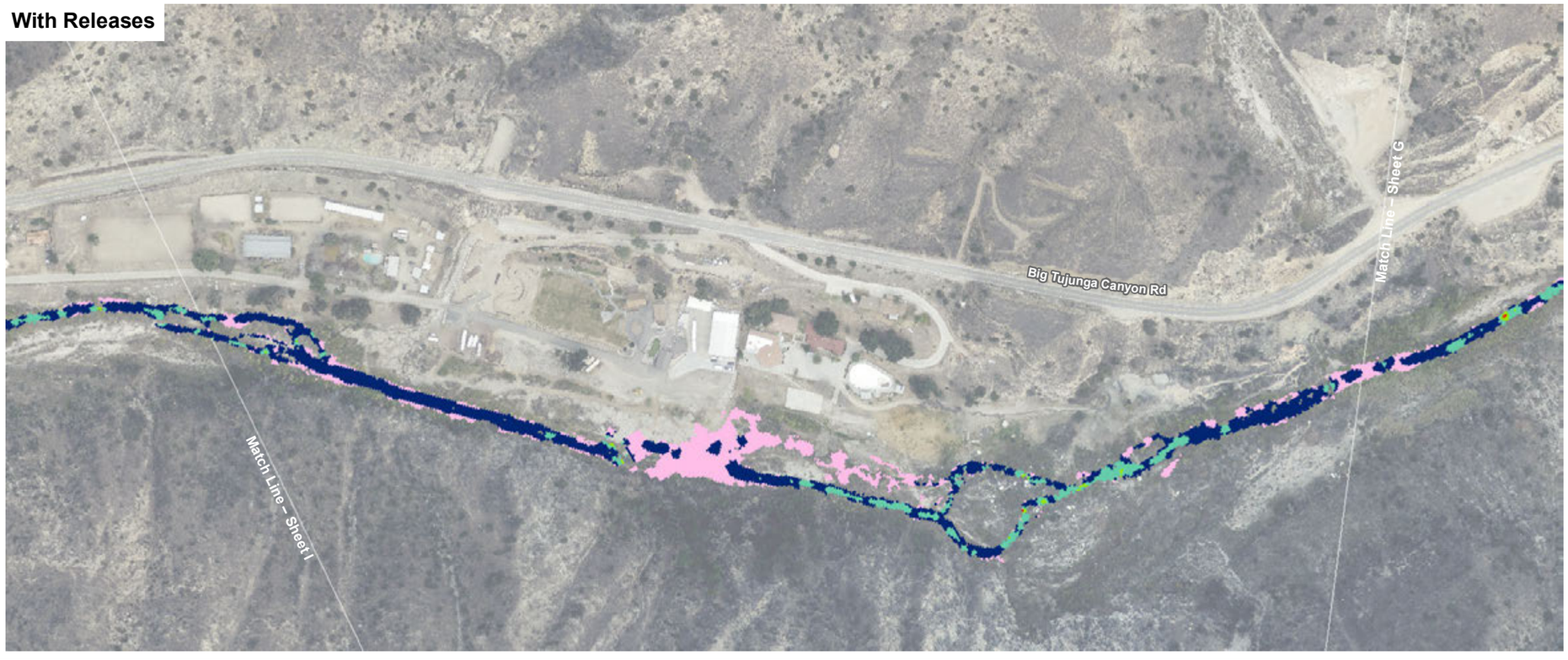
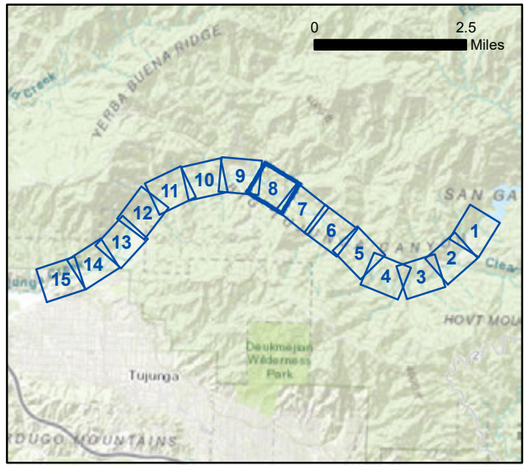




Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6
- 2.6 - 3.2

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 5A
Sheet 8

Maximum Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

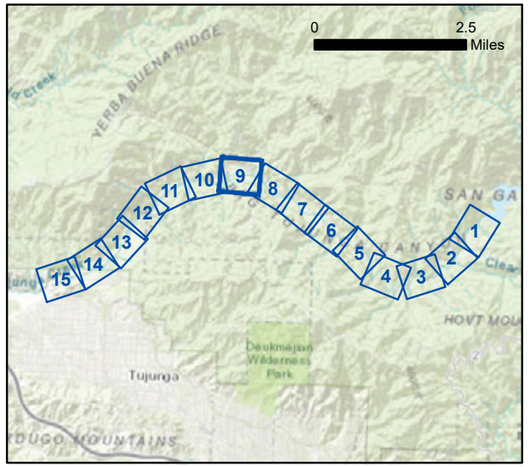
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6
- 2.6 - 3.2

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 5A
Sheet 9

Maximum Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

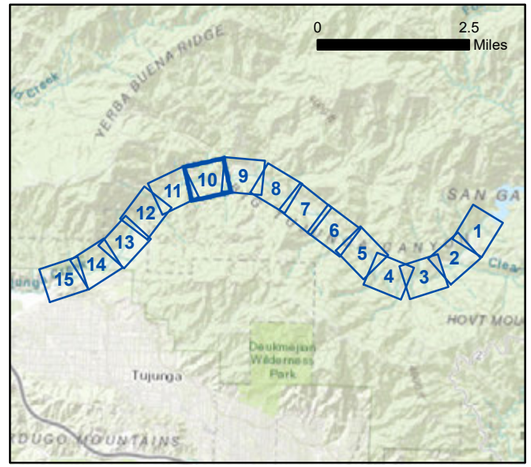
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6
- 2.6 - 3.2
- 3.2 - 3.8

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 5A
Sheet 10

Maximum Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

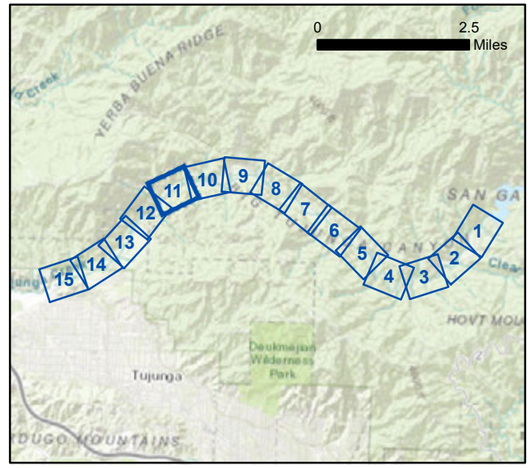
D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 5A
Sheet 11

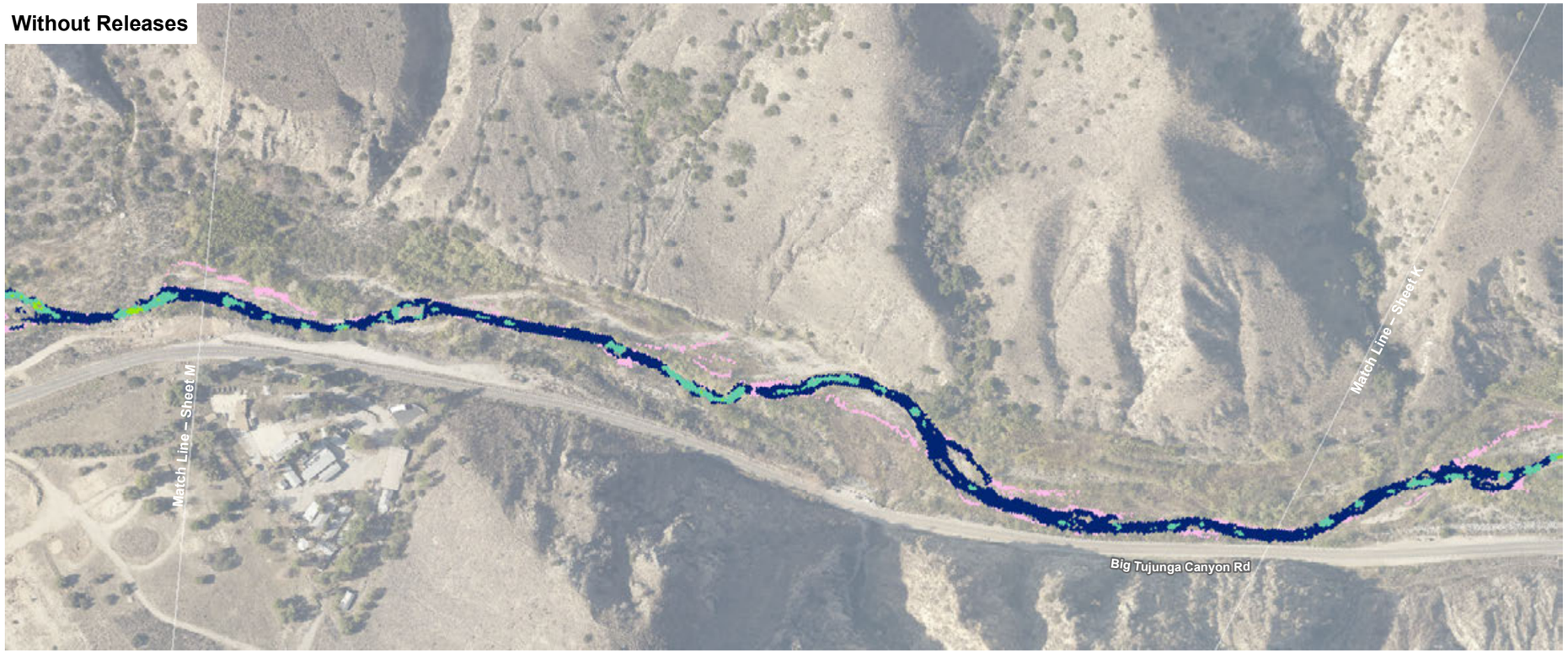
Maximum Velocity (April)

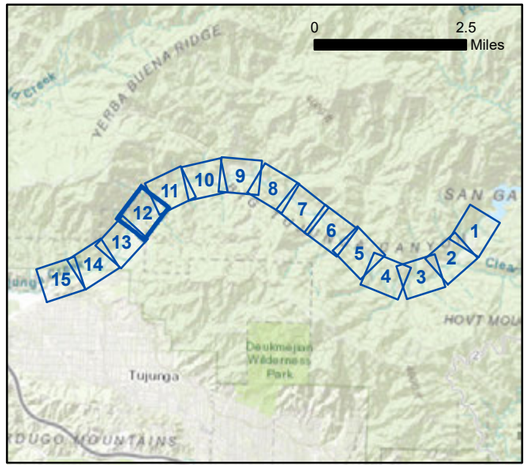
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



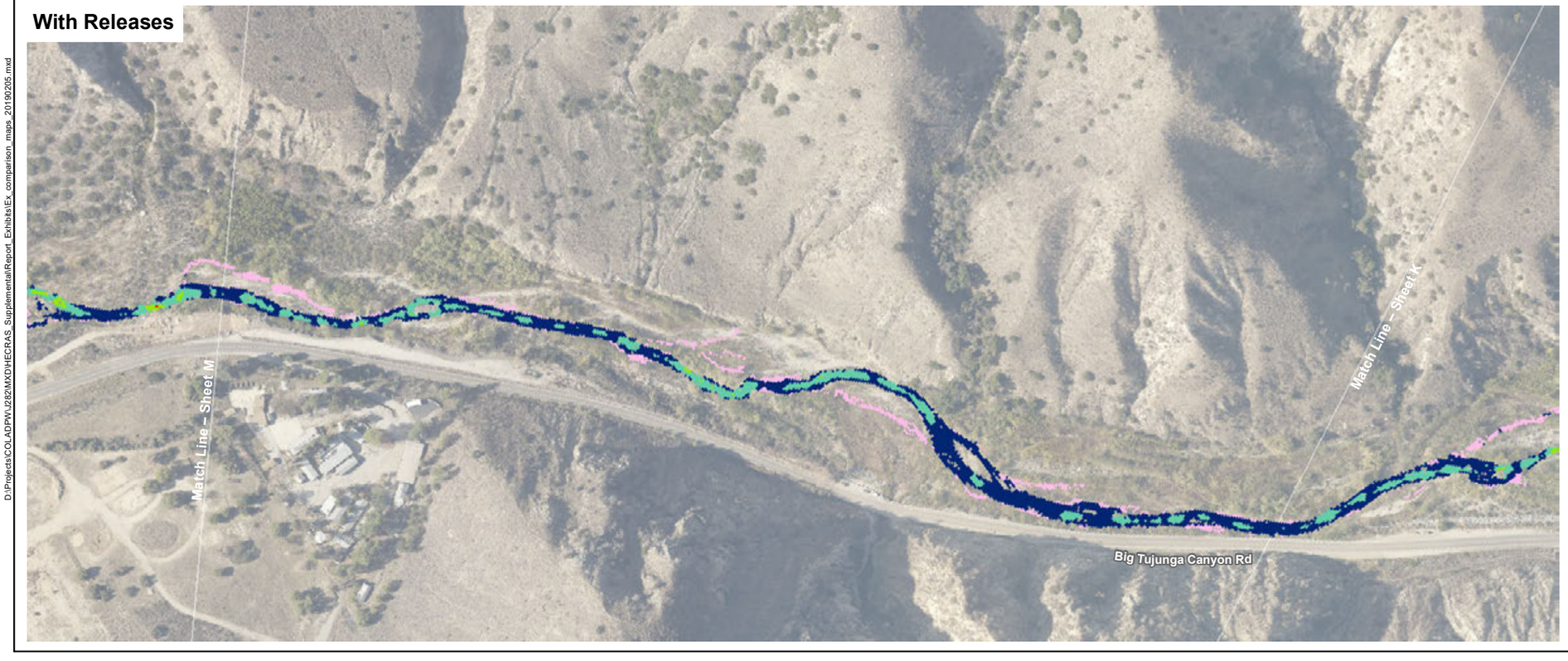


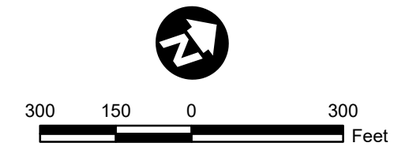
Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6
- 2.6 - 3.2

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

With Releases





Aerial Source: LAR-IAC 2014

Exhibit 5A
Sheet 12

Maximum Velocity (April)

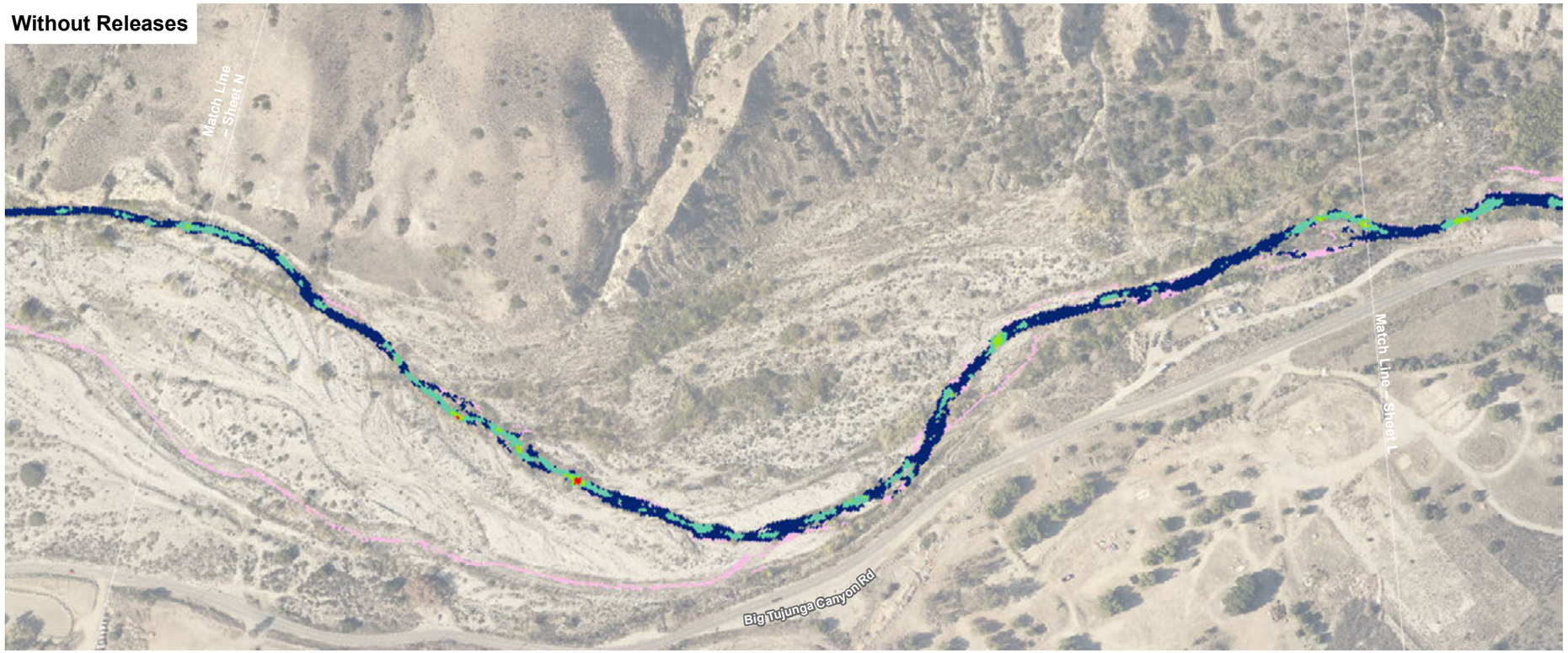
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

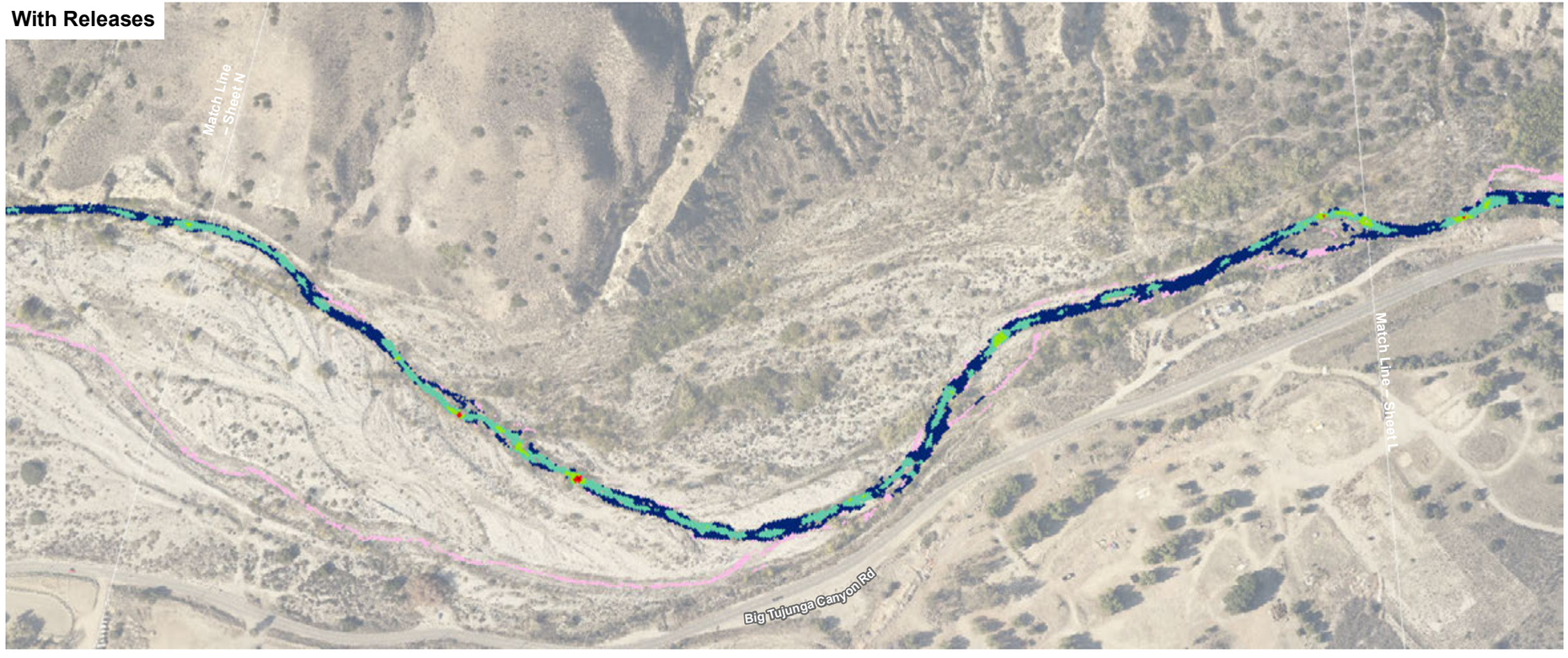
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

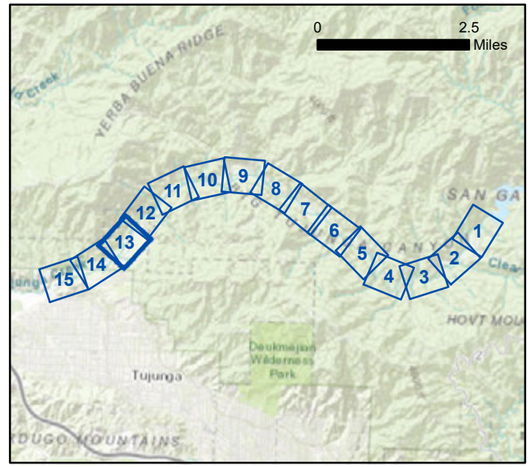
D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6
- 2.6 - 3.2
- 3.2 - 3.8

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 5A
Sheet 13

Maximum Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases

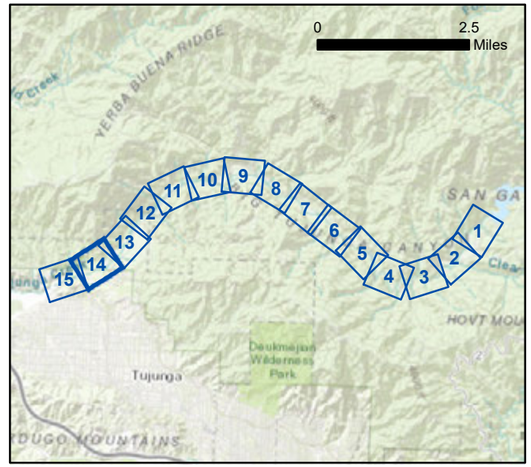
Match Line – Sheet O

Match Line – Sheet M

With Releases

Match Line – Sheet O

Match Line – Sheet M



Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HEC-RAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 5A
Sheet 14

Maximum Velocity (April)

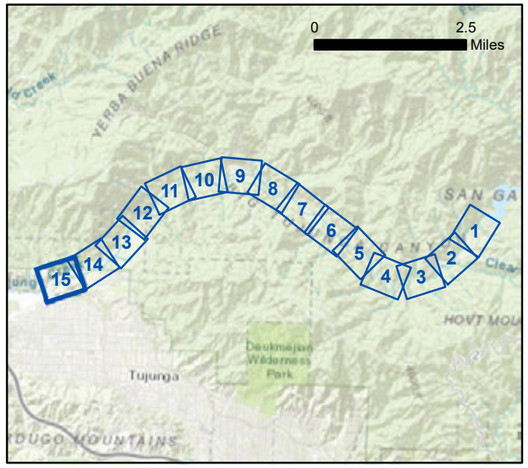
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





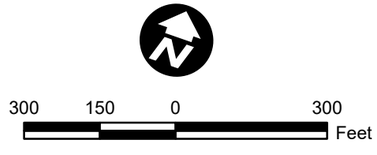
Maximum Velocity (feet per second)*

- 0.0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.6
- 2.6 - 3.2

**This graphic shows the maximum velocity over the entire time series, which occurs during the April 15 - May 15 release.*

With Releases





Aerial Source: LAR-IAC 2014

Exhibit 5A
Sheet 15

Maximum Velocity (April)

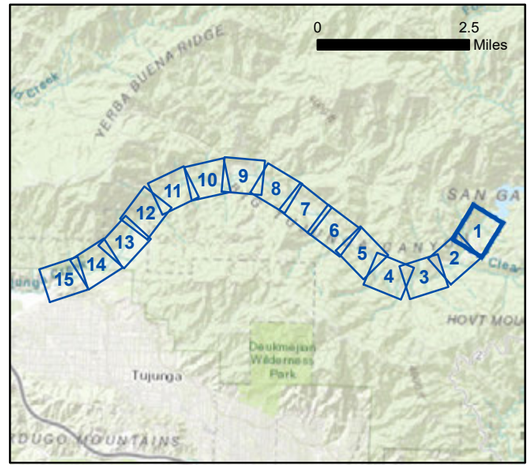
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd





Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)	Exhibit 5B Sheet 1
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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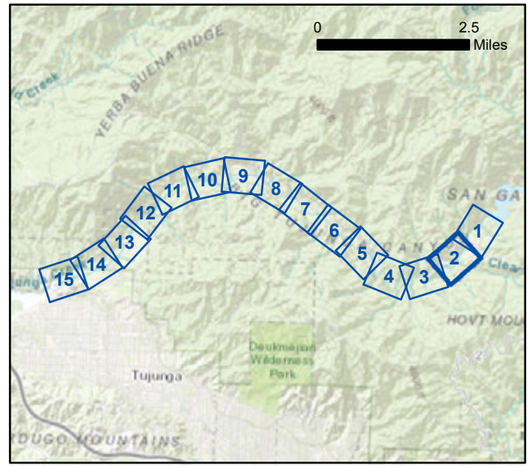

Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Change in Maximum Velocity (September)

Exhibit 5B
Sheet 2

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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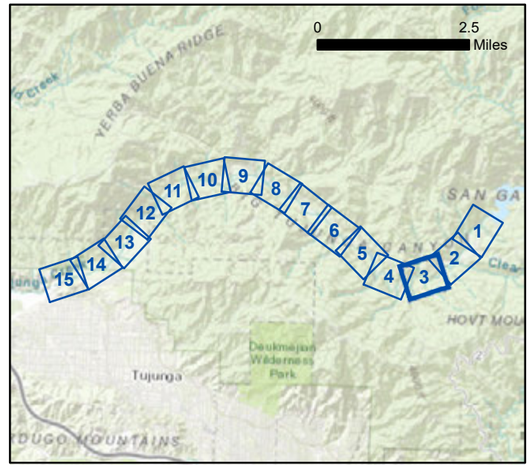

Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)

Exhibit 5B
Sheet 3

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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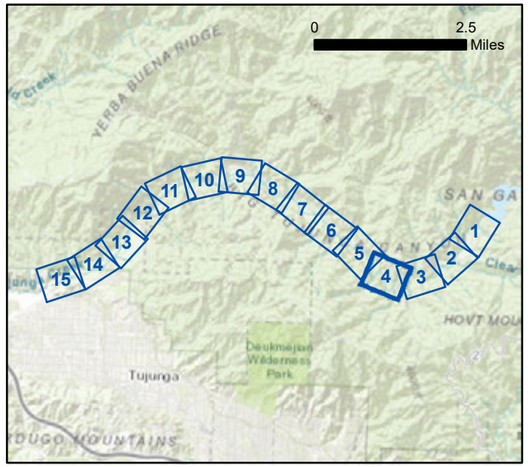

Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)	Exhibit 5B Sheet 4
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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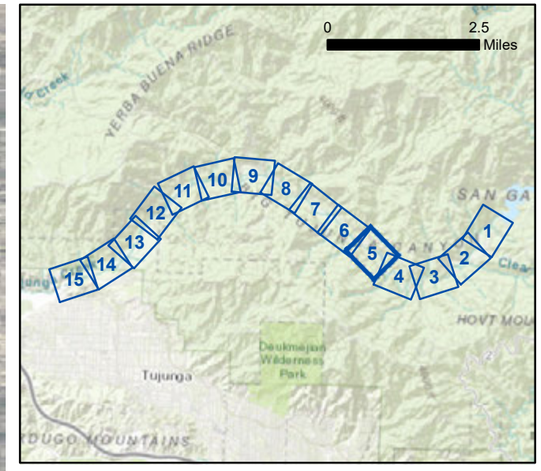

Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)

Exhibit 5B
Sheet 5

Big Tujunga Dam – Supplemental Release Study

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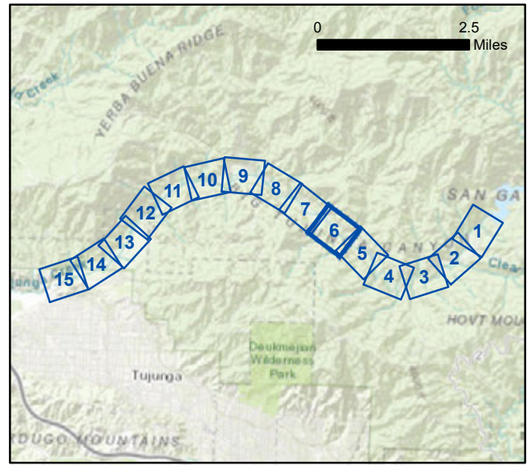

Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)

Exhibit 5B
Sheet 6

Big Tujunga Dam – Supplemental Release Study

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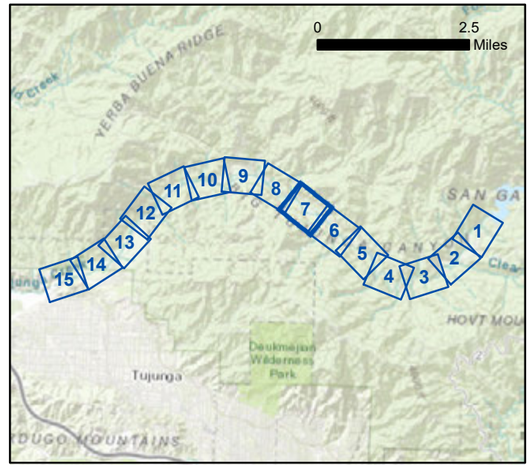
Match Line – Sheet H

Big Tujunga Canyon Rd

Doske Rd

Match Line – Sheet F

Match Line – Sheet H



Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)

Exhibit 5B Sheet 7

Big Tujunga Dam – Supplemental Release Study

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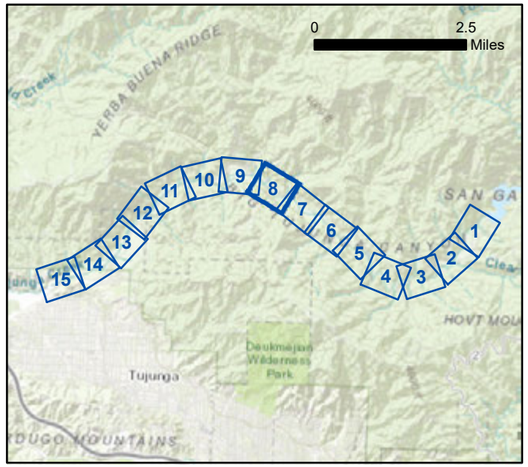

Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)

Exhibit 5B
Sheet 8

Big Tujunga Dam – Supplemental Release Study

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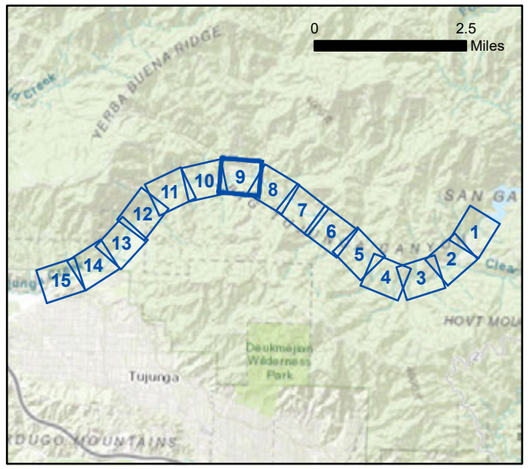

Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)

Exhibit 5B
Sheet 9

Big Tujunga Dam – Supplemental Release Study

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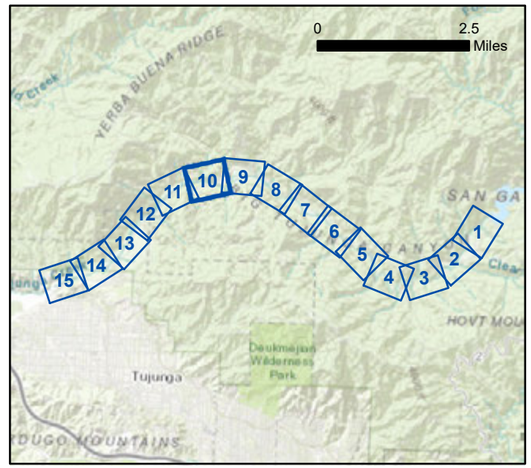

Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)

Exhibit 5B
Sheet 10

Big Tujunga Dam – Supplemental Release Study

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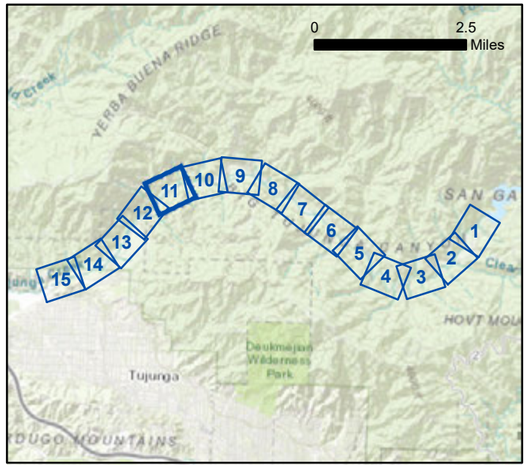

Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)

Exhibit 5B
Sheet 11

Big Tujunga Dam – Supplemental Release Study

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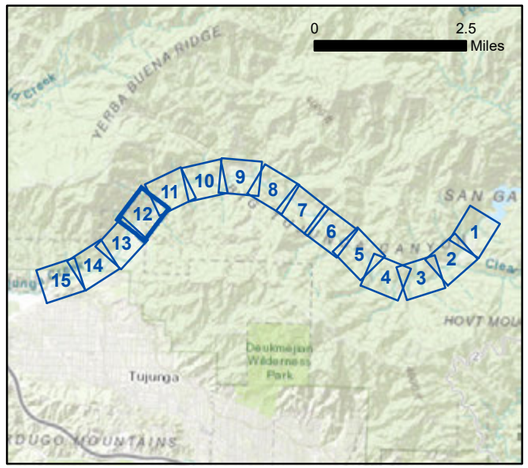

Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)

Exhibit 5B
Sheet 12

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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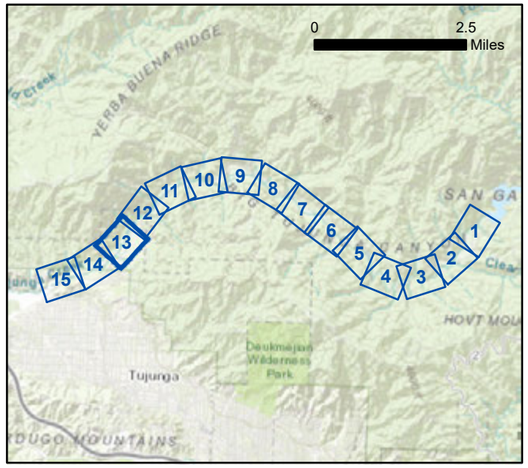

Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)

Exhibit 5B
Sheet 13

Big Tujunga Dam – Supplemental Release Study

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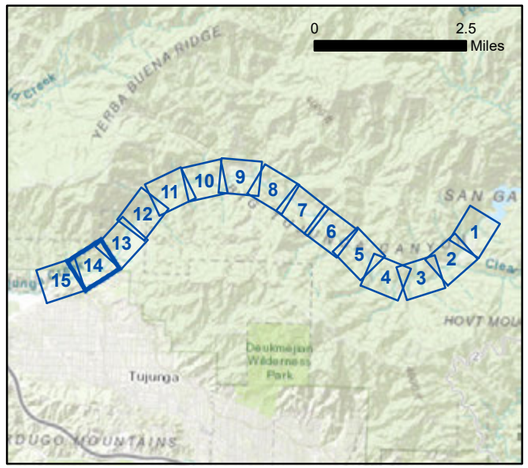

Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)

Exhibit 5B
Sheet 14

Big Tujunga Dam – Supplemental Release Study

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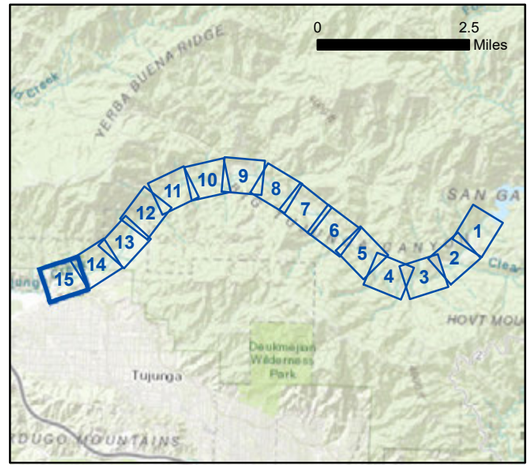

Change in Maximum Velocity (feet per second)*

- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 2.9

**This graphic shows the maximum change in velocity, which occurs during the September 15 - October 15 release.*

300 150 0 300 Feet

Aerial Source: LAR-IAC 2014

Change in Maximum Velocity (September)	Exhibit 5B Sheet 15
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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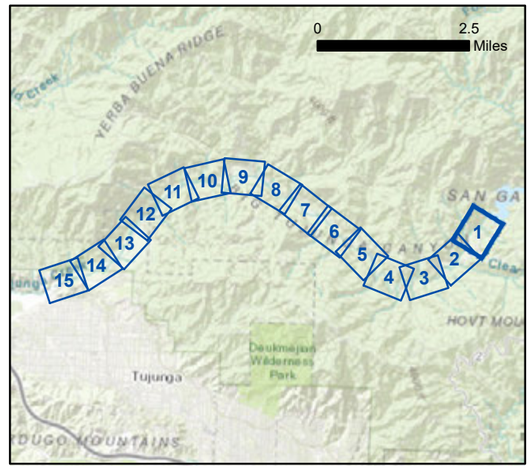
D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_single_DF_20190205.mxd

Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5
- 2.5 - 3.2
- 3.2 - 3.8

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6A
Sheet 1

Average Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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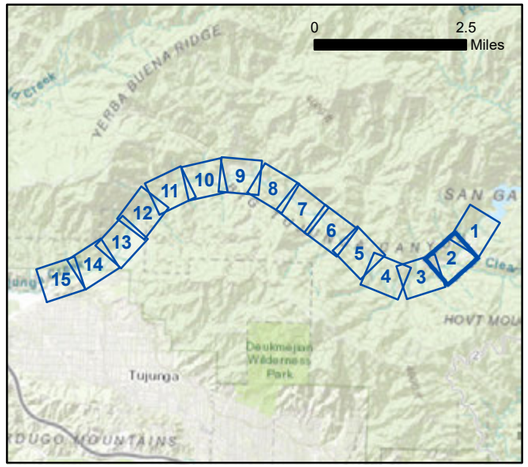
Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5
- 2.5 - 3.2
- 3.2 - 3.8

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6A
Sheet 2

Average Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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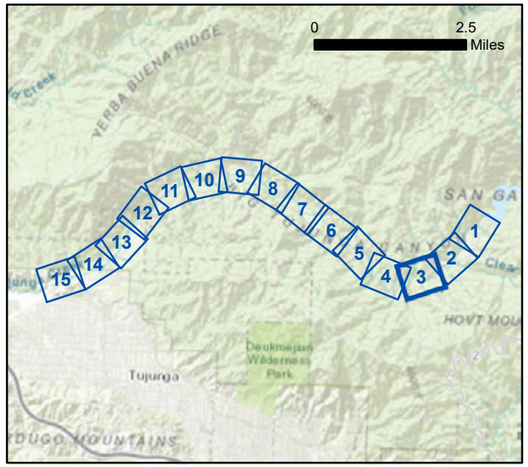
Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5
- 2.5 - 3.2

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 6A
Sheet 3

Average Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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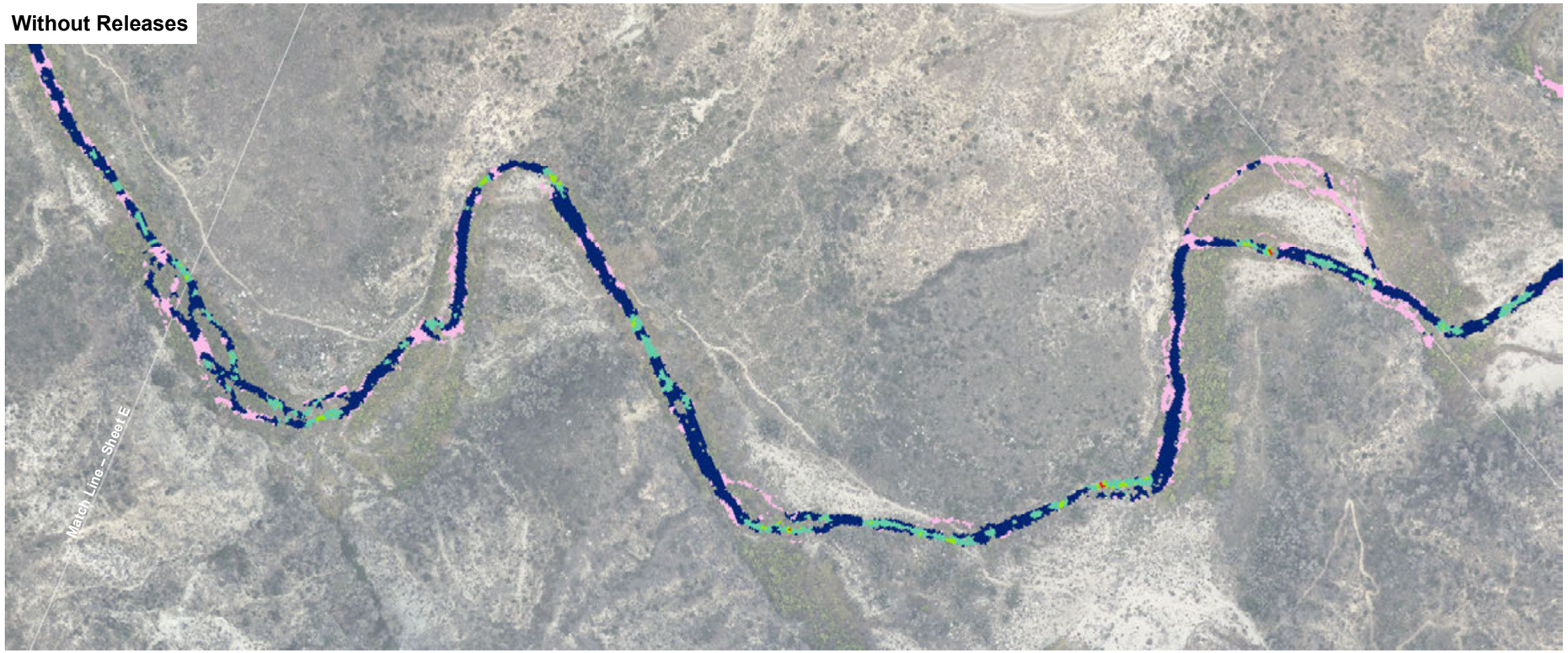
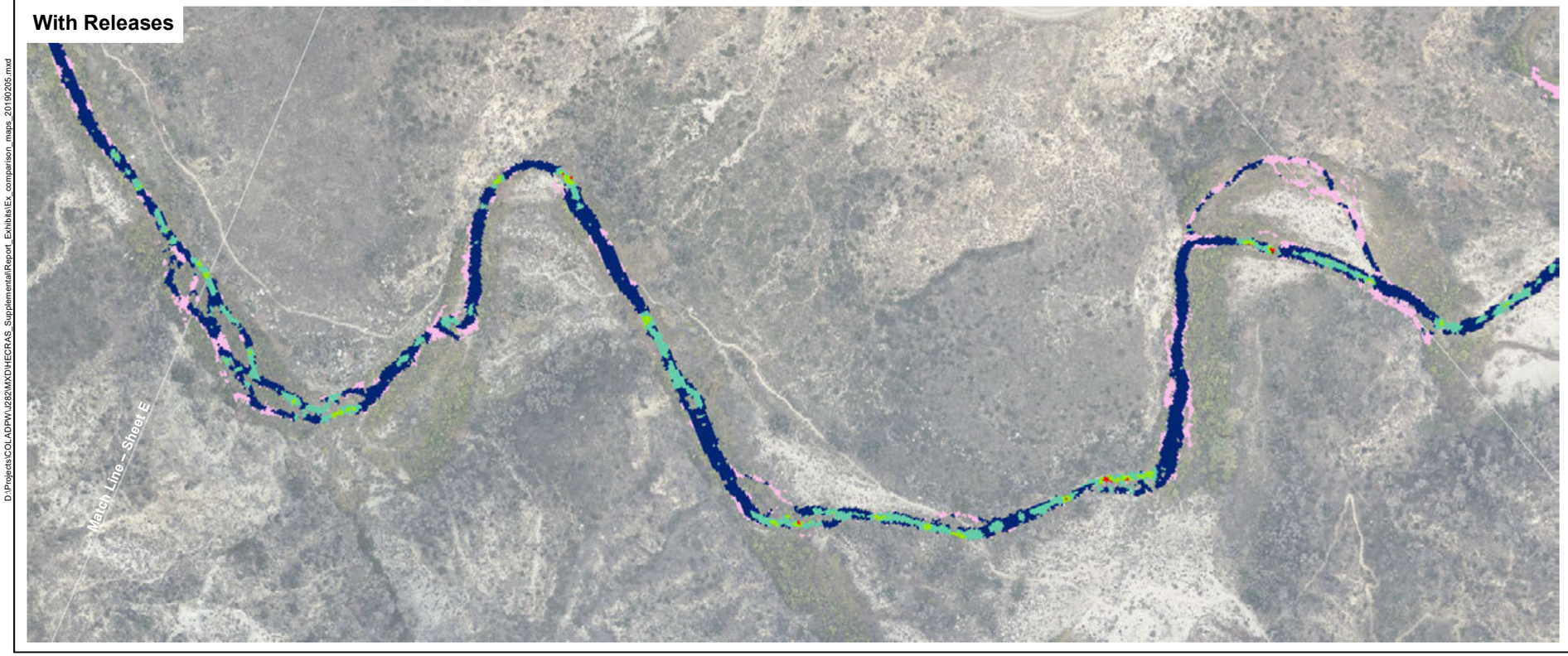
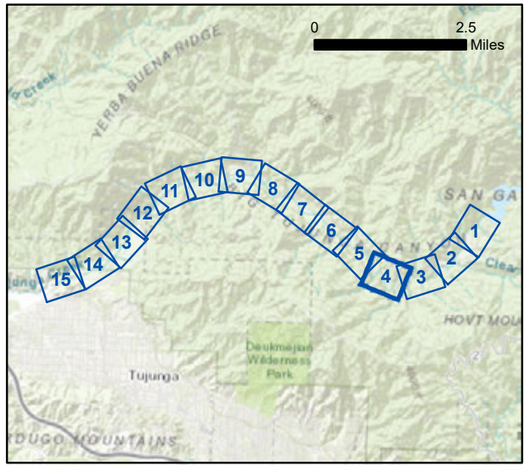
Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5
- 2.5 - 3.2
- 3.2 - 3.8

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6A
Sheet 4

Average Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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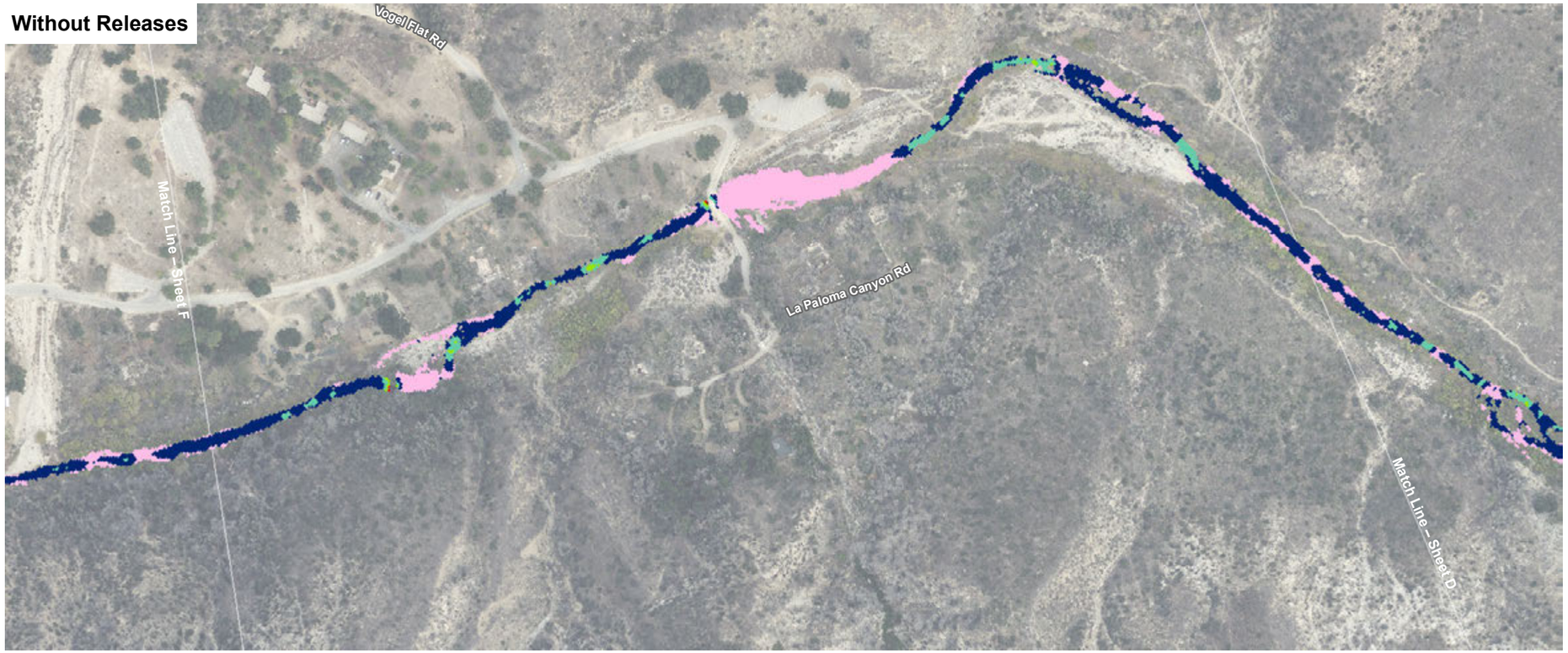
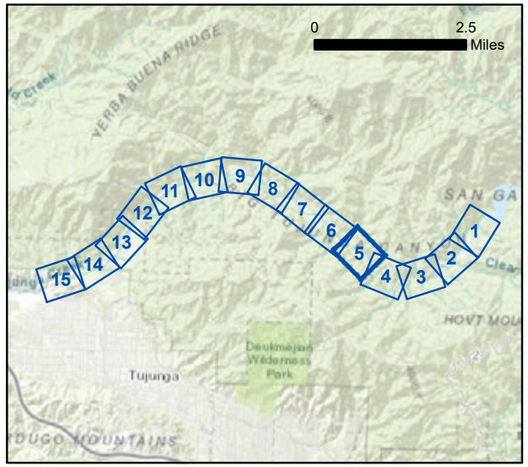
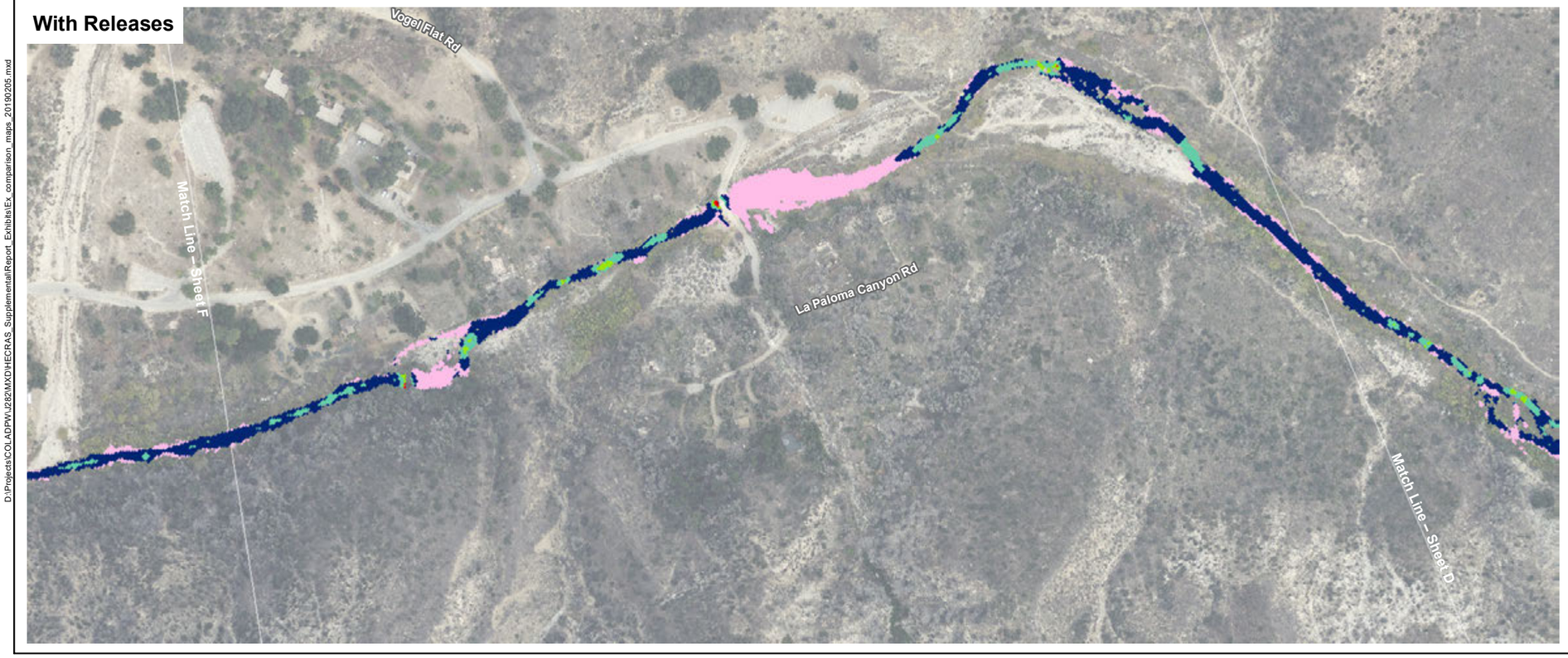
Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5
- 2.5 - 3.2
- 3.2 - 3.8

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6A
Sheet 5

Average Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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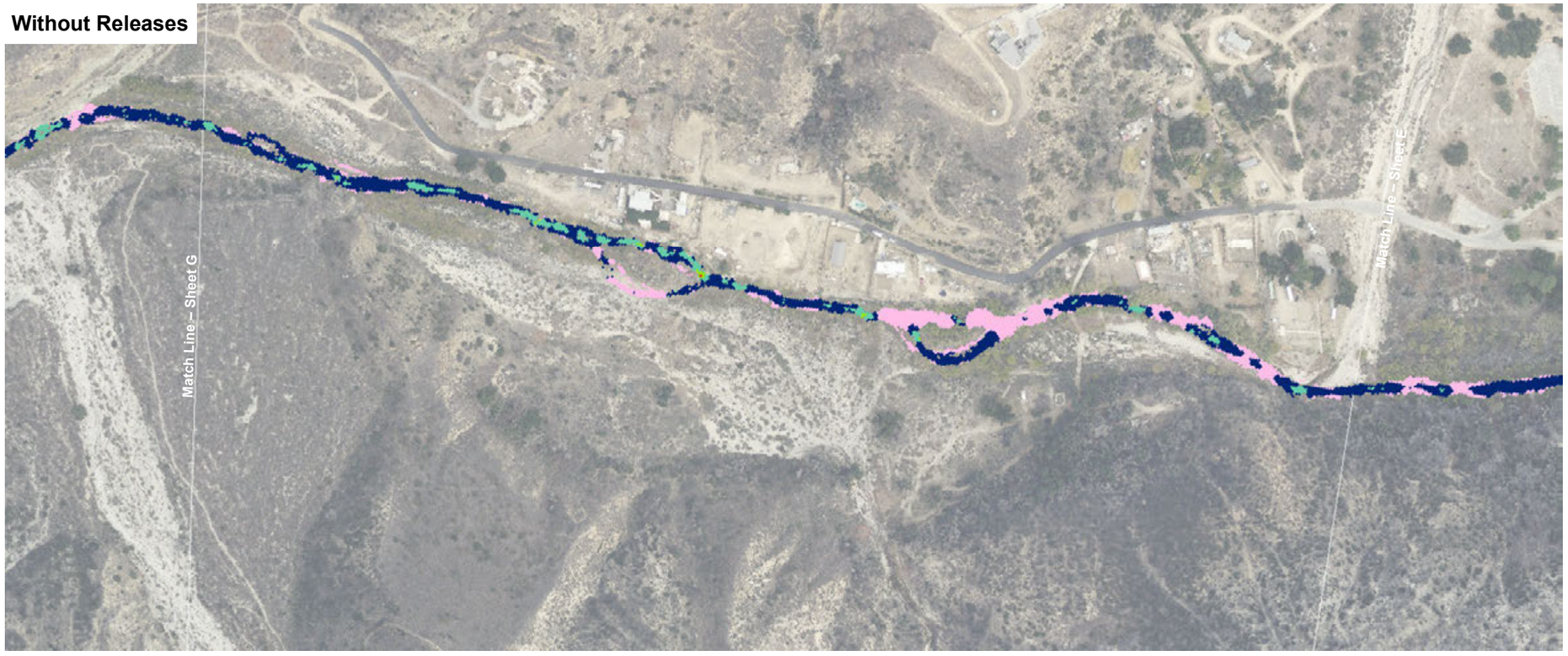
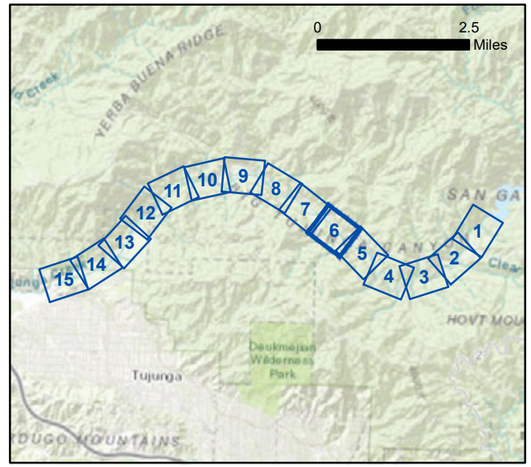
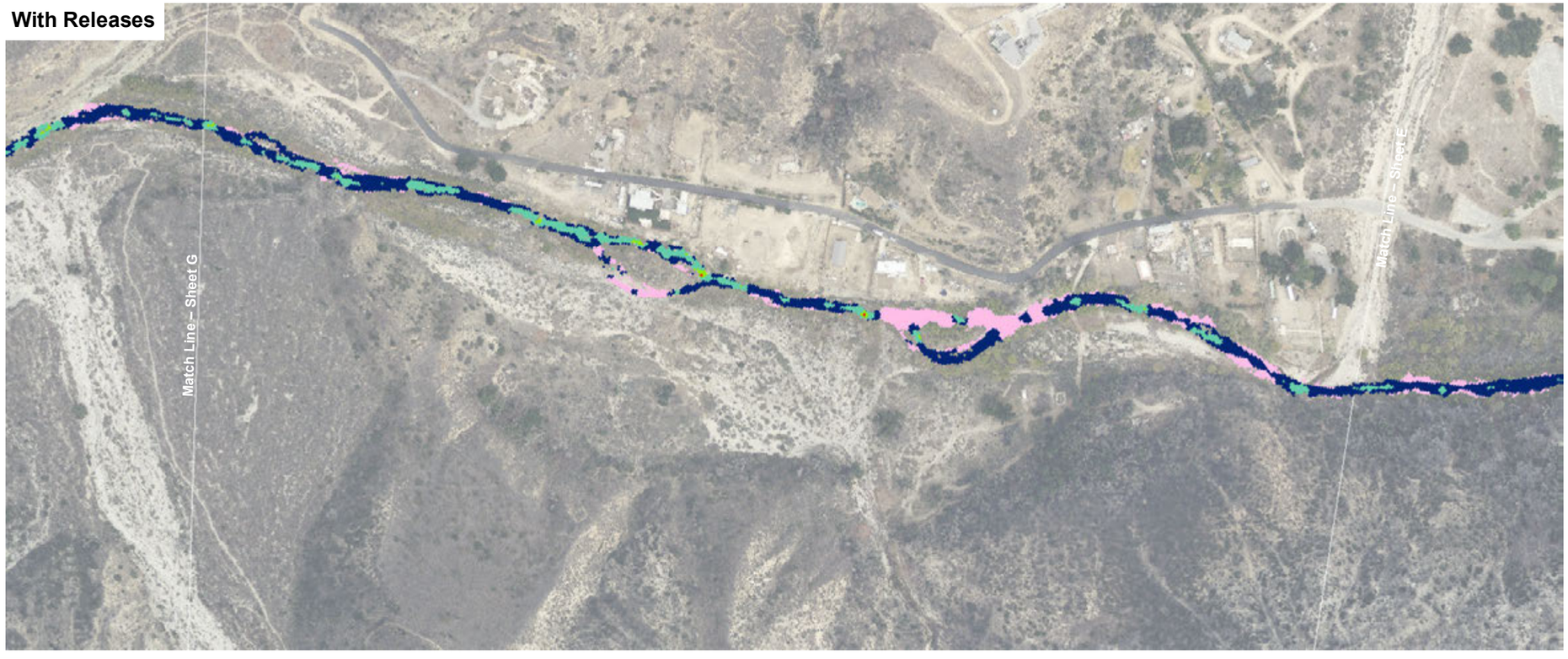




With Releases



Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5
- 2.5 - 3.2

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6A
Sheet 6

Average Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

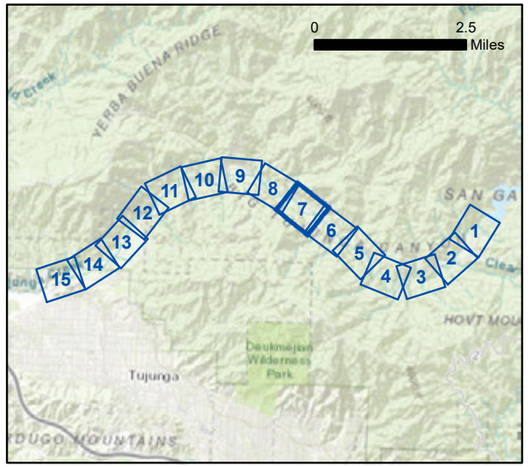
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5
- 2.5 - 3.2

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6A
Sheet 7

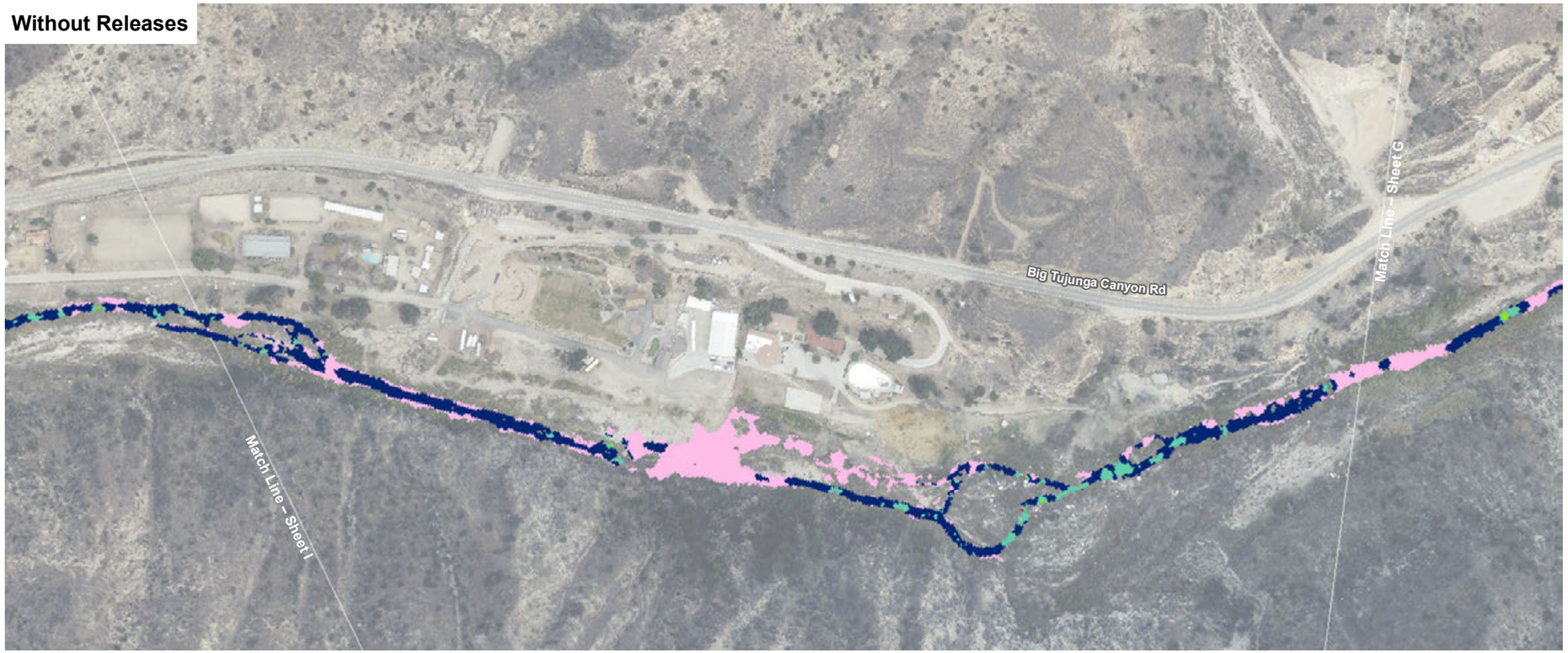
Average Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

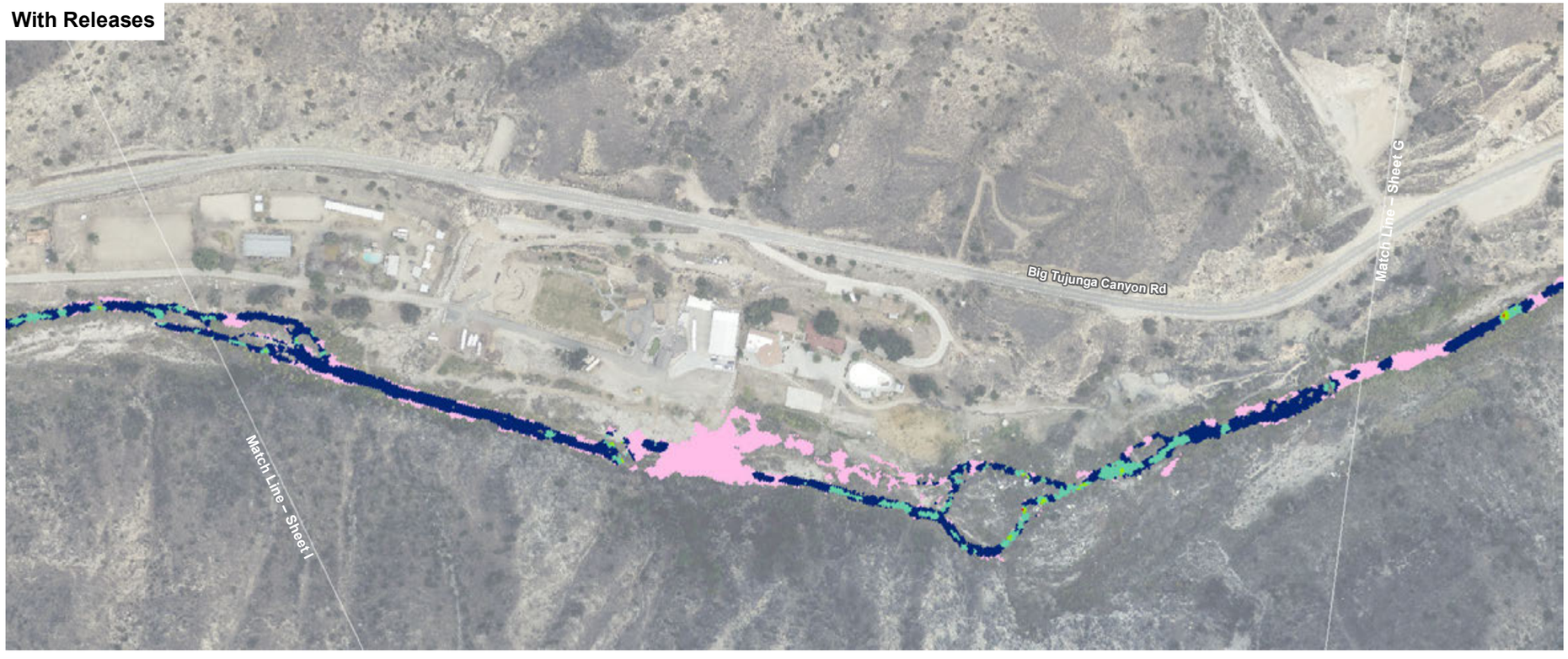
PSOMAS

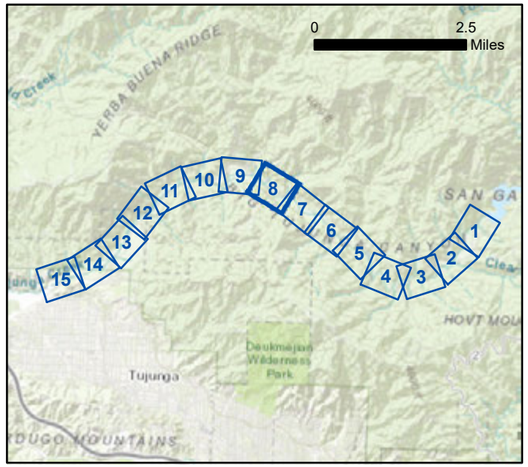
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5
- 2.5 - 3.2

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6A
Sheet 8

Average Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

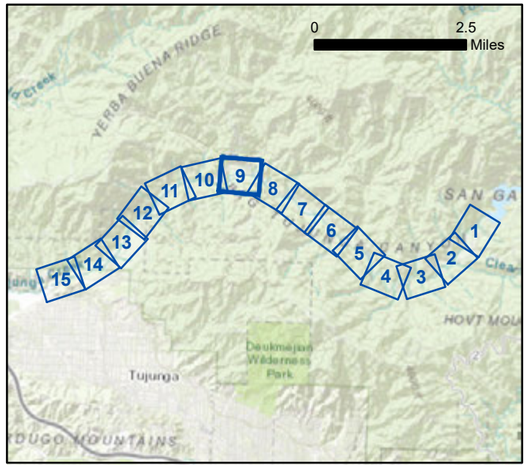
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5
- 2.5 - 3.2

N

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

Exhibit 6A
Sheet 9

Average Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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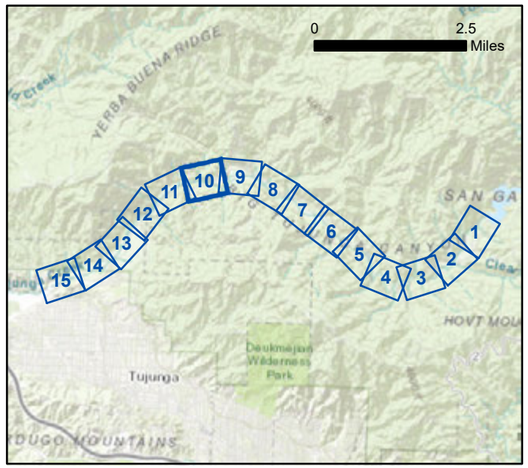
Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5
- 2.5 - 3.2
- 3.2 - 3.8

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6A
Sheet 10

Average Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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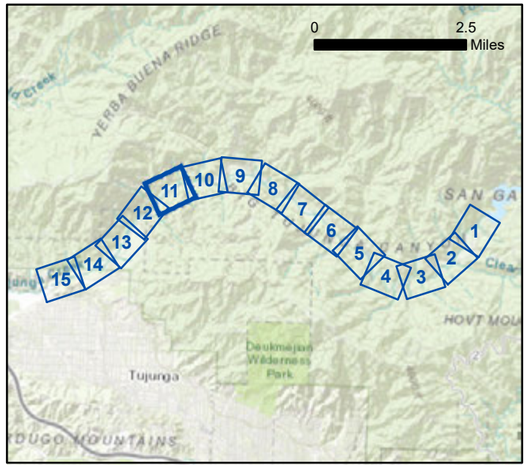
Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6A
Sheet 11

Average Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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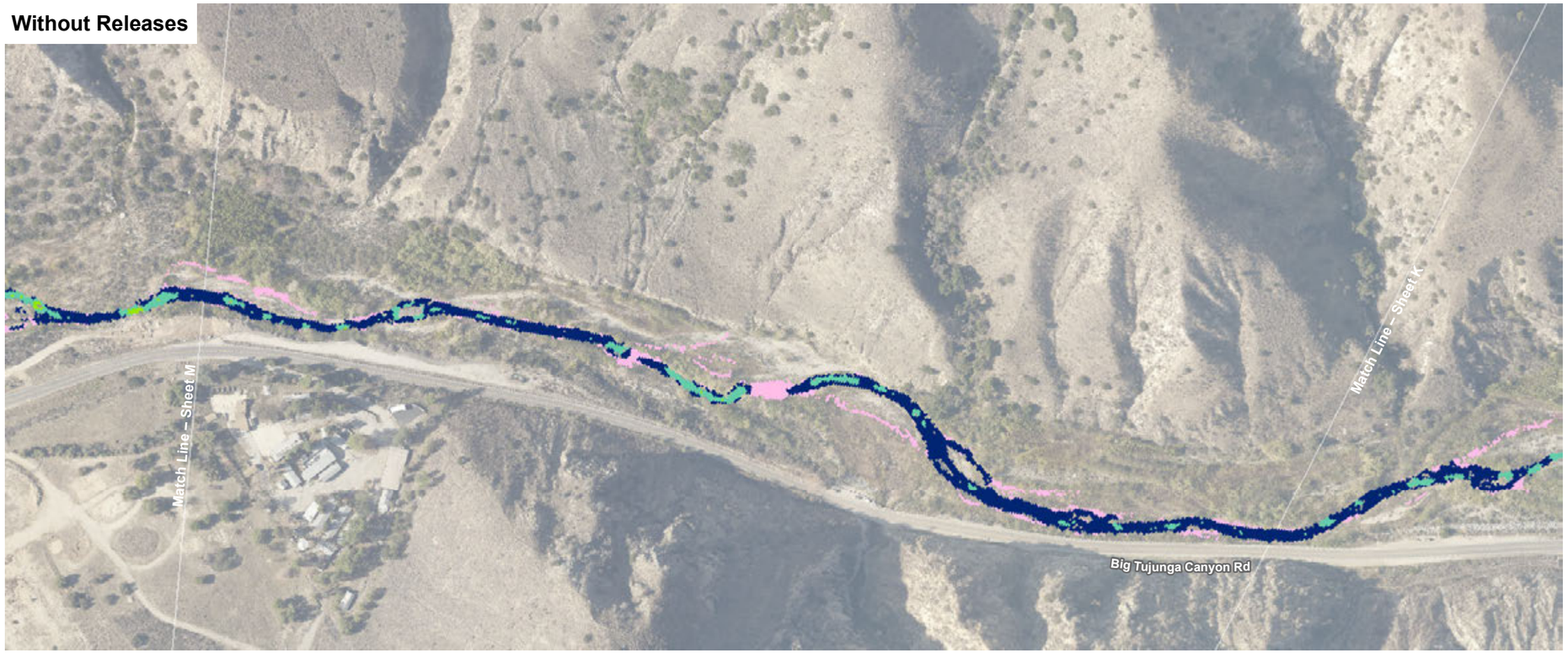
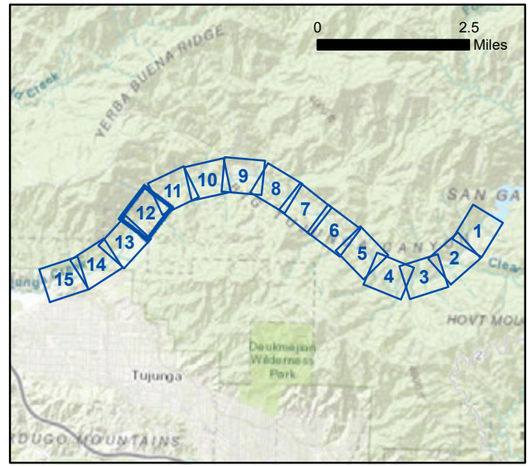
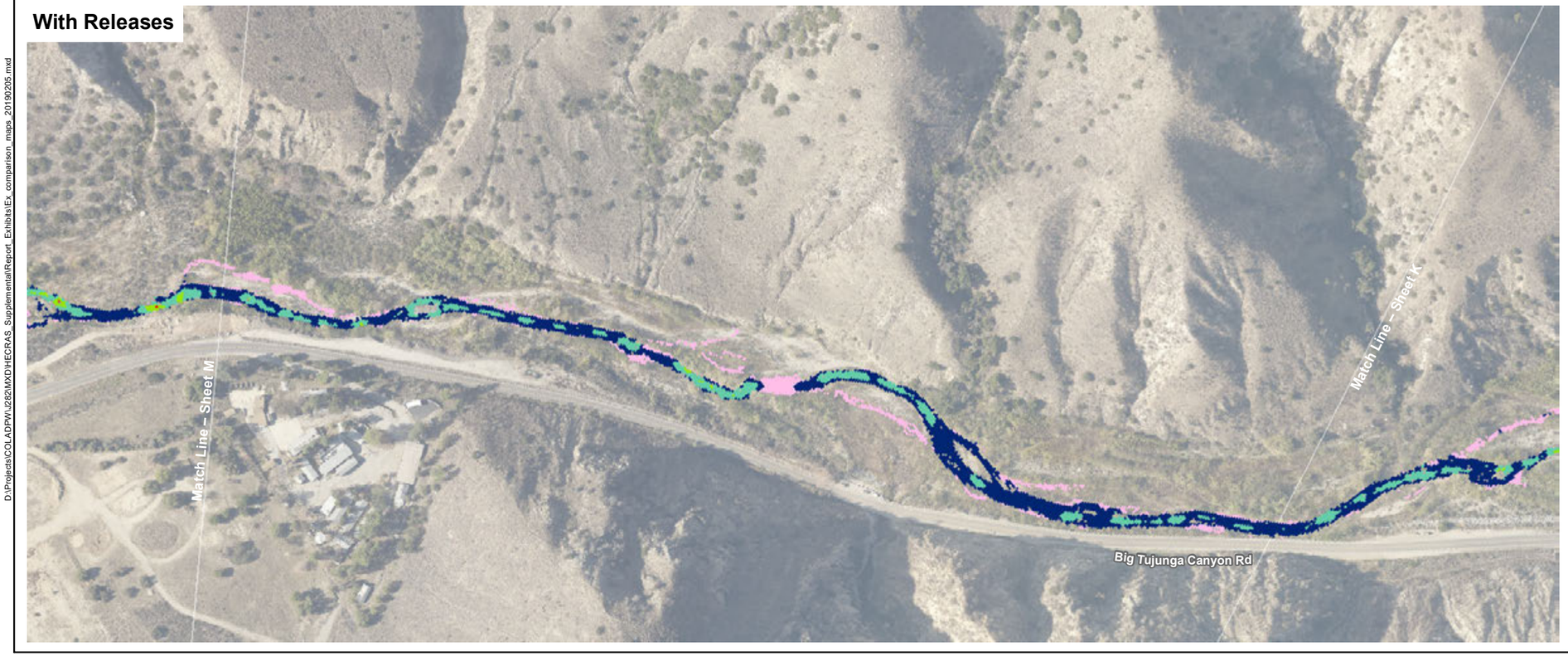




With Releases



Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5
- 2.5 - 3.2

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6A
Sheet 12

Average Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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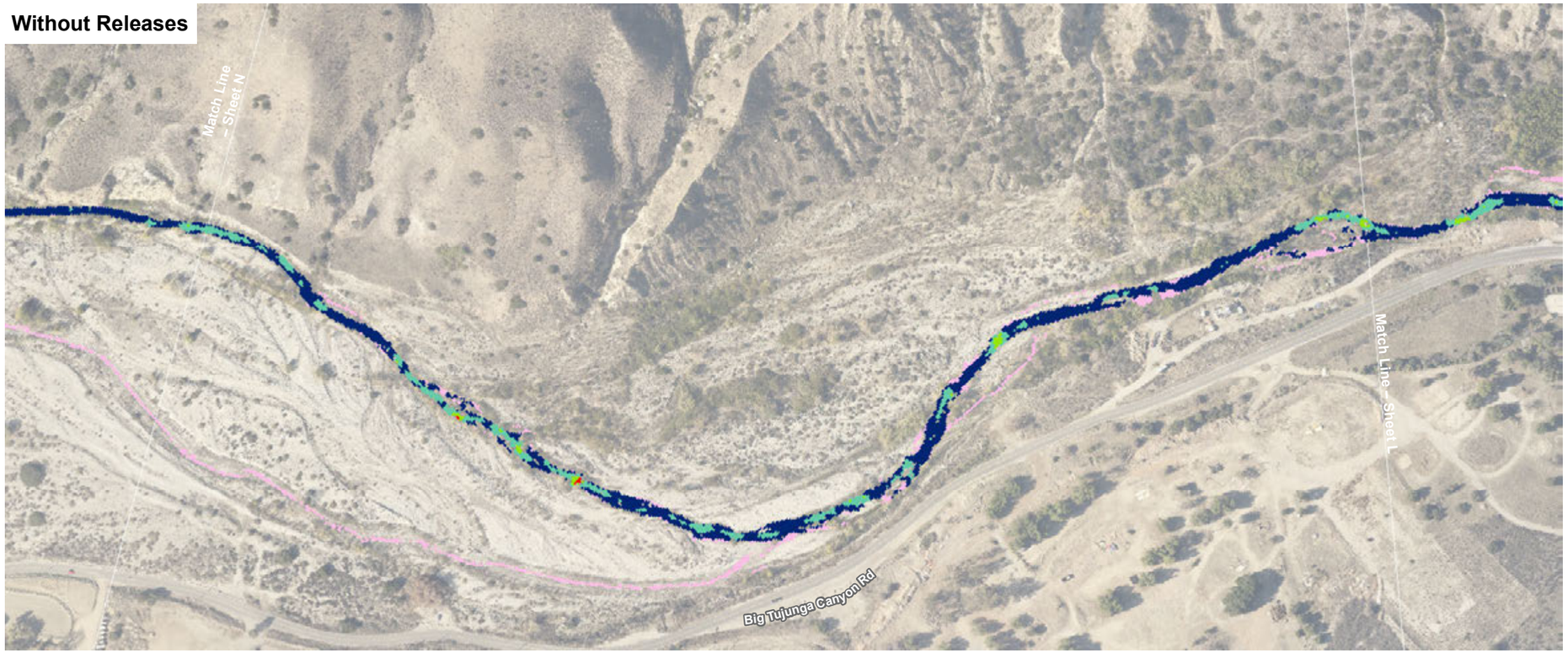
Without Releases



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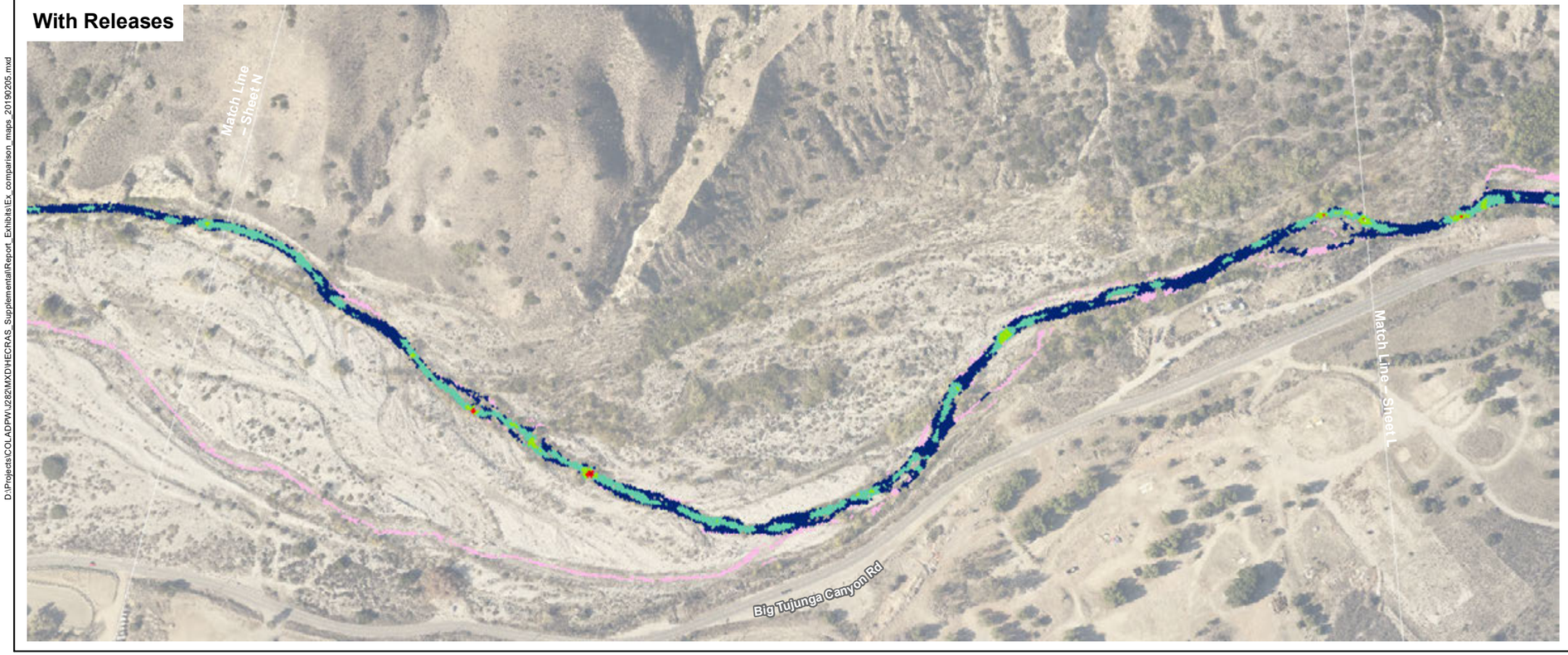

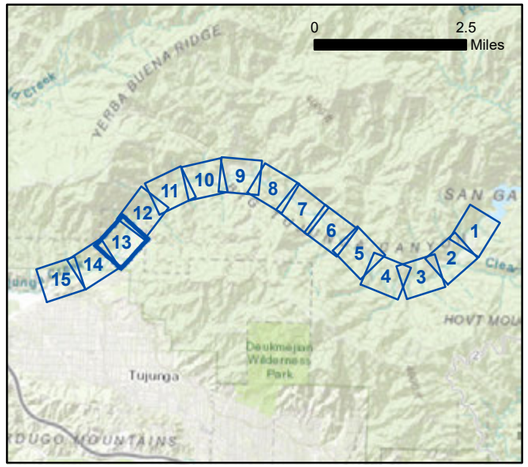

Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5
- 2.5 - 3.2
- 3.2 - 3.8

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6A
Sheet 13

Average Velocity (April)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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Without Releases

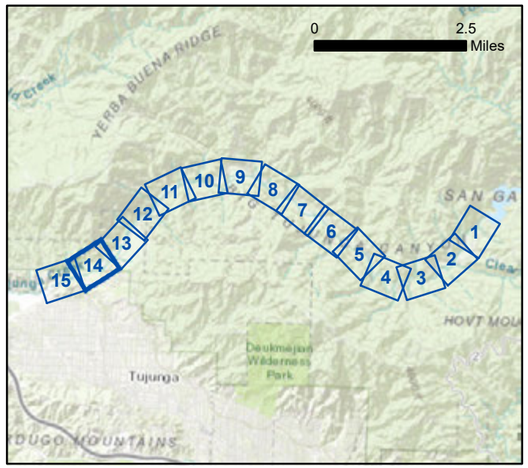
Match Line – Sheet O

Match Line – Sheet M

With Releases

Match Line – Sheet O

Match Line – Sheet M



Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J28\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6A
Sheet 14

Average Velocity (April)

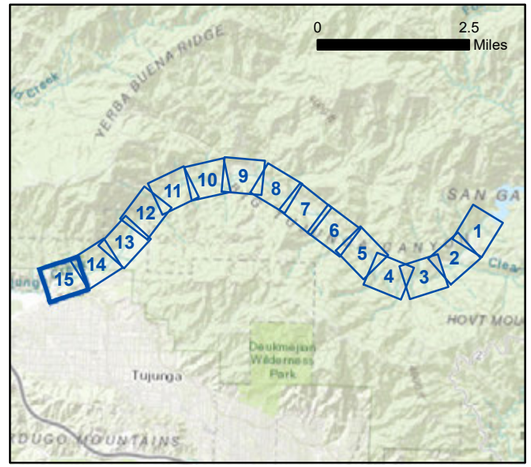
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.6
- 0.6 - 1.3
- 1.3 - 1.9
- 1.9 - 2.5
- 2.5 - 3.2

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6A
Sheet 15

Average Velocity (April)

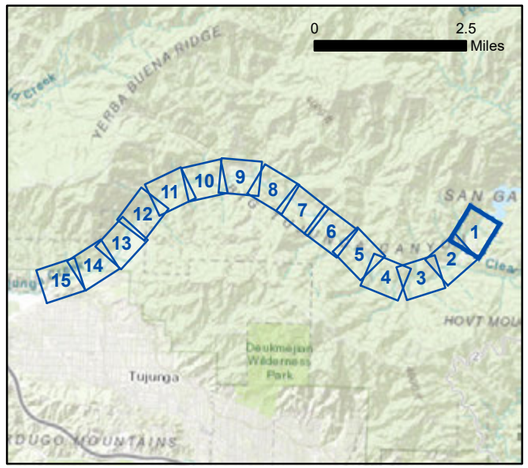
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6B
Sheet 1

Average Velocity (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

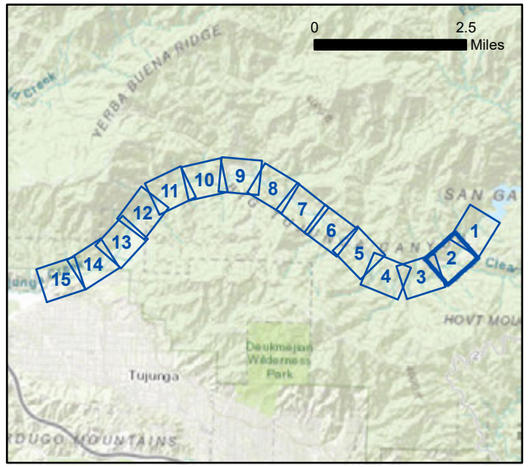
D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6B
Sheet 2

Average Velocity (June)

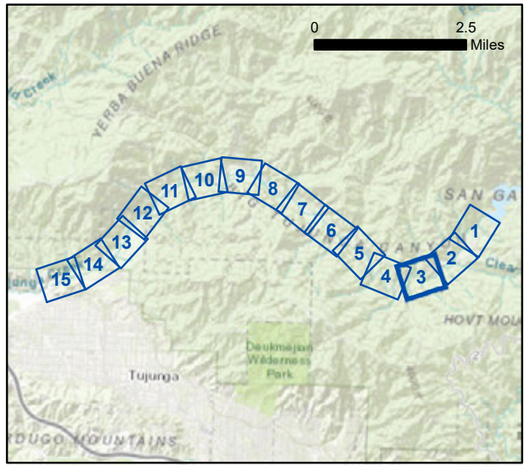
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2
- 2.2 - 2.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6B
Sheet 3

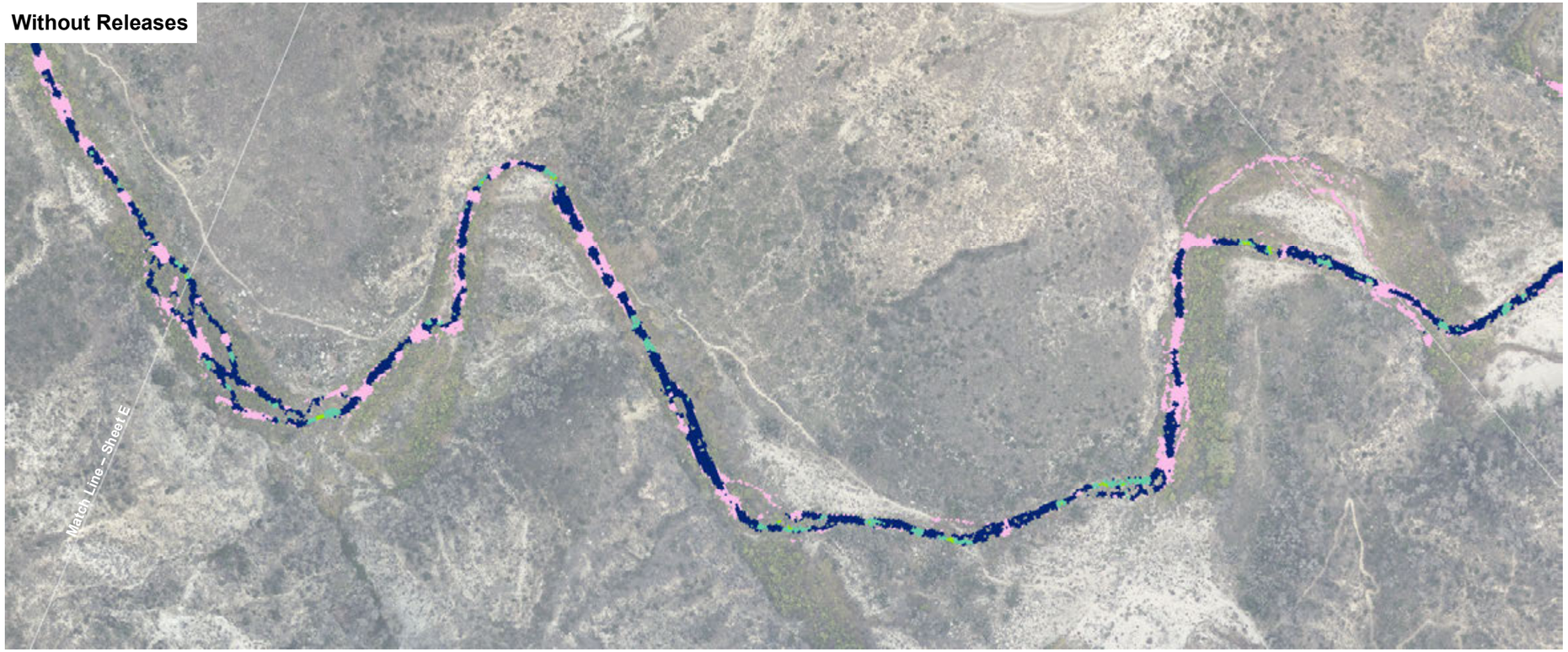
Average Velocity (June)

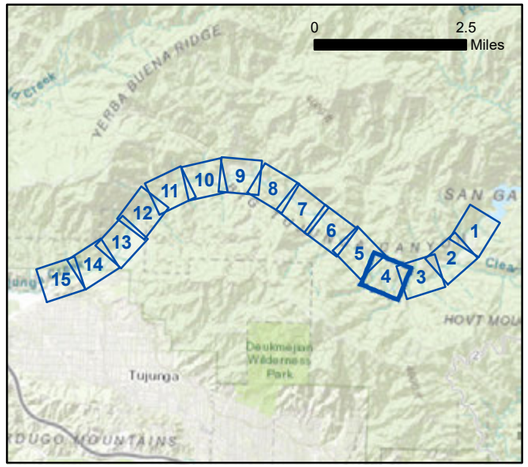
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

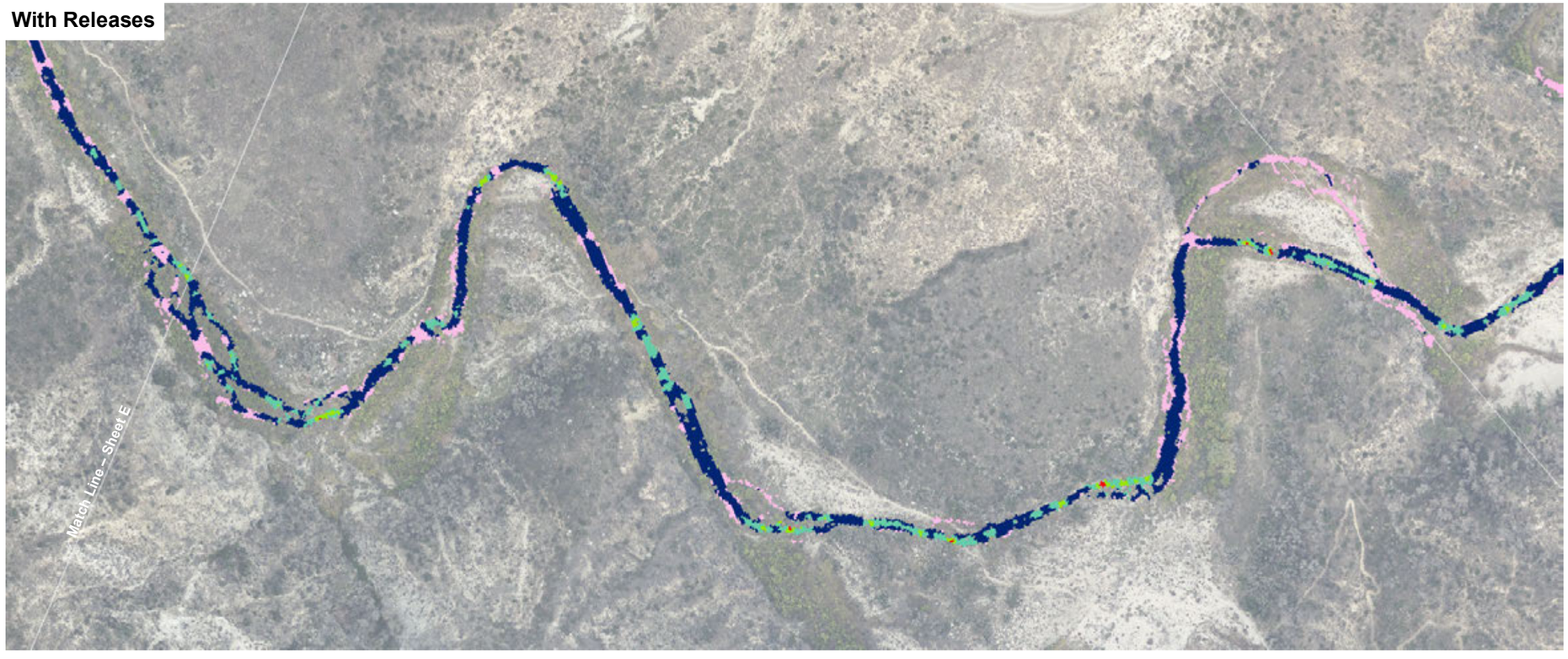
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2
- 2.2 - 2.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6B
Sheet 4

Average Velocity (June)

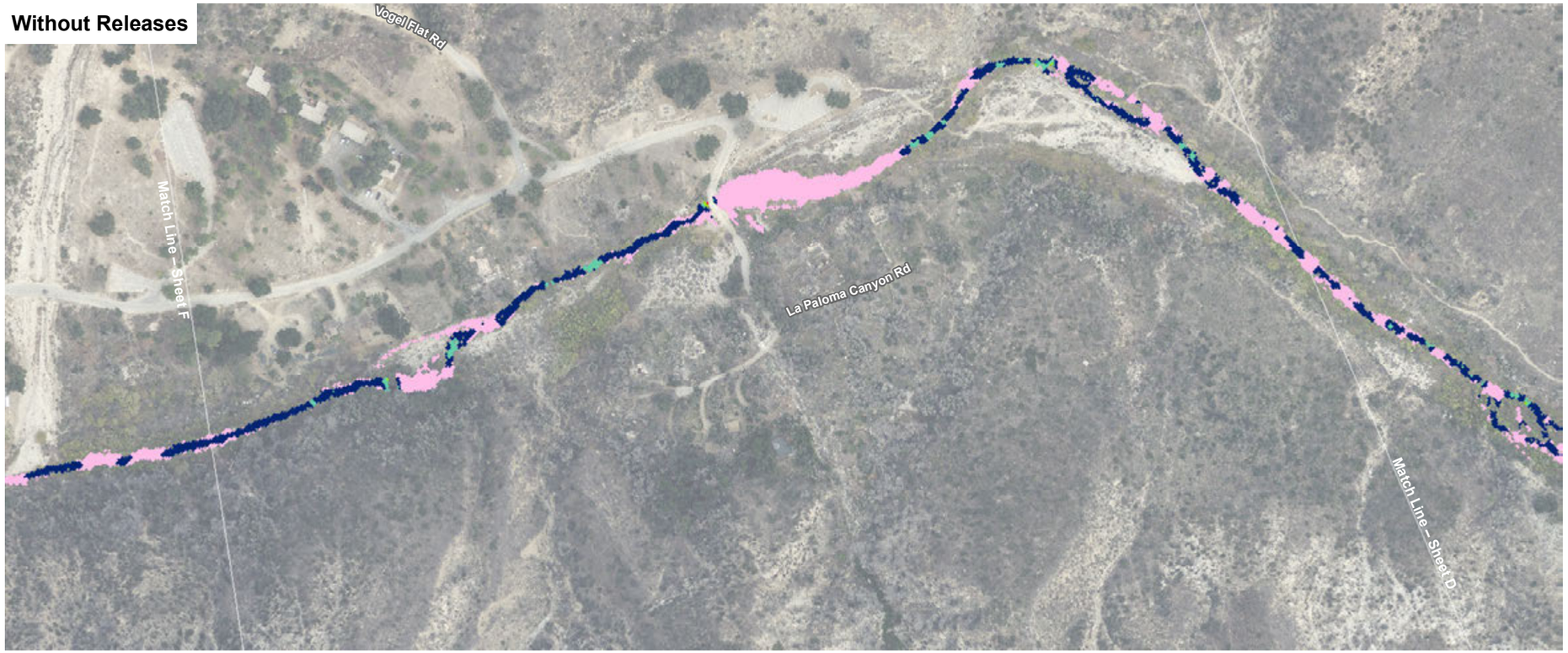
Big Tujunga Dam –
Supplemental Release Study

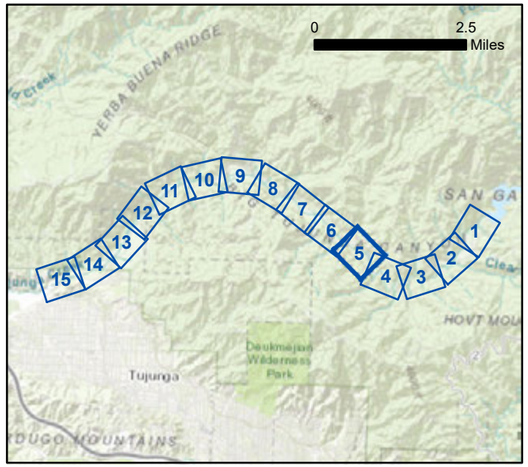
PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

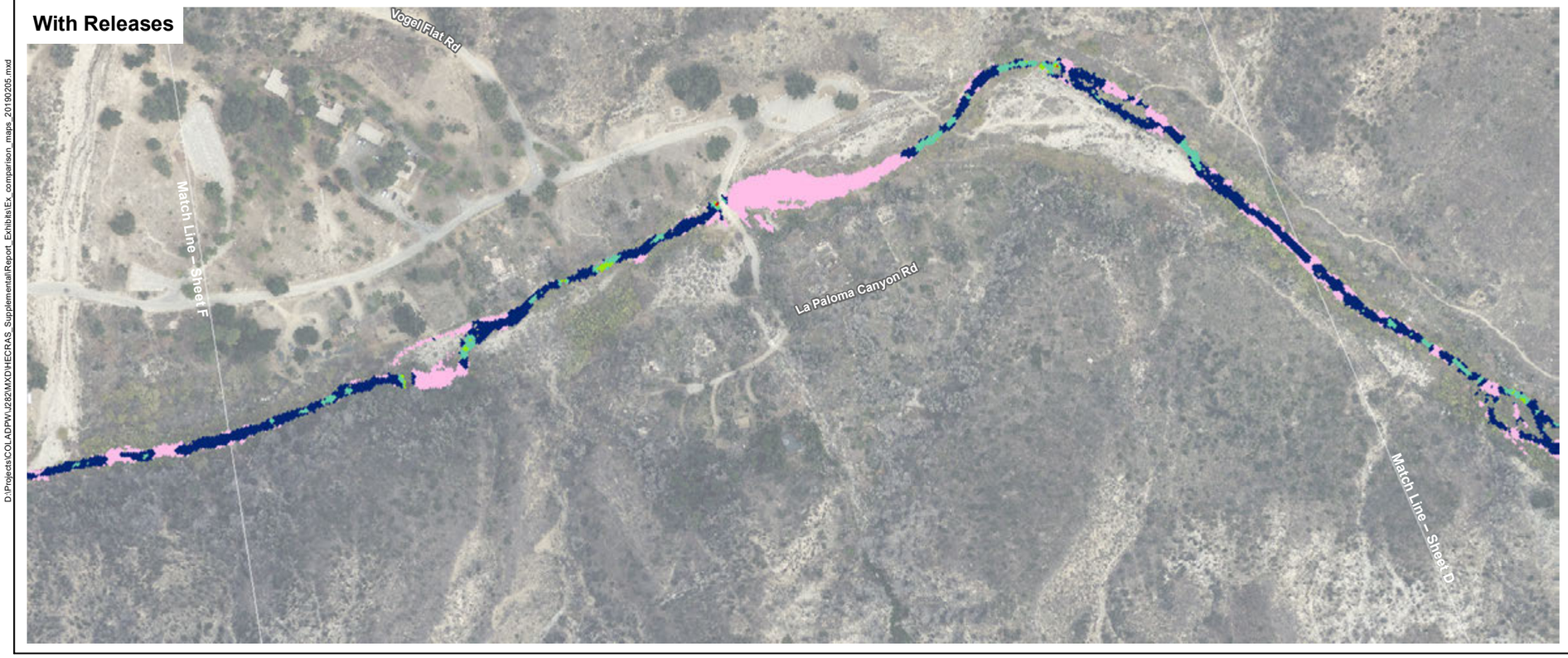
D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6B
Sheet 5

Average Velocity (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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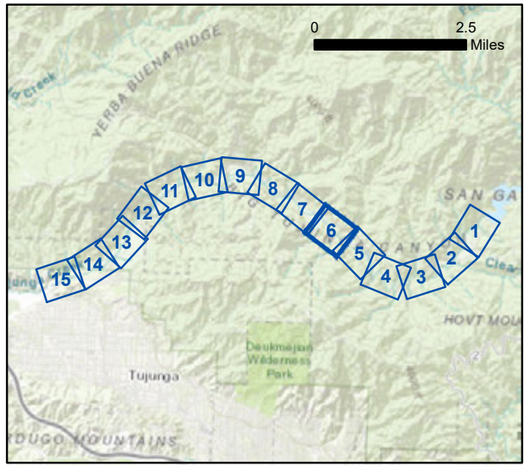
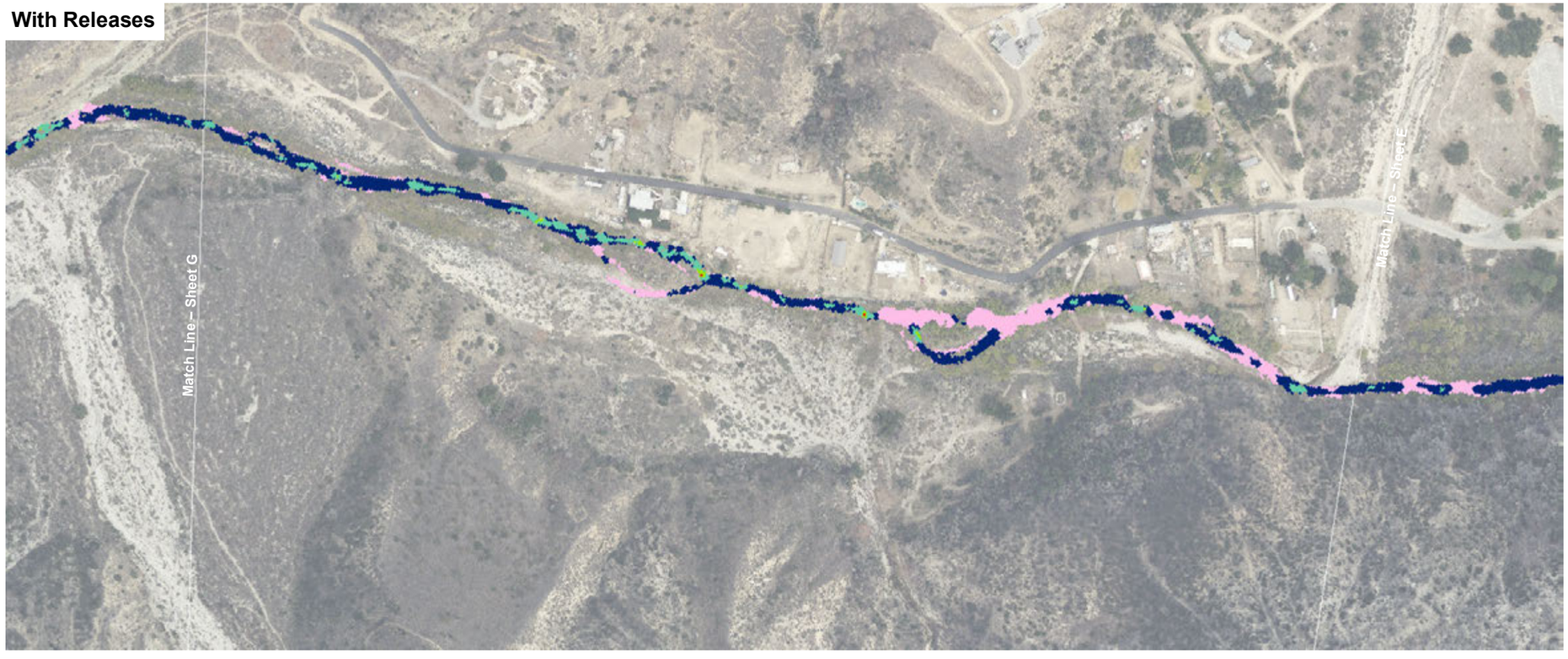
Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2
- 2.2 - 2.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 6B
Sheet 6

Average Velocity (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

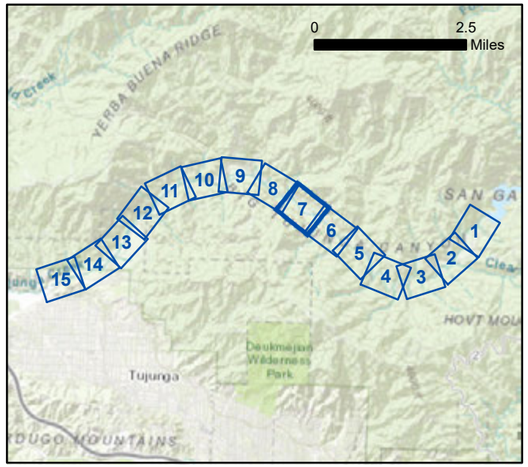
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2
- 2.2 - 2.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 6B
Sheet 7

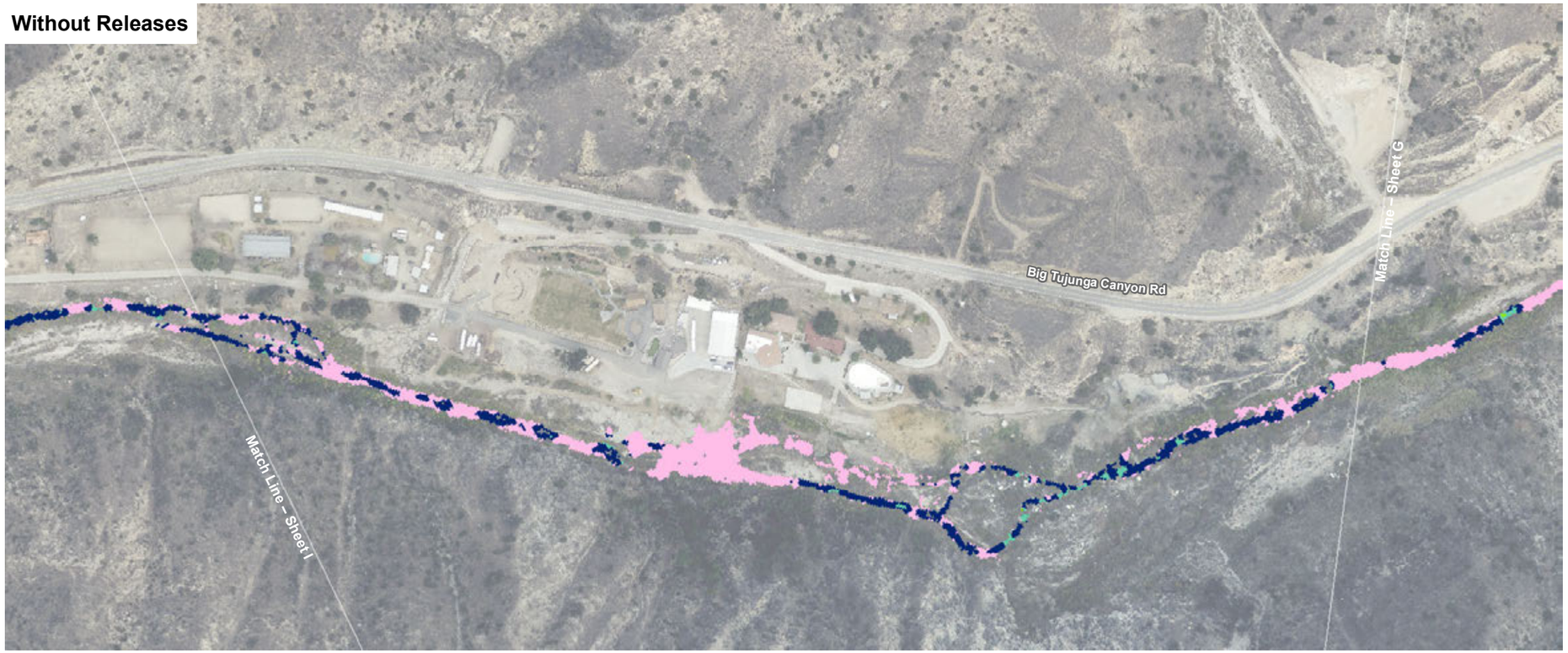
Average Velocity (June)

Big Tujunga Dam –
Supplemental Release Study

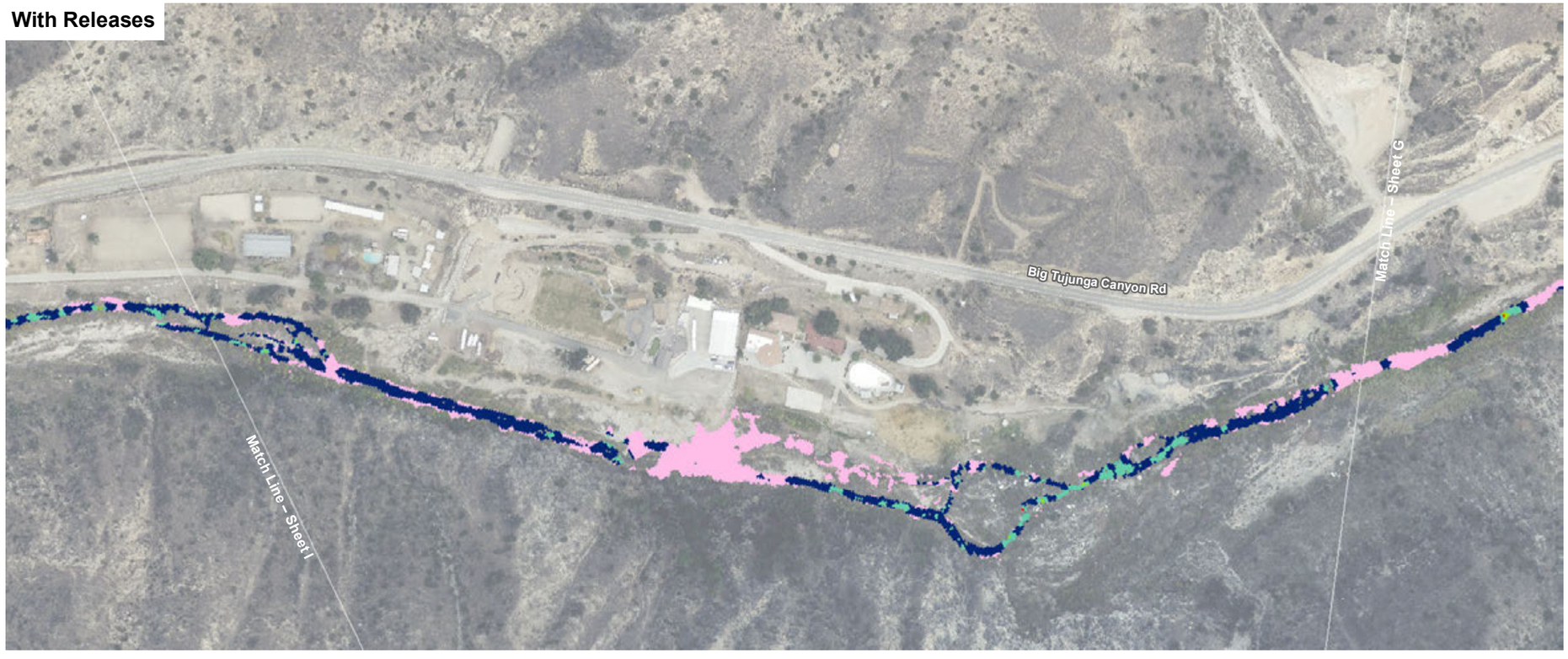
PSOMAS

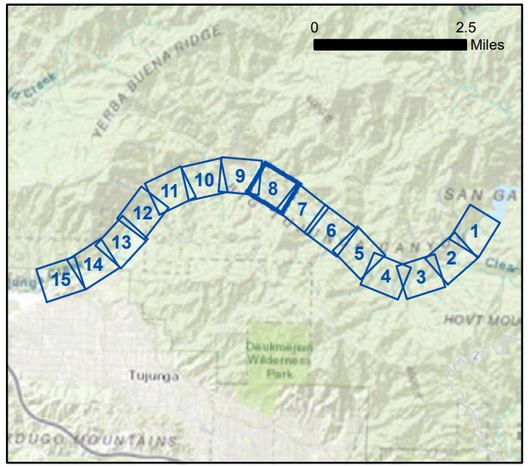
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2
- 2.2 - 2.7

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Exhibit 6B
Sheet 8

Average Velocity (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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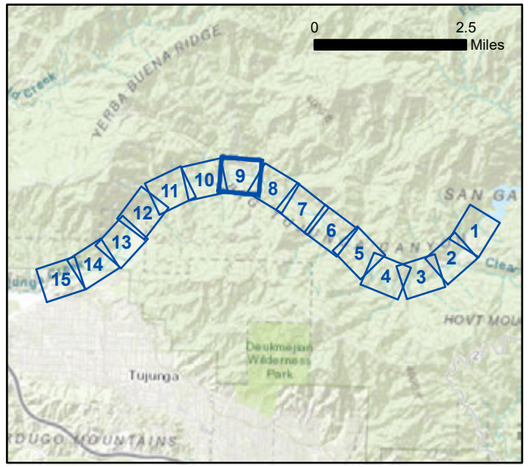
Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2
- 2.2 - 2.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6B
Sheet 9

Average Velocity (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

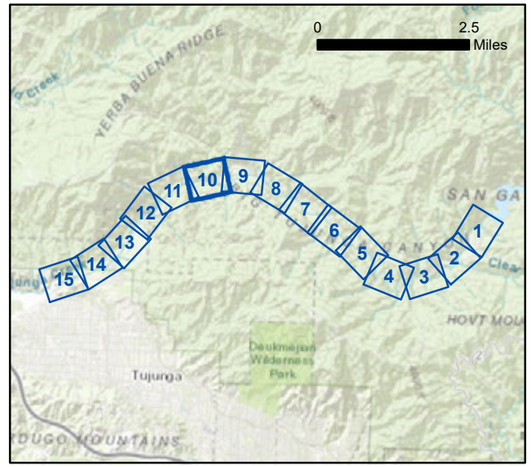
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6B
Sheet 10

Average Velocity (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

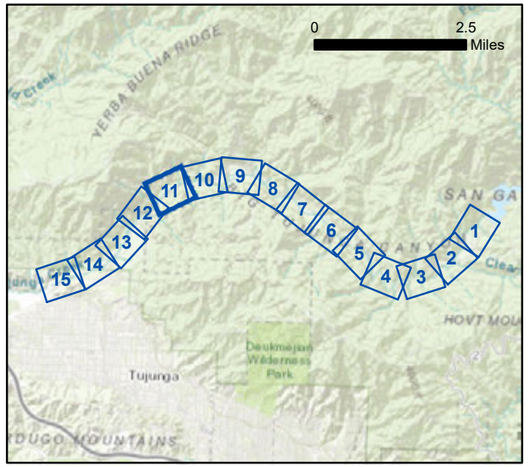
D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6B
Sheet 11

Average Velocity (June)

Big Tujunga Dam –
Supplemental Release Study

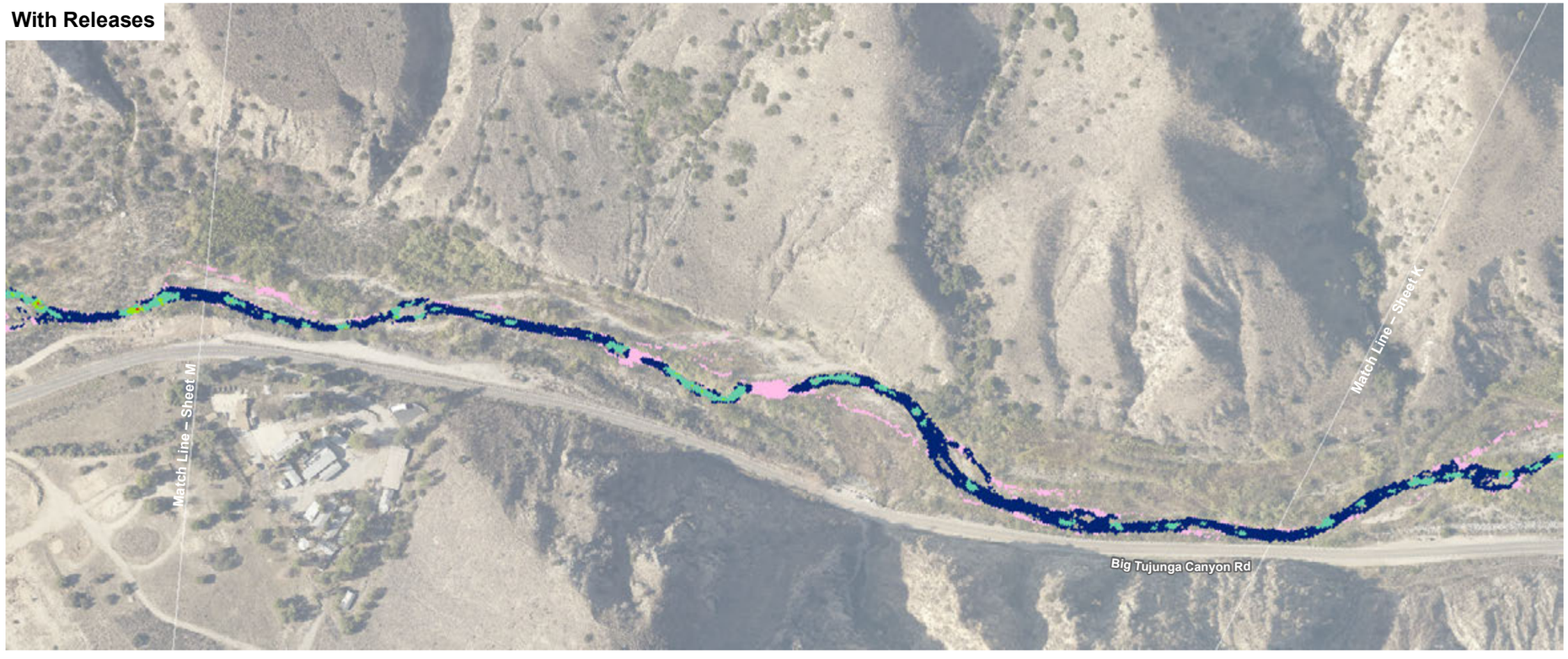
PSOMAS

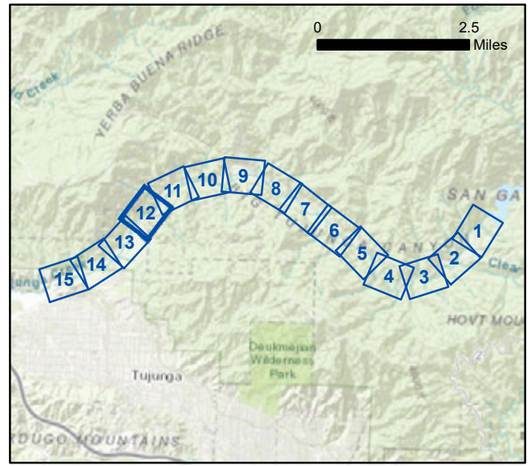
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2
- 2.2 - 2.7

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_ExhibitsIEx_comparison_maps_20190205.mxd

Exhibit 6B
Sheet 12

Average Velocity (June)

Big Tujunga Dam –
Supplemental Release Study

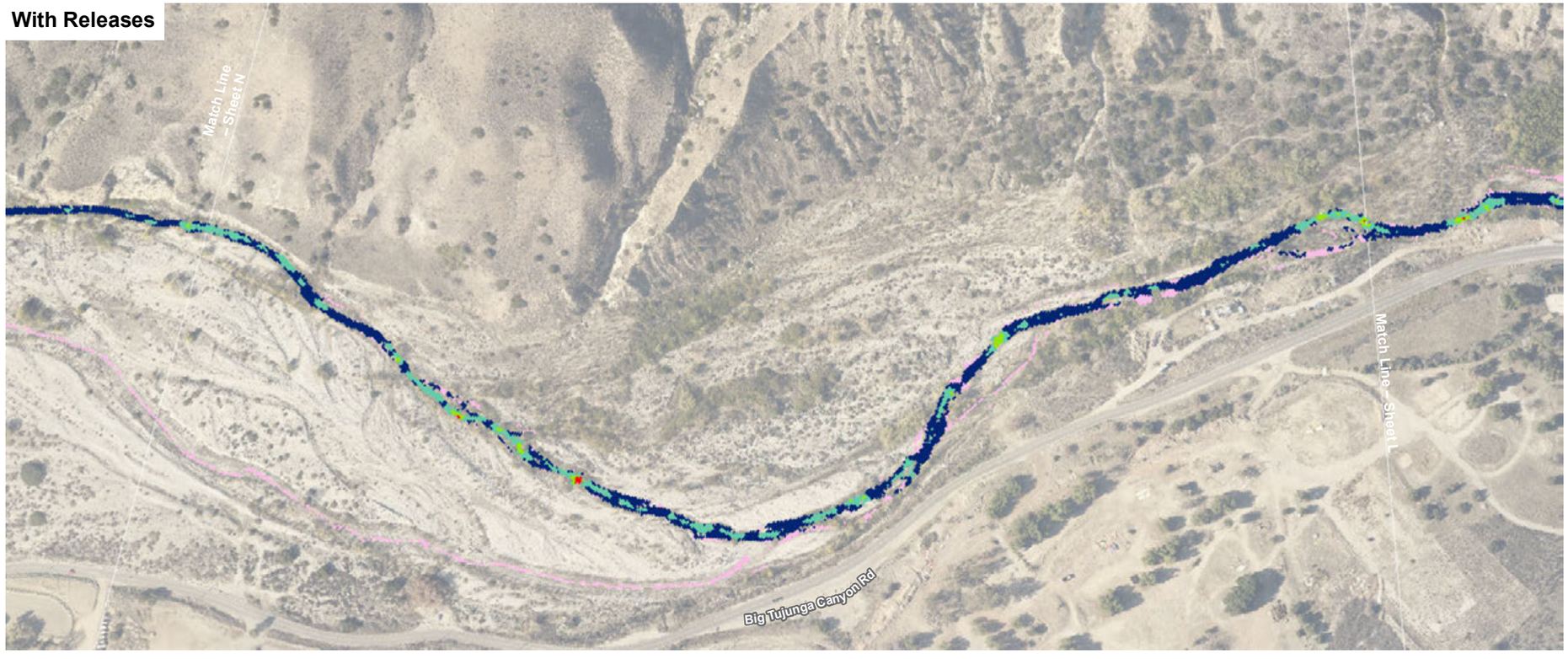
PSOMAS

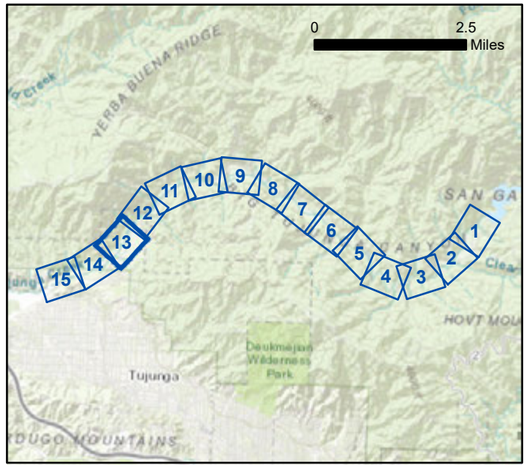
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2
- 2.2 - 2.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6B
Sheet 13

Average Velocity (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases

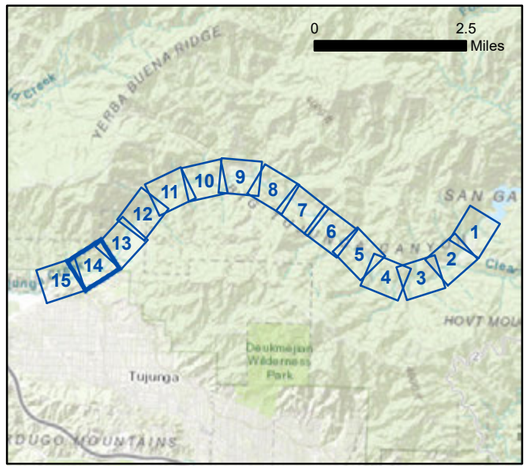
Match Line – Sheet O

Match Line – Sheet M

With Releases

Match Line – Sheet O

Match Line – Sheet M



Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J28\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6B
Sheet 14

Average Velocity (June)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

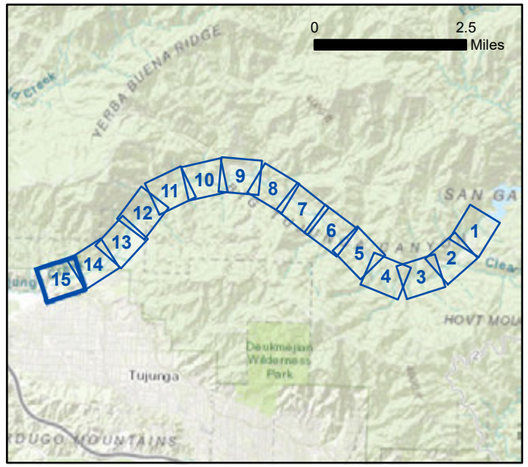
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.1
- 1.1 - 1.6
- 1.6 - 2.2
- 2.2 - 2.7

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6B
Sheet 15

Average Velocity (June)

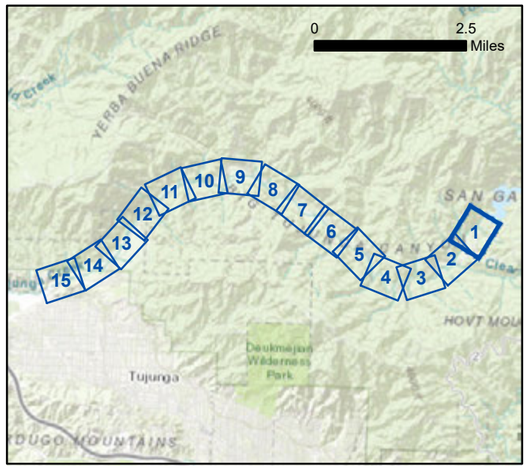
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9
- 1.9 - 2.4
- 2.4 - 2.9

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6C
Sheet 1

Average Velocity (Spetember)

Big Tujunga Dam –
Supplemental Release Study

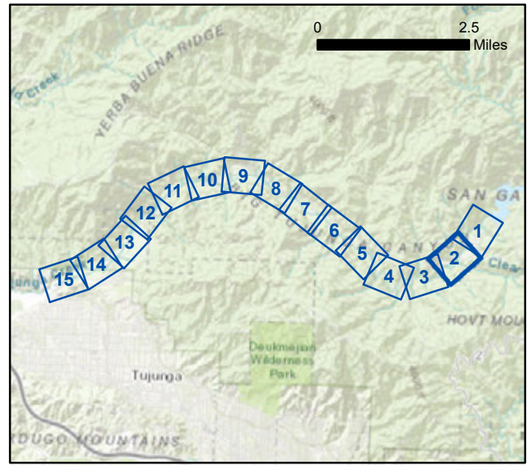
PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

D:\Projects\COLADPW\J28\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9
- 1.9 - 2.4
- 2.4 - 2.9

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6C
Sheet 2

Average Velocity (Spetember)

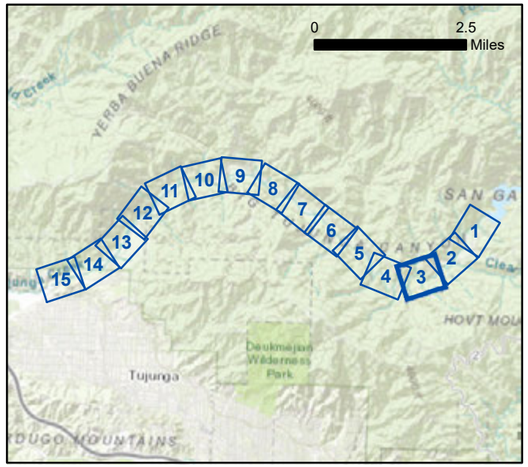
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9
- 1.9 - 2.4

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6C
Sheet 3

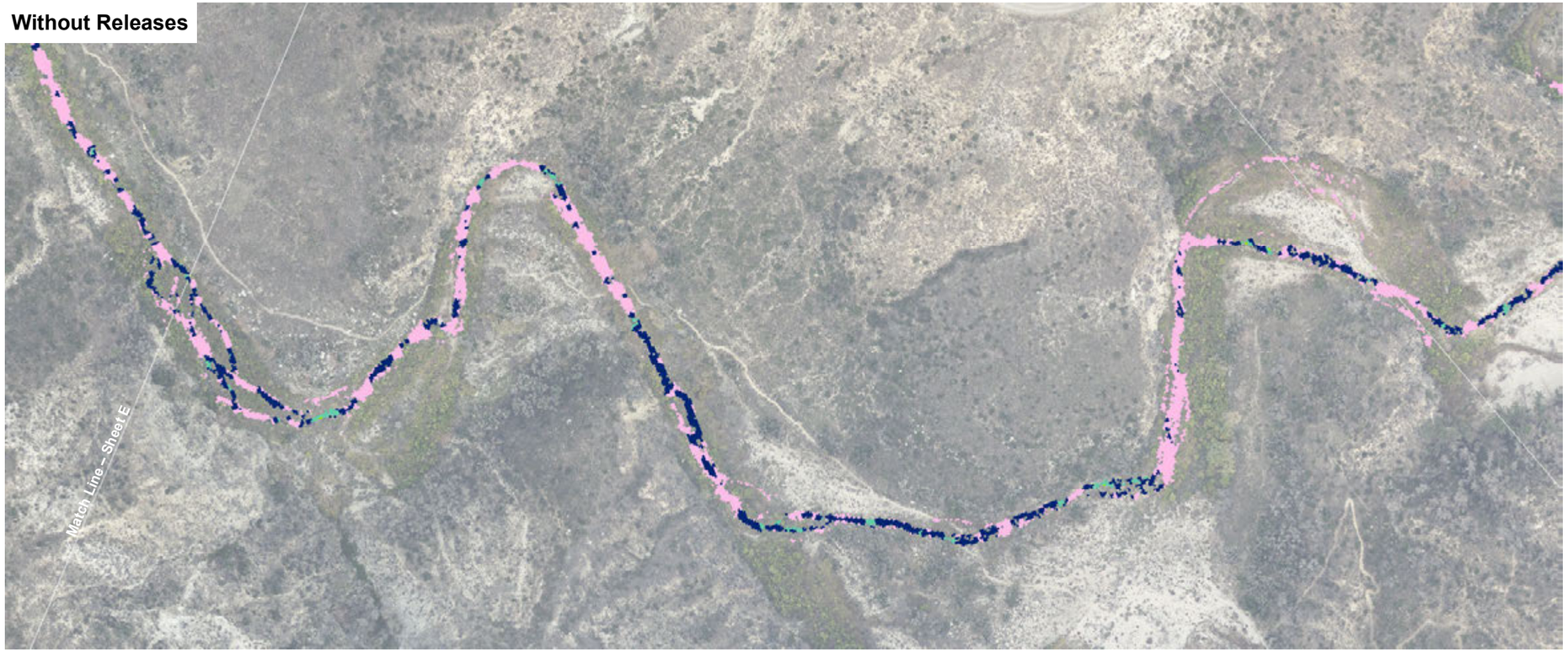
Average Velocity (Spetember)

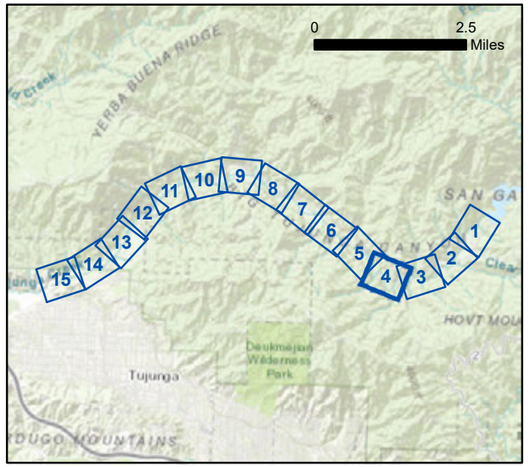
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

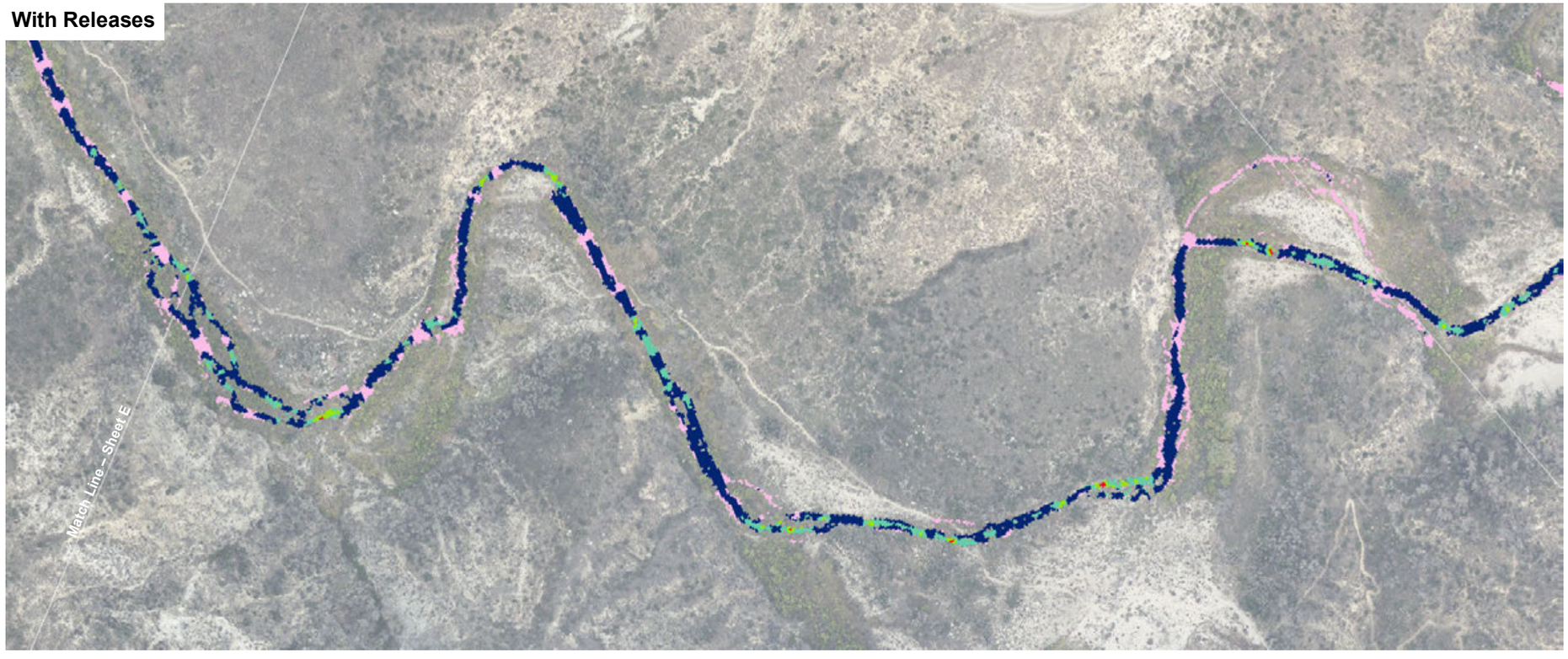
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9
- 1.9 - 2.4

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6C
Sheet 4

Average Velocity (Spetember)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

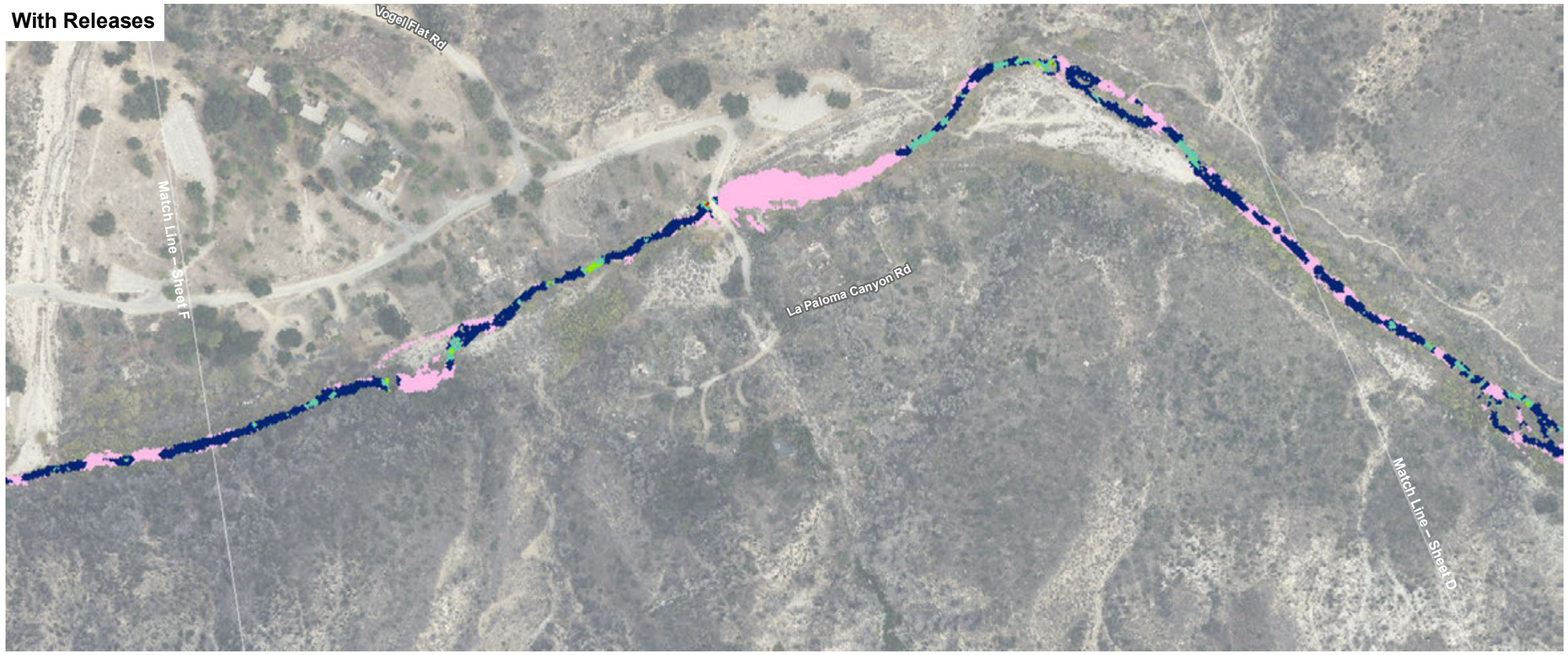
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

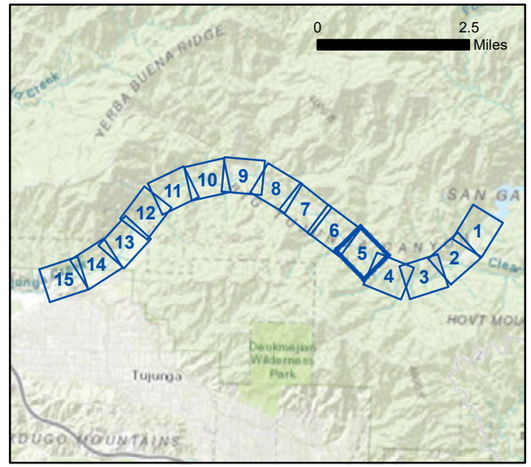
D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9
- 1.9 - 2.4
- 2.4 - 2.9

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6C
Average Velocity (Spetember) Sheet 5

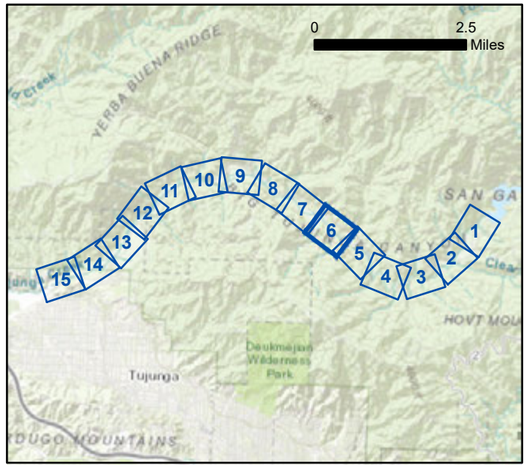
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9
- 1.9 - 2.4

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6C
Sheet 6

Average Velocity (Spetember)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

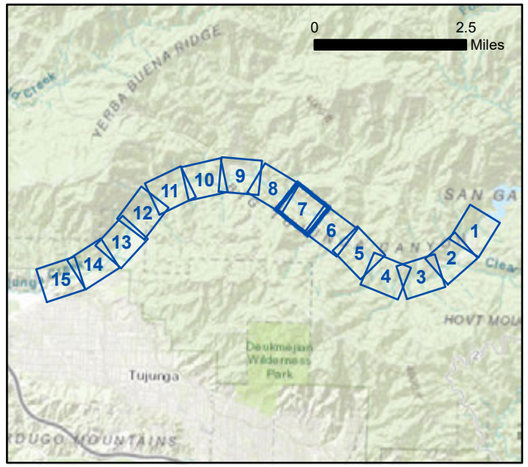
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9
- 1.9 - 2.4

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

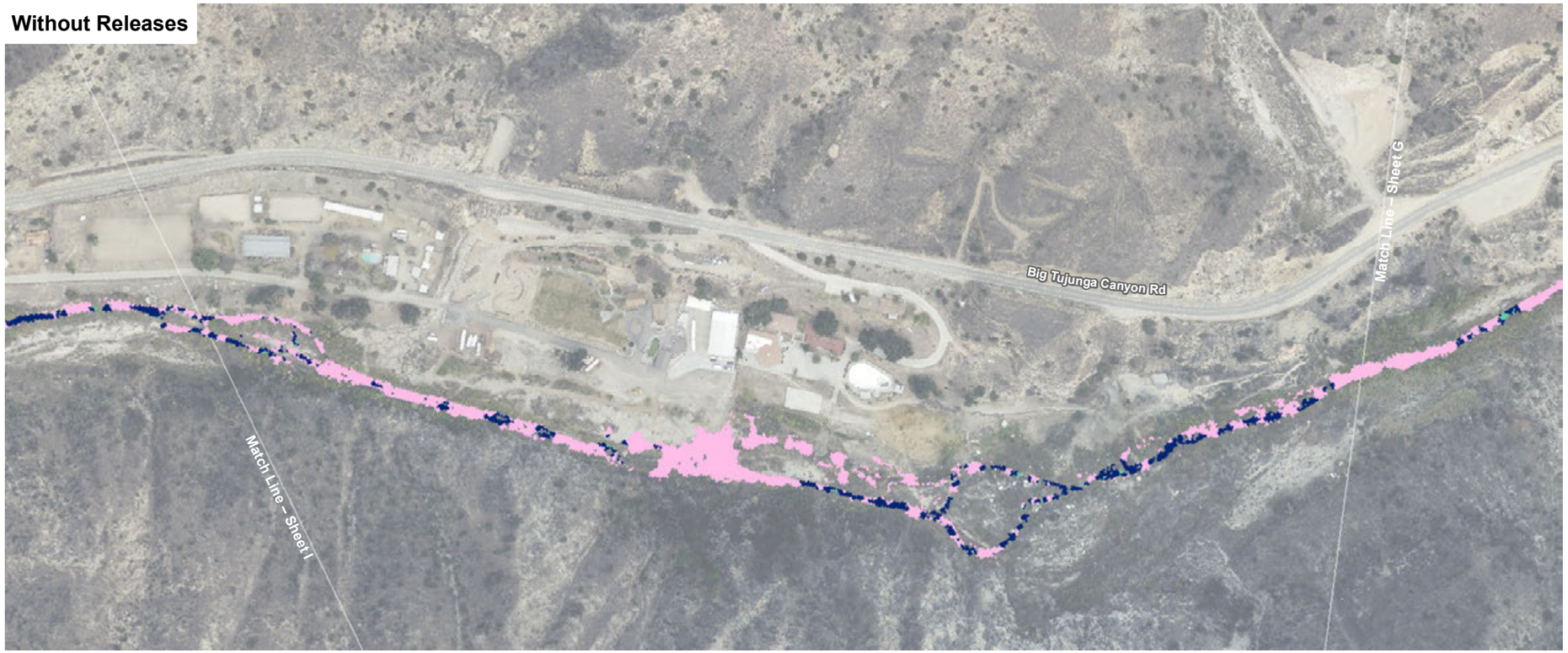
Exhibit 6C
Average Velocity (Spetember) Sheet 7

Big Tujunga Dam –
Supplemental Release Study

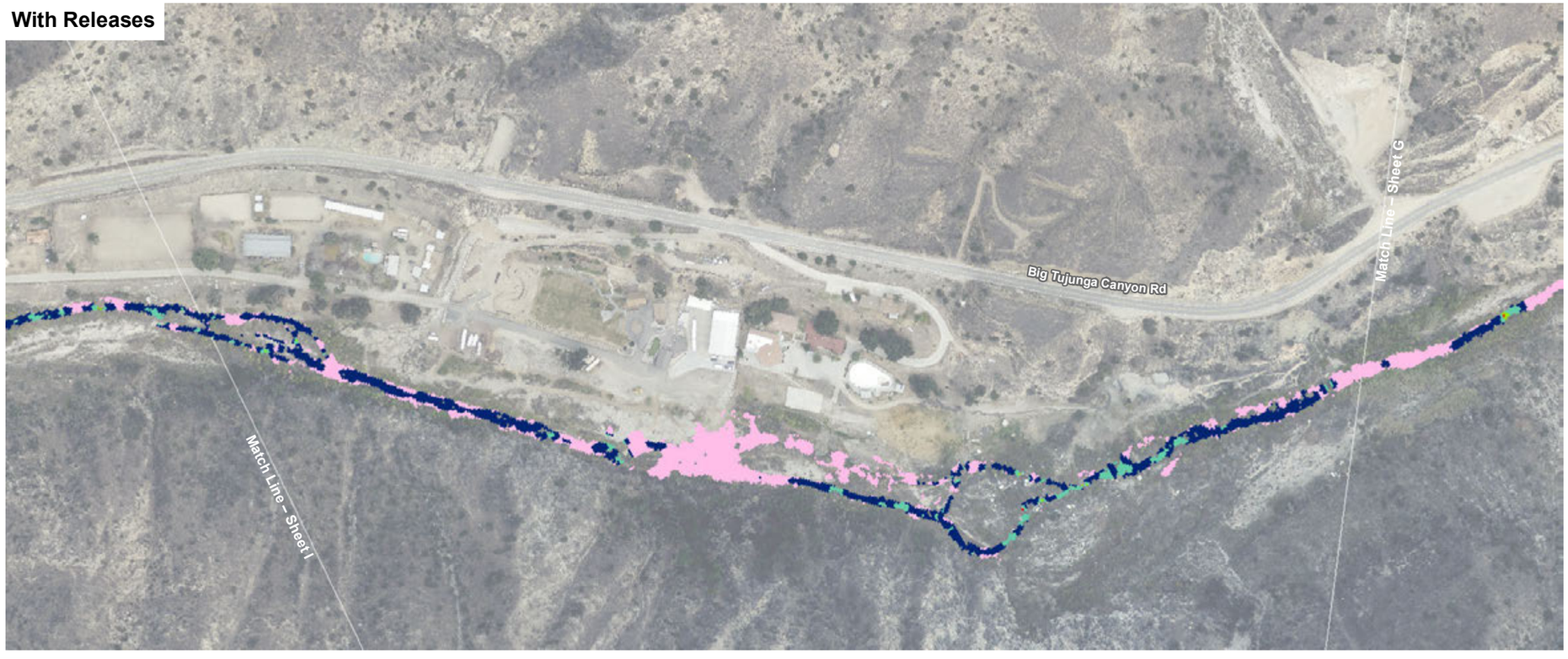
PSOMAS

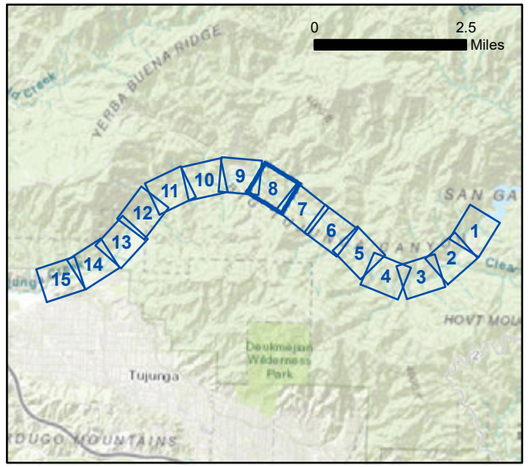
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9
- 1.9 - 2.4

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6C
Sheet 8

Average Velocity (Spetember)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

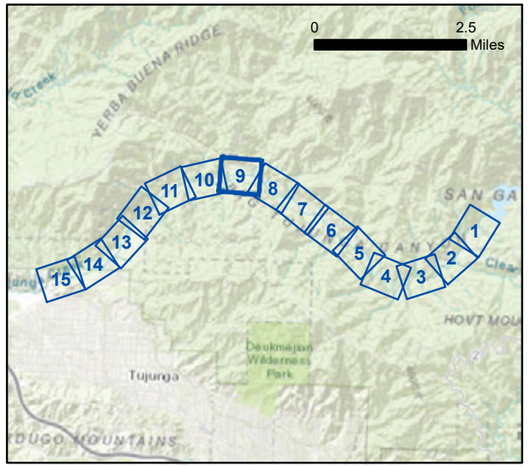
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9
- 1.9 - 2.4

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6C
Sheet 9

Average Velocity (Spetember)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

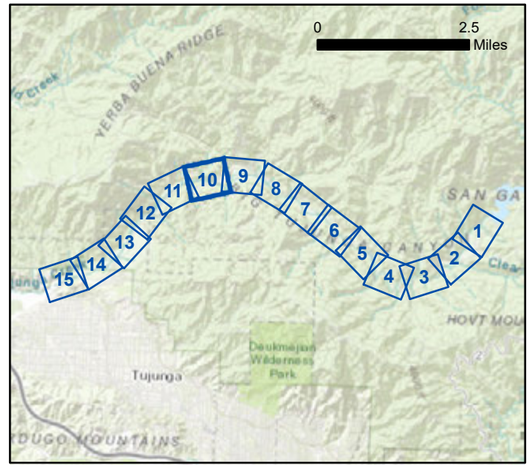
D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9
- 1.9 - 2.4
- 2.4 - 2.9

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6C
Sheet 10

Average Velocity (Spetember)

Big Tujunga Dam –
Supplemental Release Study

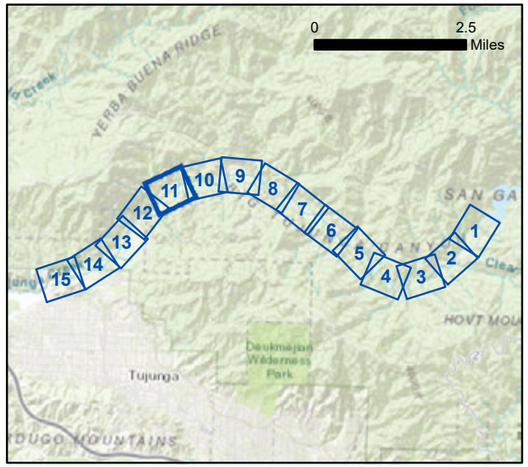
PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

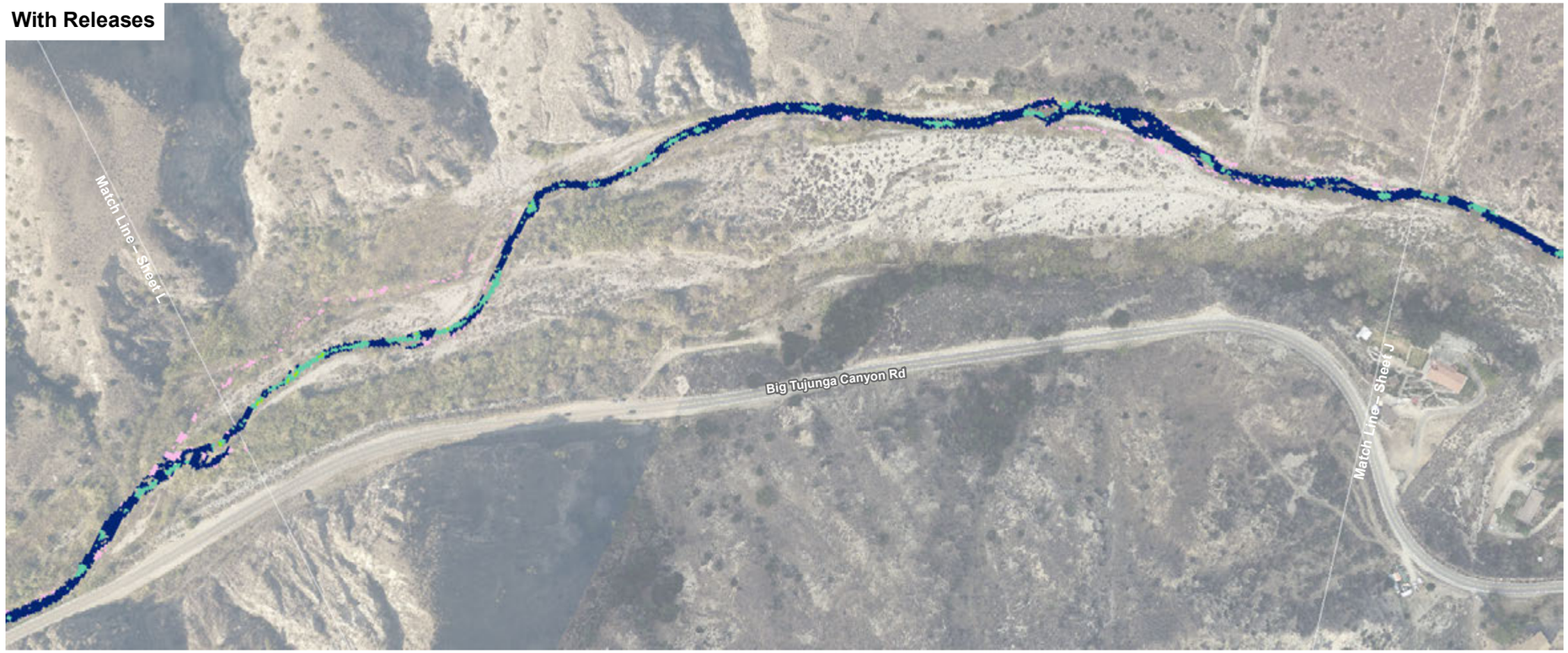
D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6C
Sheet 11

Average Velocity (Spetember)

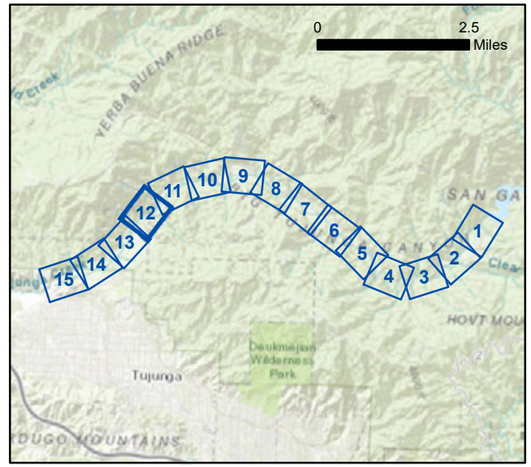
Big Tujunga Dam –
Supplemental Release Study

PSOMAS

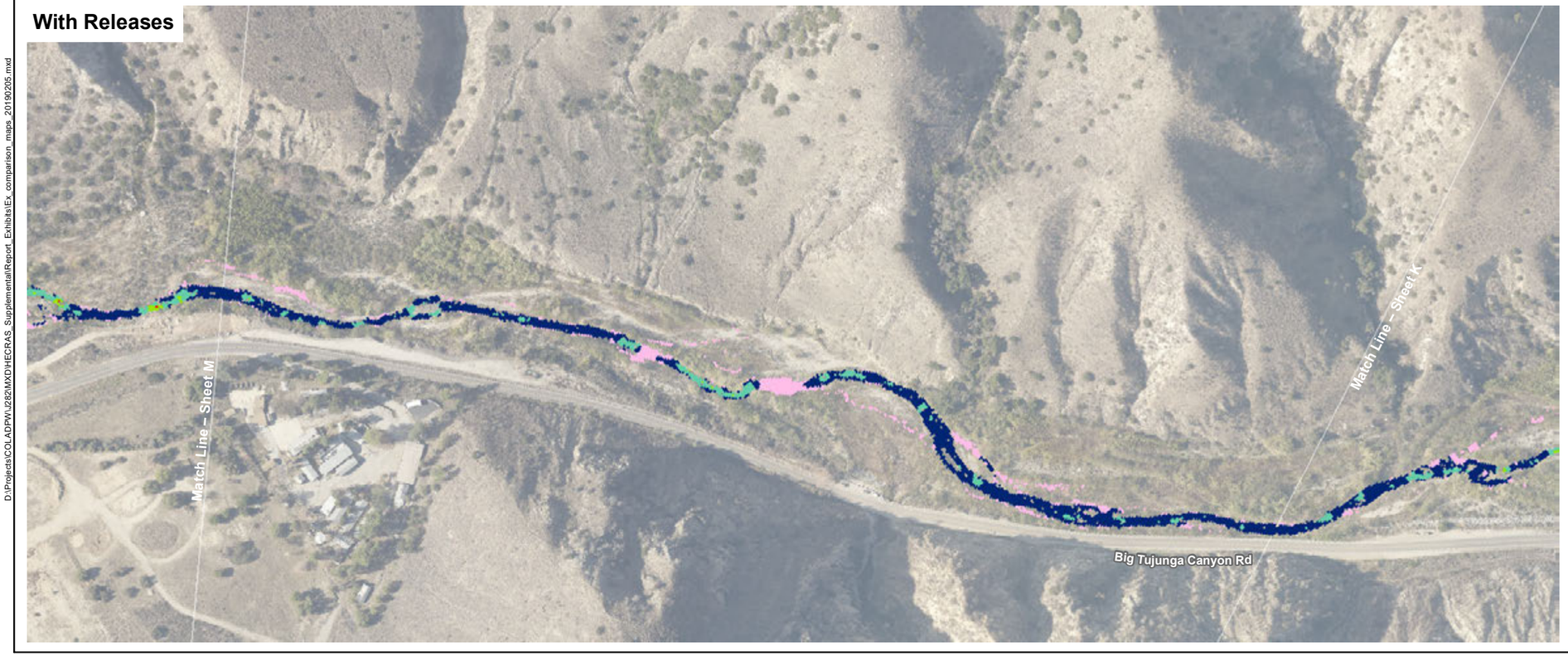
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases





With Releases



Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9
- 1.9 - 2.4

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6C
Sheet 12

Average Velocity (Spetember)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

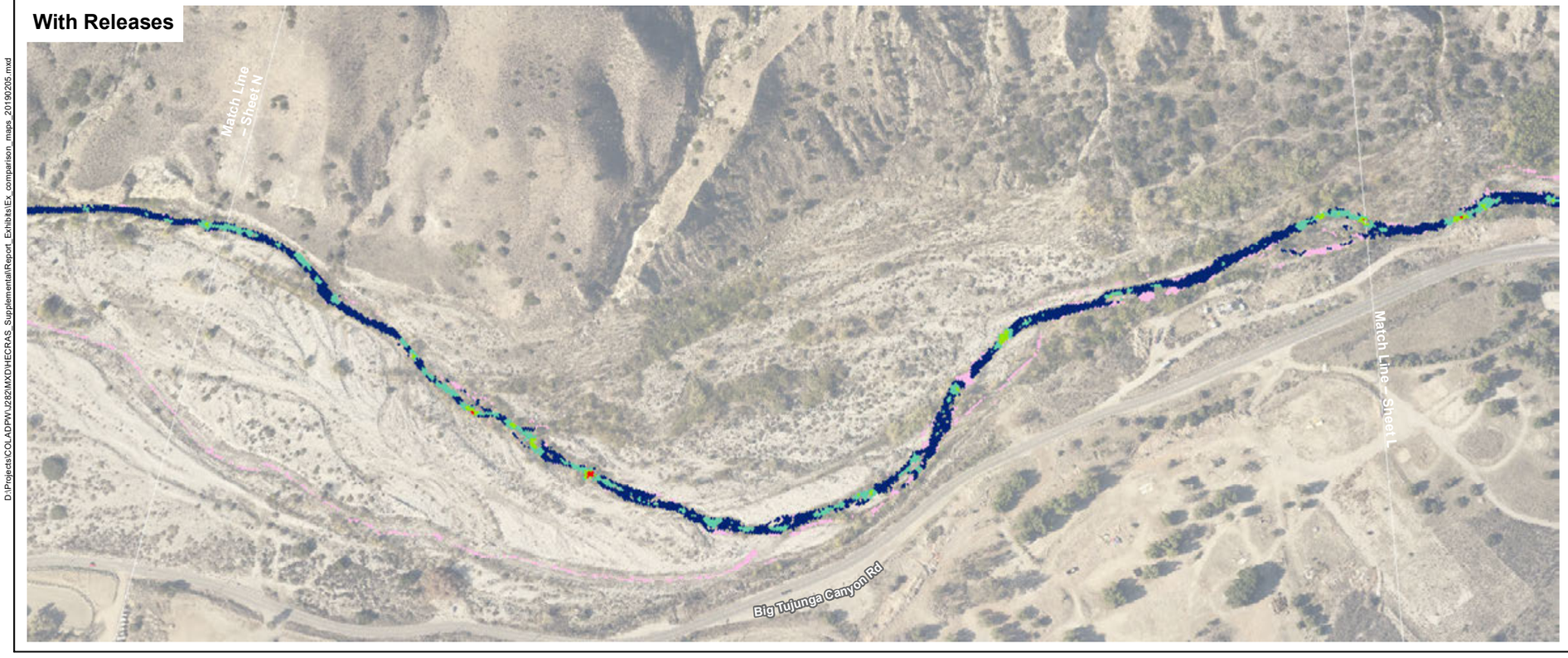
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

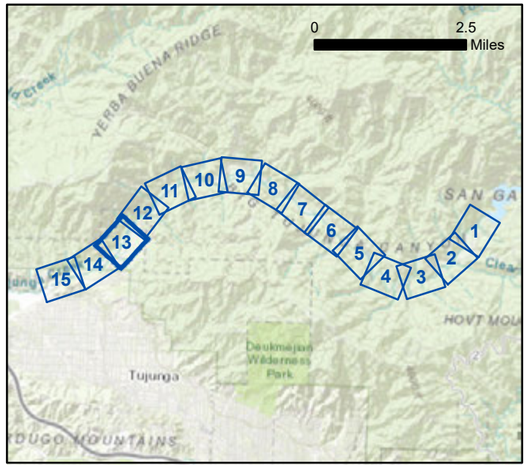
D:\Projects\COLADPW\J282MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9
- 1.9 - 2.4

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COL-ADPW\J282\MXD\HECRAS_Supplemental\Report_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6C
Sheet 13

Average Velocity (Spetember)

Big Tujunga Dam –
Supplemental Release Study

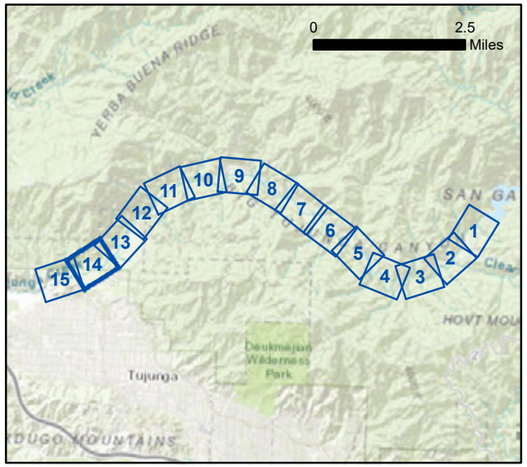
PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases

Match Line – Sheet O

Match Line – Sheet M



With Releases

Match Line – Sheet O

Match Line – Sheet M

Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J282\MXD\HECRAS_SupplementalReport_Exhibits\Ex_comparison_maps_20190205.mxd

Exhibit 6C
Sheet 14

Average Velocity (Spetember)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

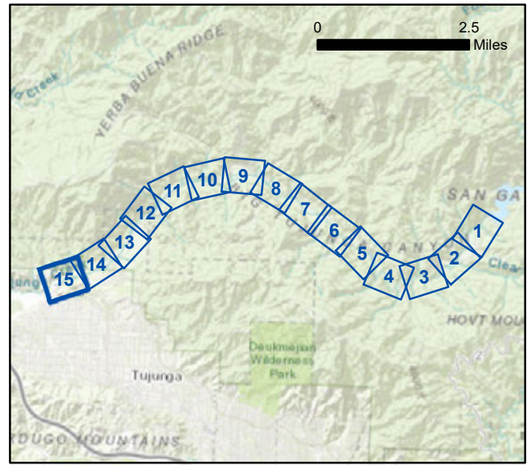
(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

Without Releases



With Releases





Average Velocity (feet per second)

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.4
- 1.4 - 1.9
- 1.9 - 2.4

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Exhibit 6C
Sheet 15

Average Velocity (Spetember)

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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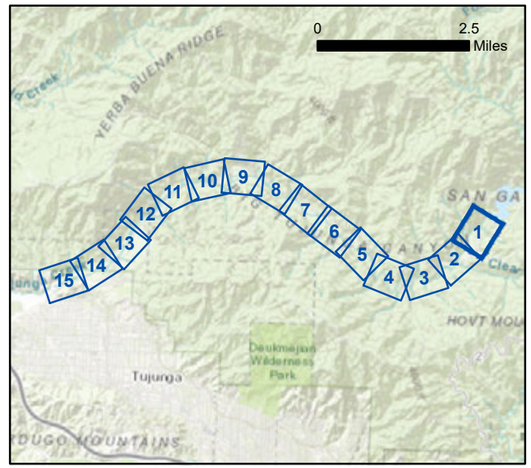

Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity	Exhibit 6D Sheet 1
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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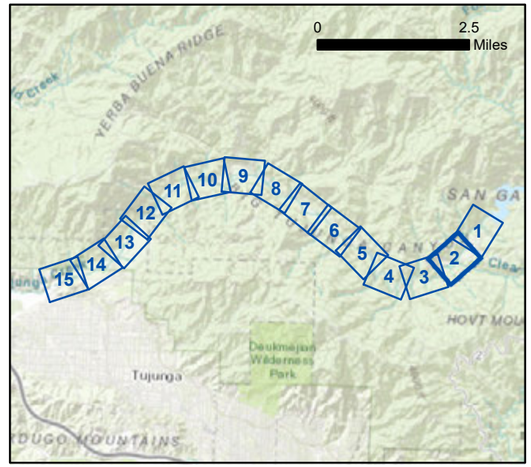

Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity

Exhibit 6D
Sheet 2

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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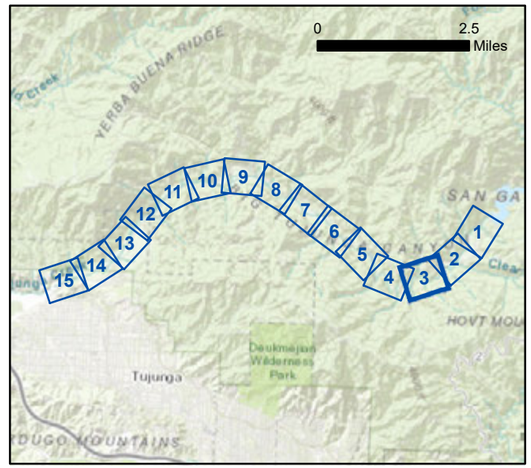
Match Line – Sheet D

Big Tujunga Canyon Rd

Match Line – Sheet B



Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity	Exhibit 6D Sheet 3
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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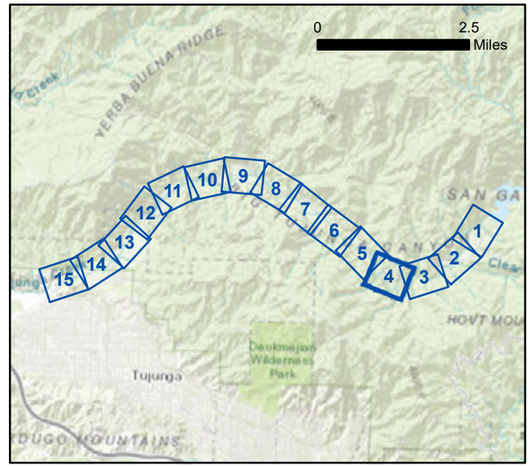
Big Tujunga Canyon Rd

Match Line – Sheet E

Match Line – Sheet C



Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

N

300 150 0 300

Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity	Exhibit 6D Sheet 4
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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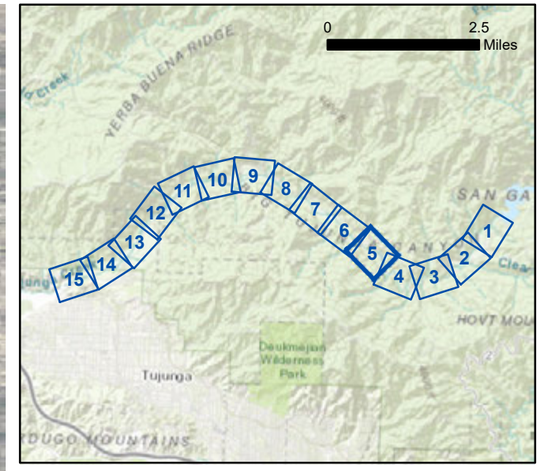

Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity

Exhibit 6D
Sheet 5

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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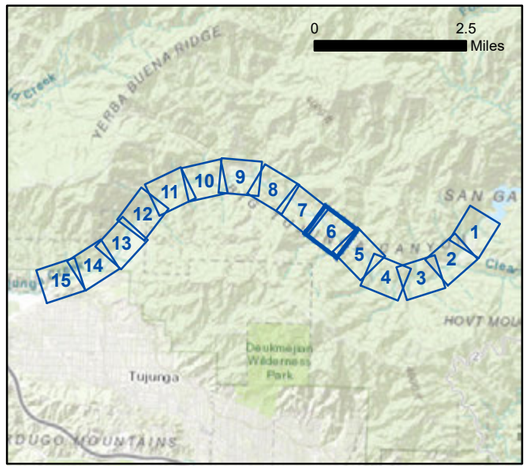
Big Tujunga Canyon Rd

Match Line – Sheet G

Match Line – Sheet E



Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity	Exhibit 6D Sheet 6
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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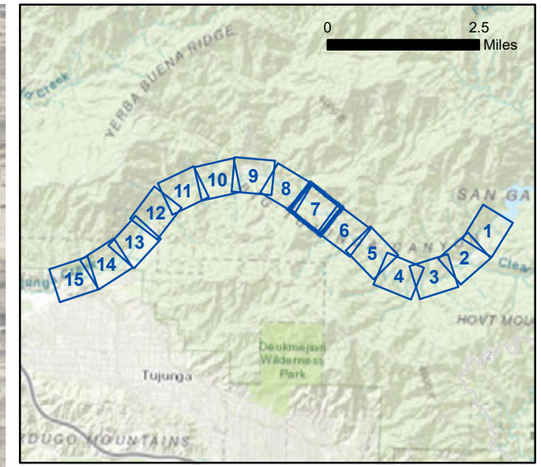
Match Line – Sheet H

Big Tujunga Canyon Rd

Doske Rd

Match Line – Sheet F

Match Line – Sheet H



Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

N

300 150 0 300 Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity	Exhibit 6D Sheet 7
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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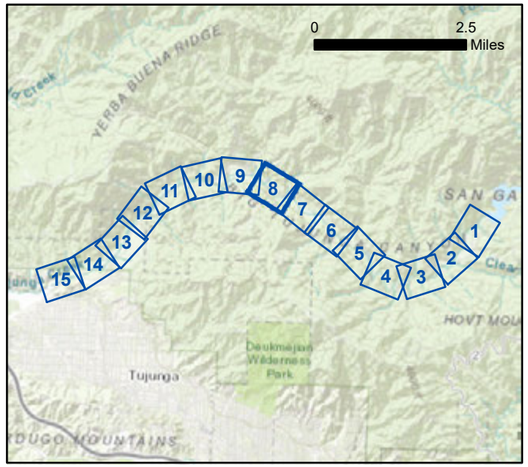

Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity	Exhibit 6D Sheet 8
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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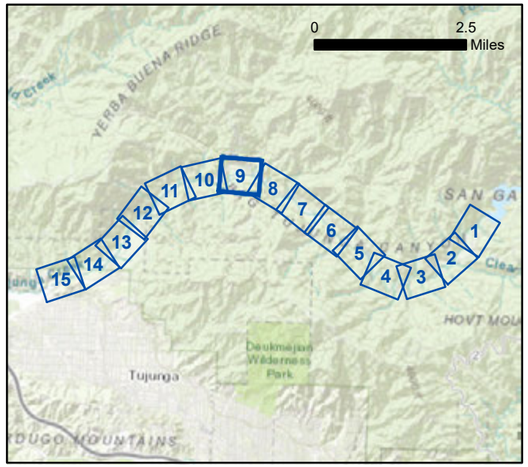

Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity	Exhibit 6D Sheet 9
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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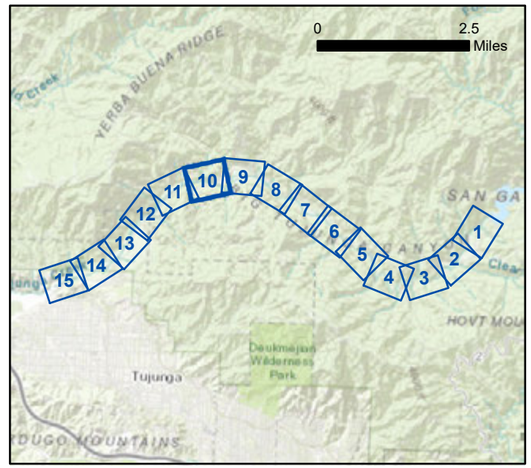

Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity	Exhibit 6D Sheet 10
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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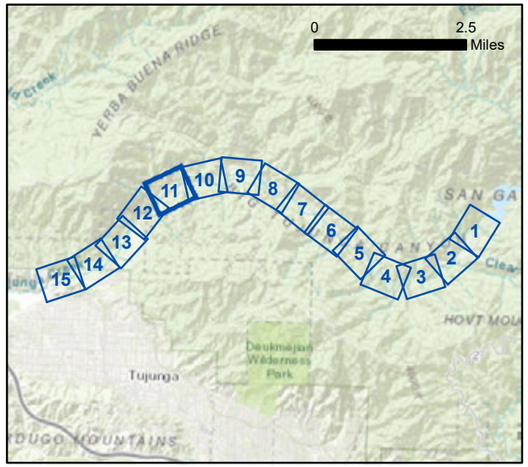

Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity	Exhibit 6D Sheet 11
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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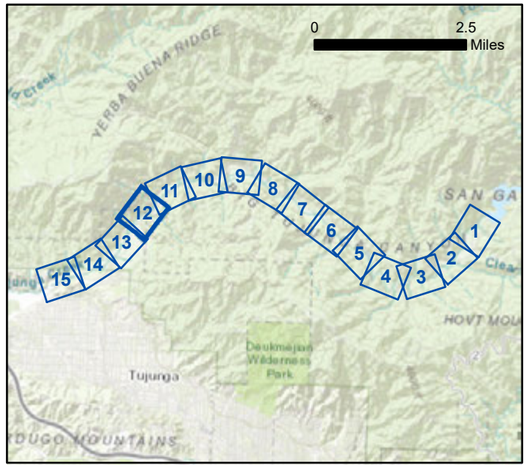

Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity	Exhibit 6D Sheet 12
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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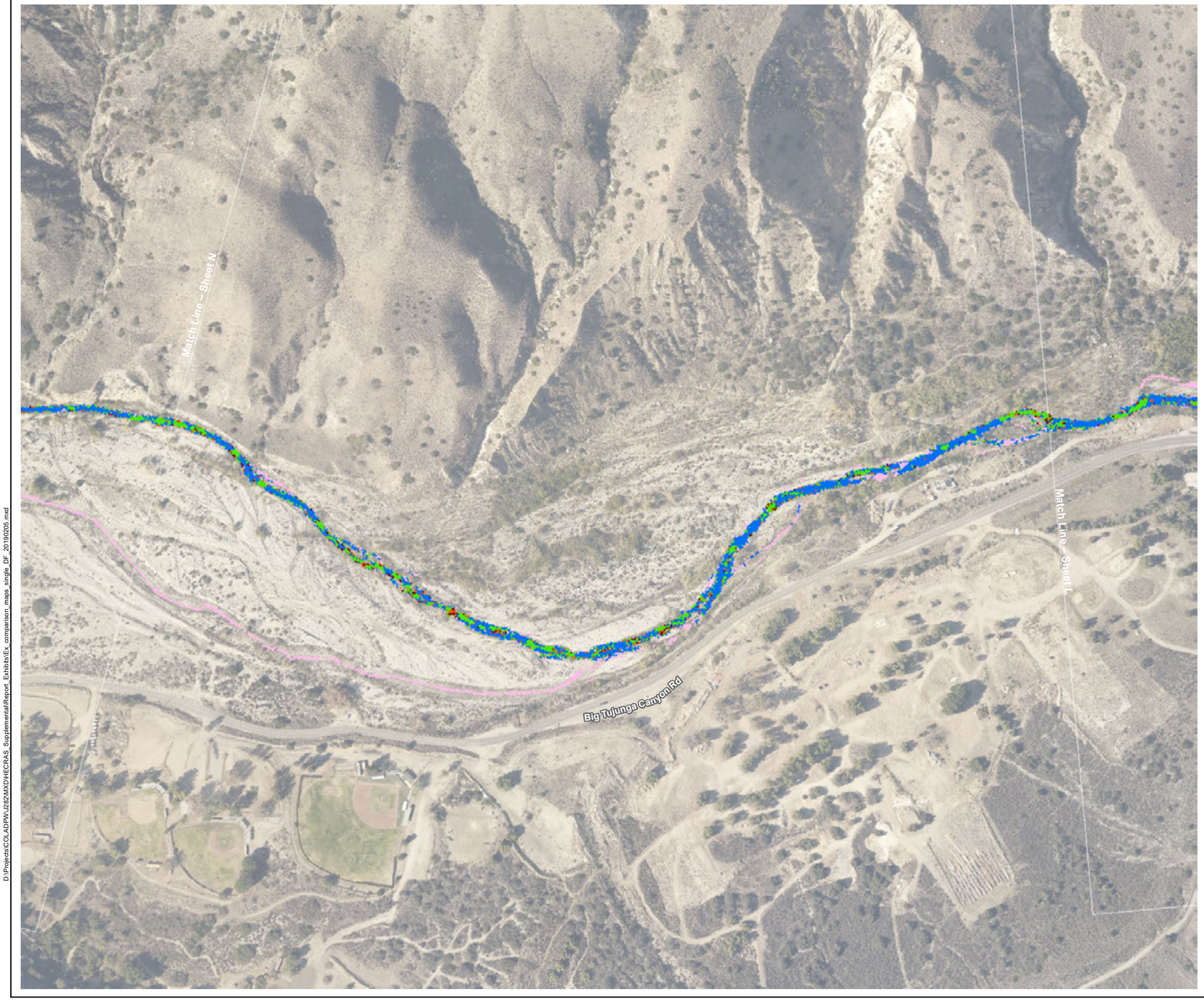

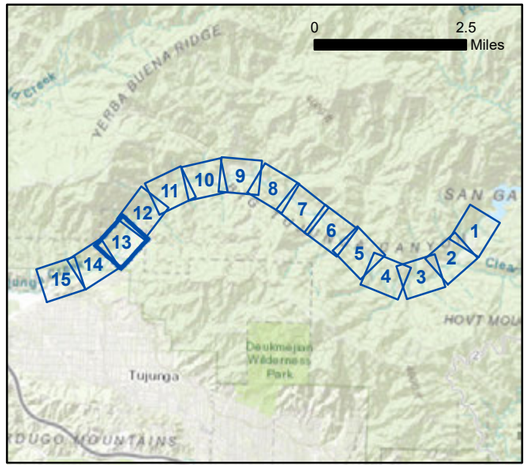

Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity

Exhibit 6D
Sheet 13

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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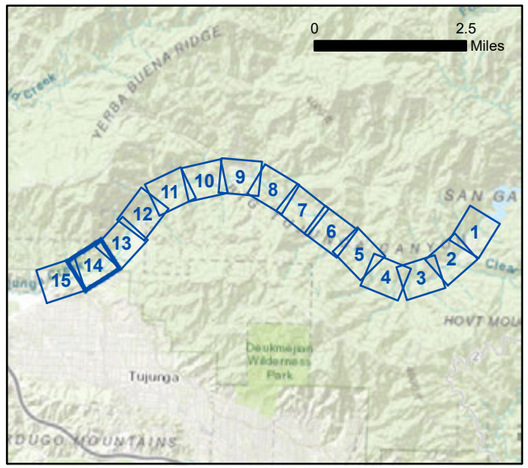

Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity

Exhibit 6D
Sheet 14

Big Tujunga Dam – Supplemental Release Study

PSOMAS

(Rev: 02/11/2019 CJS) R:\Projects\DPW\3DPW150102\Graphics\Supp_Release_Memo\

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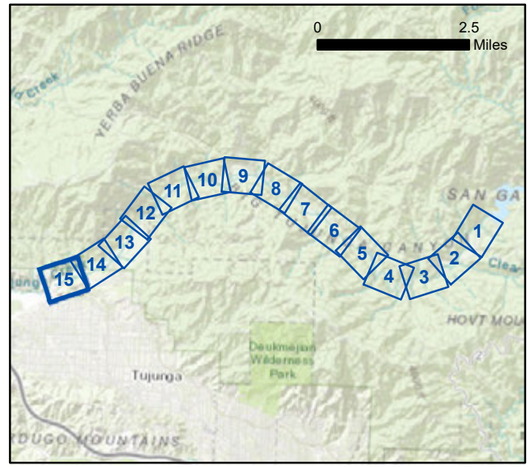

Change in Average Velocity (feet per second)*

- 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.5
- 0.5 - 1.9

**This graphic shows the change in average velocity over the entire time series.*

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Change in Average Velocity	Exhibit 6D Sheet 15
Big Tujunga Dam – Supplemental Release Study	PSOMAS

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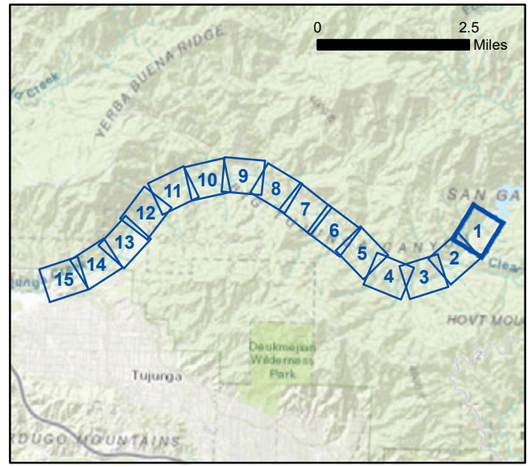

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- > 0.34
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 1

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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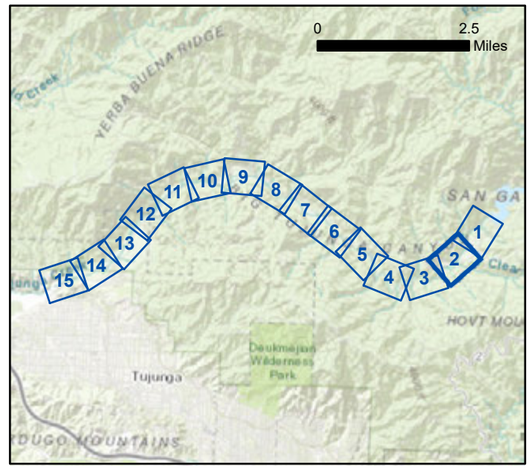

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- > 0.34
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 2

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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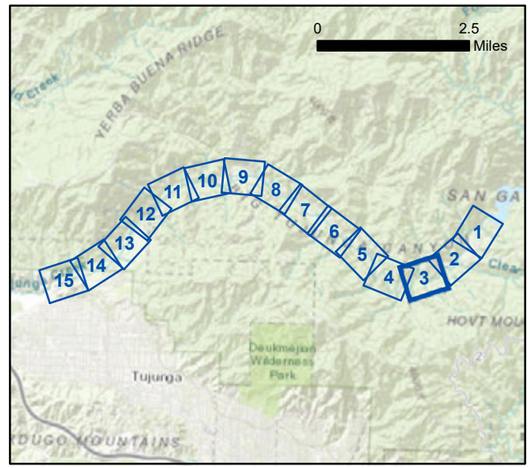

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- > 0.34
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 3

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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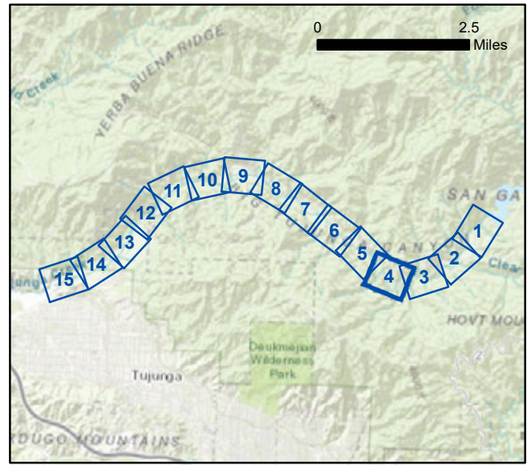

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- > 0.34
- Extent of Inundation Without Supplemental Releases

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 4

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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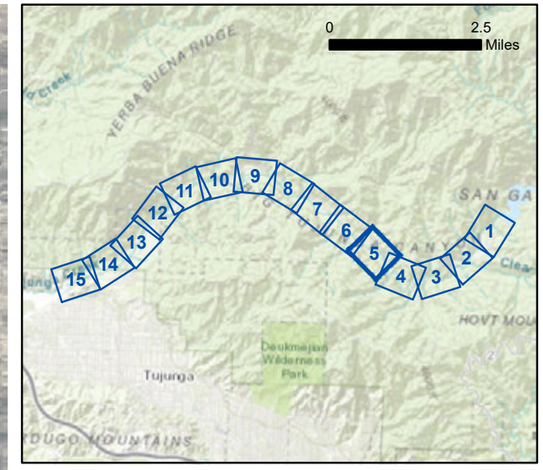
Big Tujunga Canyon Rd

Vogel Flat Rd

Match Line – Sheet D

Match Line – Sheet F

La Paloma Canyon Rd



Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- > 0.34
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 5

Big Tujunga Dam – Supplemental Release Study

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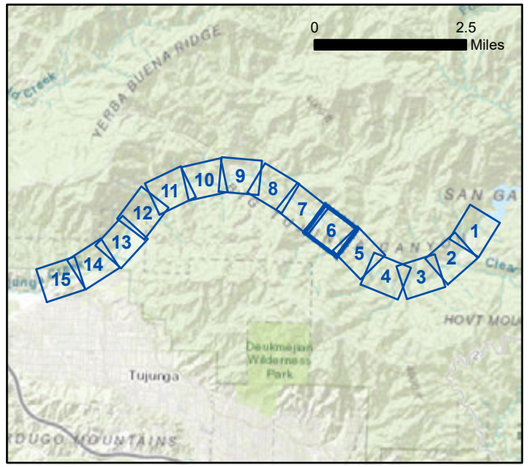

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 6

Big Tujunga Dam –
Supplemental Release Study

PSOMAS

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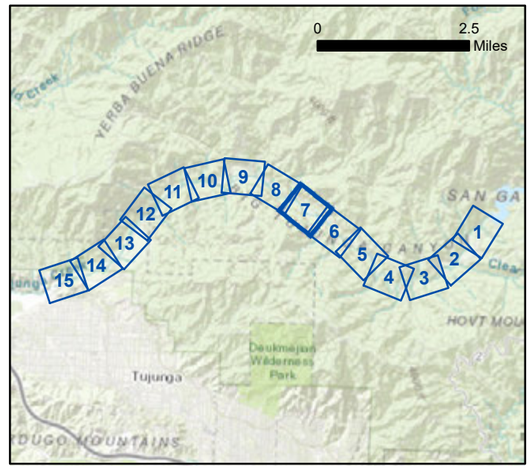

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- > 0.34
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 7

Big Tujunga Dam – Supplemental Release Study

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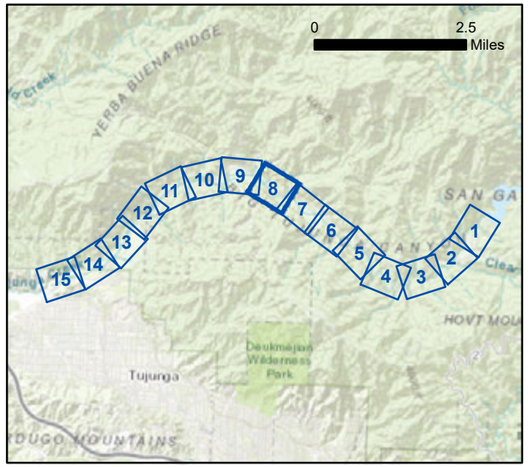

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- > 0.34
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 8

Big Tujunga Dam –
Supplemental Release Study

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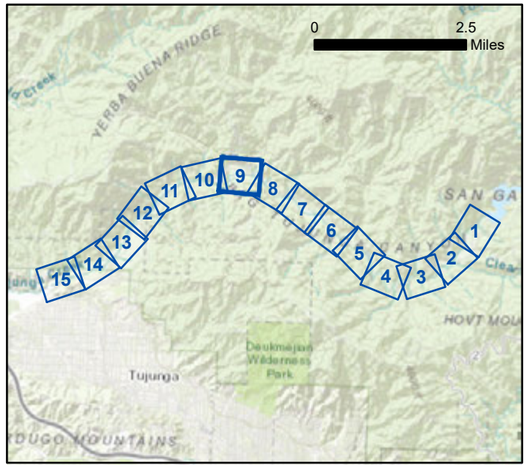

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- > 0.34
- Extent of Inundation Without Supplemental Releases

N

300 150 0 300 Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 9

Big Tujunga Dam – Supplemental Release Study

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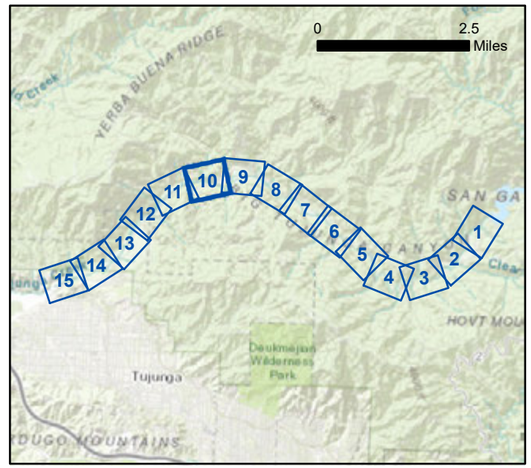

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- > 0.34
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 10

Big Tujunga Dam –
Supplemental Release Study

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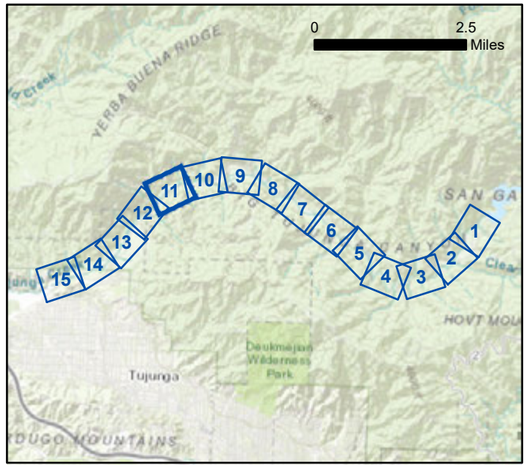

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 11

Big Tujunga Dam –
Supplemental Release Study

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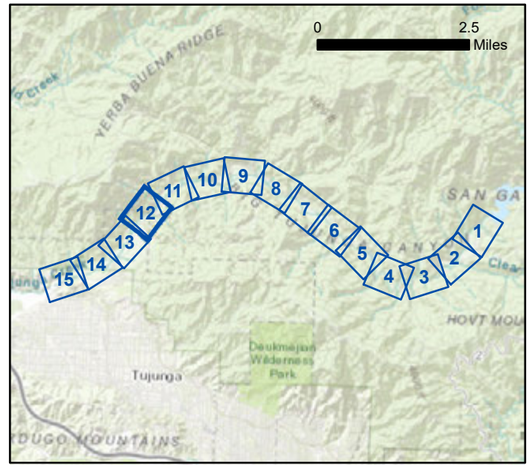

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- > 0.34
- Extent of Inundation Without Supplemental Releases

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 12

Big Tujunga Dam –
Supplemental Release Study

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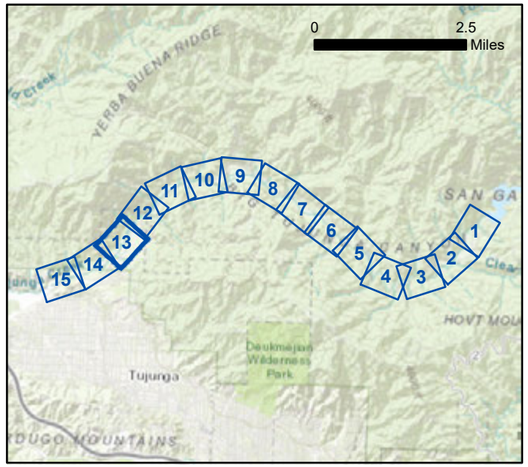

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- > 0.34
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 13

Big Tujunga Dam – Supplemental Release Study

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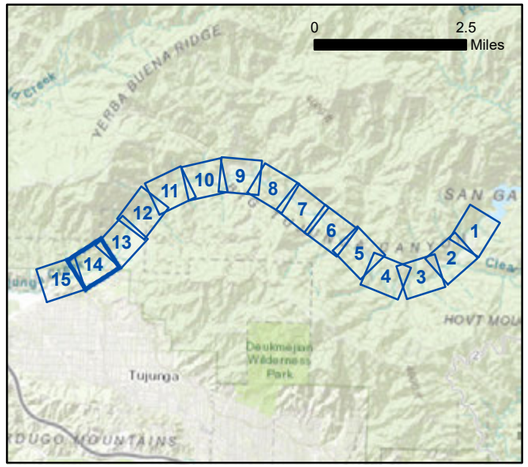

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- > 0.34
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 14

Big Tujunga Dam – Supplemental Release Study

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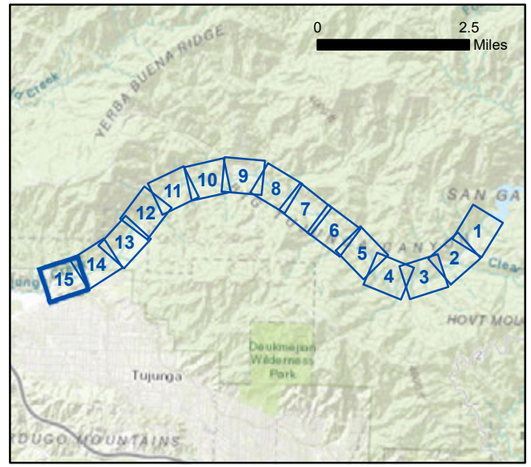

Average Velocity (feet per second)

- 0.00 - 0.07
- 0.07 - 0.16
- 0.16 - 0.25
- 0.25 - 0.34
- > 0.34
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Velocity for Additional Wetted Areas

Exhibit 7A
Sheet 15

Big Tujunga Dam – Supplemental Release Study

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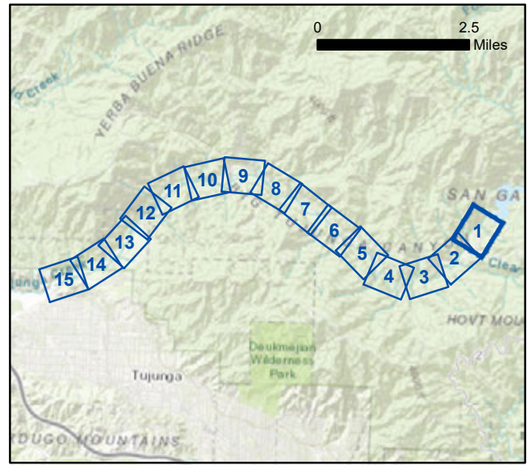

Average Depth (inches)

- 0.0 - 0.5
- 0.5 - 1.2
- > 1.2
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 1

Big Tujunga Dam –
Supplemental Release Study

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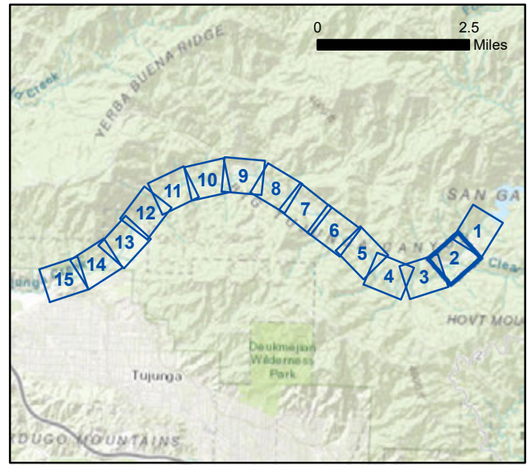

Average Depth (inches)

- 0.0 - 0.5
- 0.5 - 1.2
- > 1.2
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 2

Big Tujunga Dam –
Supplemental Release Study

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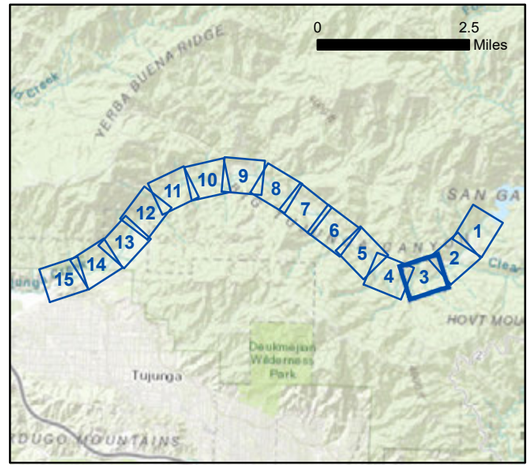

Average Depth (inches)

- 0.0 - 0.5
- 0.5 - 1.2
- > 1.2
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 3

Big Tujunga Dam –
Supplemental Release Study

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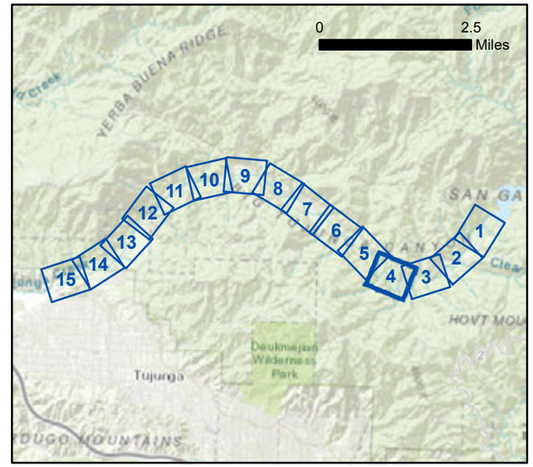
Big Tujunga Canyon Rd

Match Line – Sheet E

Match Line – Sheet C



Average Depth (inches)

- 0.0 - 0.5
- 0.5 - 1.2
- > 1.2
- Extent of Inundation Without Supplemental Releases

N

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

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Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 4

Big Tujunga Dam –
Supplemental Release Study

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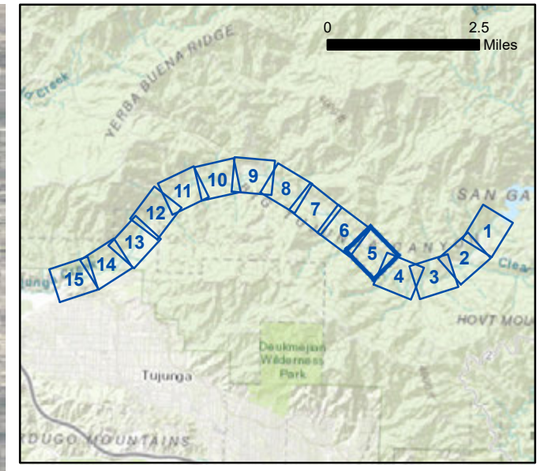

Average Depth (inches)

- 0.0 - 0.5
- 0.5 - 1.2
- > 1.2
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 5

Big Tujunga Dam –
Supplemental Release Study

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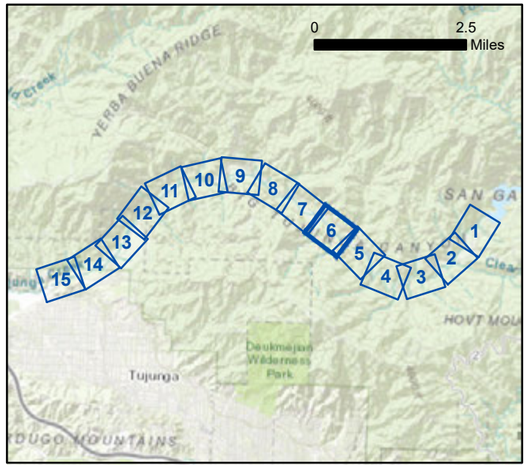

Average Depth (inches)

- 0.0 - 0.5
- 0.5 - 1.2
- > 1.2
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Big Tujunga Dam – Supplemental Release Study

Exhibit 7B
Sheet 6

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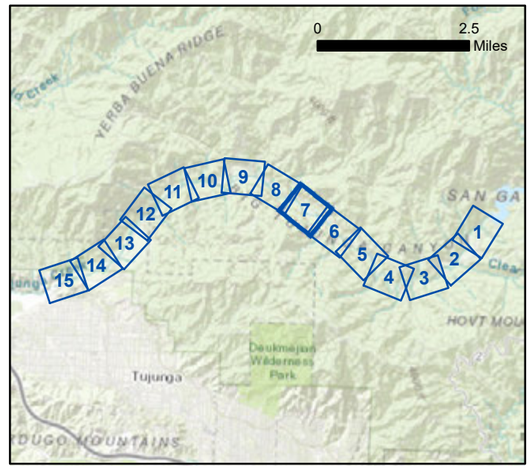

Average Depth (inches)

- 0.0 - 0.5
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 7

Big Tujunga Dam – Supplemental Release Study

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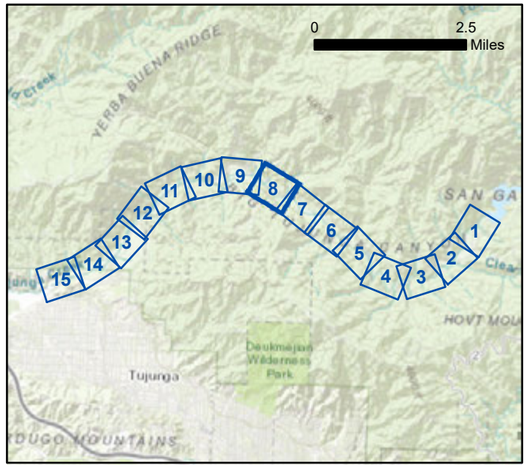

Average Depth (inches)

- 0.0 - 0.5
- 0.5 - 1.2
- > 1.2
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 8

Big Tujunga Dam – Supplemental Release Study

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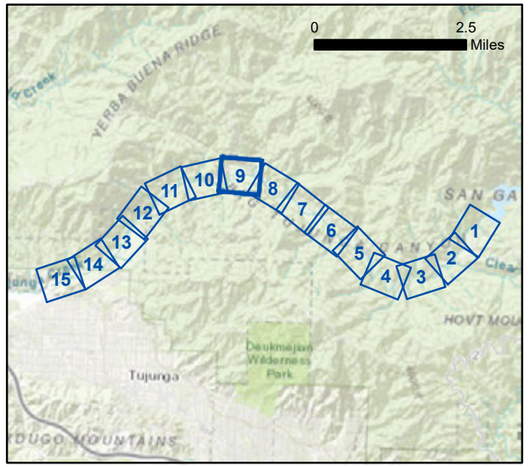

Average Depth (inches)

- 0.0 - 0.5
- 0.5 - 1.2
- > 1.2
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 9

Big Tujunga Dam – Supplemental Release Study

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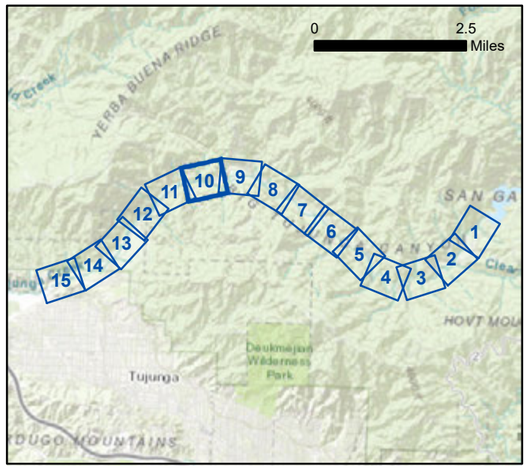

Average Depth (inches)

- 0.0 - 0.5
- > 1.2
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 10

Big Tujunga Dam –
Supplemental Release Study

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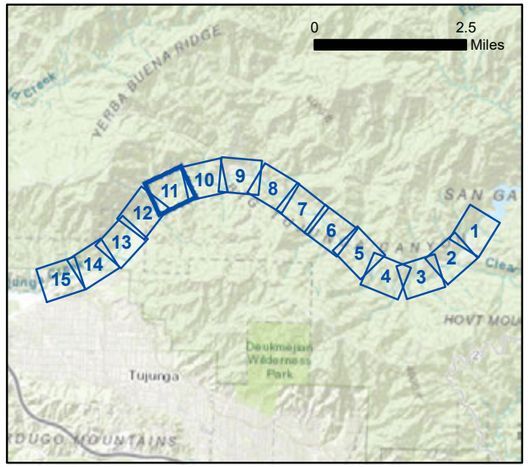

Average Depth (inches)

- 0.0 - 0.5
- 0.5 - 1.2
- > 1.2
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 11

Big Tujunga Dam –
Supplemental Release Study

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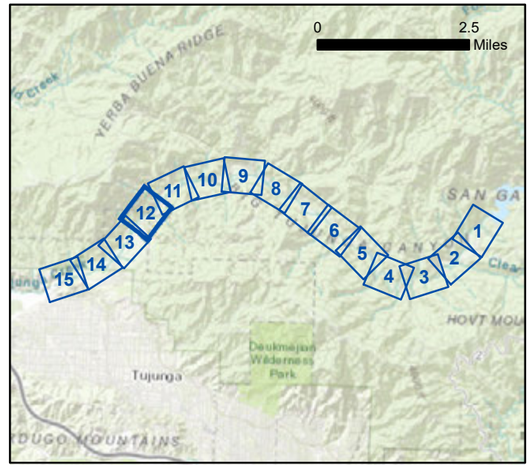

Average Depth (inches)

- 0.0 - 0.5
- 0.5 - 1.2
- > 1.2
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 12

Big Tujunga Dam – Supplemental Release Study

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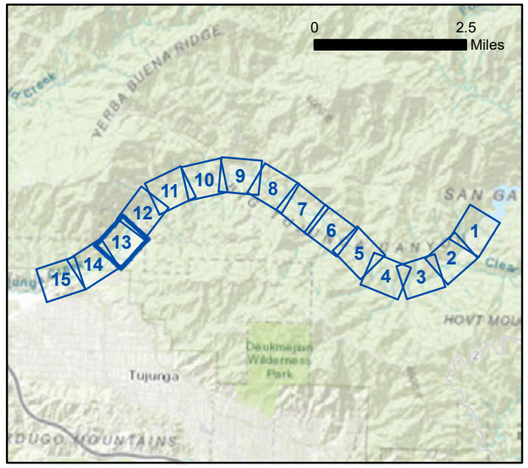

Average Depth (inches)

- 0.0 - 0.5
- 0.5 - 1.2
- > 1.2
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 13

Big Tujunga Dam – Supplemental Release Study

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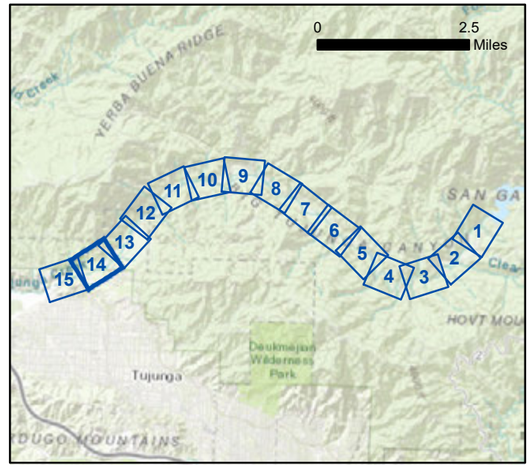

Average Depth (inches)

- 0.0 - 0.5
- 0.5 - 1.2
- > 1.2
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 14

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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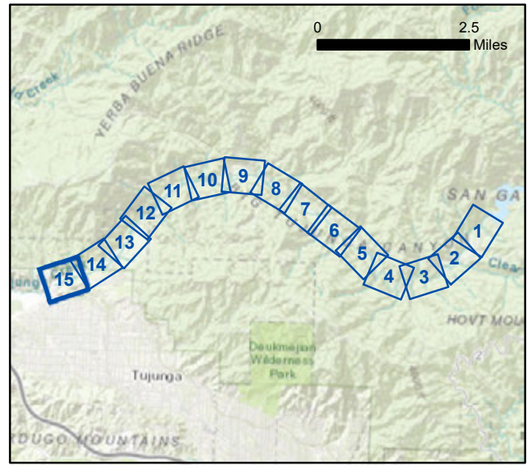

Average Depth (inches)

- 0.0 - 0.5
- > 1.2
- Extent of Inundation Without Supplemental Releases

300 150 0 300
Feet

Aerial Source: LAR-IAC 2014

Average Depth for Additional Wetted Areas

Exhibit 7B
Sheet 15

Big Tujunga Dam – Supplemental Release Study

PSOMAS

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APPENDIX B-10

VEGETATION MAPPING
FOR THE BIG TUJUNGA DAM OPERATION AND MAINTENANCE HCP

MEMORANDUM

November 8, 2017

To:
Justin Jones
Water Resources Division
Department of Public Works
County of Los Angeles

From:
Amber Heredia
Allison Rudalevige

Subject: Vegetation Mapping for the Big Tujunga Dam Operation and Maintenance Habitat Conservation Plan, Los Angeles County, California

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This memorandum presents the findings of vegetation mapping of the Action Area for the Los Angeles County Department of Public Works (LACDPW) Habitat Conservation Plan for Big Tujunga Dam Operation and Maintenance (hereinafter referred to as "the HCP"). The vegetation mapping provides baseline habitat conditions for the HCP and updates previous vegetation mapping for the Big Tujunga Dam Sediment Removal Project (i.e., a Covered Activity in the HCP).

METHODS

The Action Area extends along Big Tujunga Creek from Fall Creek (upstream of the reservoir), through Big Tujunga Reservoir, and downstream to Hanson Dam. It also includes LACDPW facilities at Big Tujunga Dam such as access roads and the Maple Canyon Sediment Placement Site (SPS), which would be impacted by the Sediment Removal Project. Vegetation mapping included Big Tujunga Creek and a 100-foot buffer; in places where Big Tujunga Canyon Road was closer than 100 feet, the buffer was truncated at the road.

Psomas Senior Botanist Allison Rudalevige and Psomas Senior Wildlife Biologist Lindsay Messett conducted vegetation mapping for the Action Area on August 16 through18, August 21 and 22, and September 5, 2017. Vegetation was mapped in the field on an aerial photograph at a scale of 1 inch equals 200 feet (1″ = 200′). A minimum mapping unit of 0.1 acre was used when differentiating vegetation types. Where vegetation overlapped another landcover (e.g., a tree canopy over water or dry wash), the area was mapped according to the uppermost layer of vegetation. Where a bridge overlaps vegetation, the area was mapped according to the vegetation. Vegetation that was inaccessible due to steep topography or access issues was mapped from a distance with the use of binoculars. Representative site photographs are provided in Attachment A. A list of plant and wildlife species observed during the 2017 survey is provided in Attachment B.

Nomenclature of vegetation types follows that of *A Manual of California Vegetation*, which is the standard classification system currently recognized by the California Department of Fish and Wildlife (CDFW) and the California Native Plant Society (CNPS) (Sawyer et al. 2009). For the portion of the Action Area that was previously mapped for the Big Tujunga Sediment Removal Project, the previous vegetation nomenclature, *The Vegetation Classification and Mapping Program: List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (CDFG 2003), is cross-referenced.

Nomenclature of plant species/subspecies conforms to the *Special Vascular Plants, Bryophytes, and Lichens List* (CDFW 2017b) for special status species and the Jepson eFlora (Jepson Flora Project 2016) for all other species/subspecies.

A general walkover survey was conducted concurrently with the vegetation mapping effort. Active searches for reptiles and amphibians included lifting, overturning, and carefully replacing objects such as rocks, boards, and debris. Birds were identified by visual and auditory recognition. Mammals were identified by visual recognition or evidence of diagnostic sign including scat, footprints, scratch-outs, dust bowls, burrows, and trails. Nomenclature of wildlife taxa conforms to the *Special Animals List* (CDFW 2017a) for special status species; nomenclature for non-special status wildlife generally follows Crother (2012) for amphibians and reptiles, American Ornithologists' Union (2017) for birds, and the Smithsonian National Museum of Natural History (2011) for mammals. HCP Proposed Covered Species were mapped when incidentally observed during the vegetation mapping.

VEGETATION TYPES AND OTHER LANDCOVERS

A variety of upland and riparian vegetation types occur in the Action Area. Vegetation types and other land cover have been grouped into generalized types as follows: sage scrub, alluvial scrub, chaparral, grassland, riparian forest, riparian scrub, riparian herb, marsh, seep, forest/woodland, riparian invasive, ornamental plantings, cliff/rock, open water, alluvium, and other landcover (Exhibit 1). Table 1 provides the total area of each vegetation type; descriptions of the vegetation and other landcovers is provided below.

TABLE 1
VEGETATION TYPES AND OTHER LANDCOVERS IN THE SURVEY AREA

Vegetation Type or Landcover	Code	Area (Acres)
Sage Scrub		**207.21**
California Sagebrush Scrub	1	1.34
California Buckwheat Scrub	2	20.29
Disturbed California Buckwheat Scrub	3	2.32
California Sagebrush–California Buckwheat Scrub	4	55.37
Laurel Sumac Scrub	5	127.89
Alluvial Scrub		**493.51**
Scale Broom Scrub	6	493.51
Chaparral		**153.87**
Thick Leaf Yerba Santa Scrub	7	20.59
Chamise Chaparral	8	25.80
Chamise Chaparral–Thick Leaf Yerba Santa Scrub	9	2.62
Scrub Oak Chaparral	10	25.12
Hoary Leaf Ceanothus Chaparral	11	1.35
Birch Leaf Mountain Mahogany Chaparral	12	78.39
Grassland		**43.24**
Annual Brome Grassland	13	26.88
Upland Mustards	14	14.28
Maltese Star-thistle Patch	15	0.23
Russian Thistle Field	16	1.66
Tree Tobacco Patch	17	0.19

TABLE 1
VEGETATION TYPES AND OTHER LANDCOVERS IN THE SURVEY AREA

Vegetation Type or Landcover	Code	Area (Acres)
Riparian Forest		**690.44**
White Alder Grove–California Sycamore Woodland	18	2.08
White Alder Grove–Willow Thicket	19	66.32
California Sycamore Woodland–Fremont Cottonwood Forest	20	0.23
California Sycamore Woodland–Red Willow Thicket	21	0.63
Fremont Cottonwood Forest	22a	29.37
Fremont Cottonwood Forest–Arroyo Willow Thicket	23	2.25
Fremont Cottonwood Forest/Giant Reed Break	24a	3.65
Black Willow Thicket	25	236.57
Disturbed Black Willow Thicket	26	3.09
Black Willow Thicket–Fremont Cottonwood Forest	27	346.25
Riparian Scrub		**141.91**
Fremont Cottonwood Forest	22b	9.65
Fremont Cottonwood Forest/Giant Reed Break	24b	1.04
Arroyo Willow Thicket	28	7.10
Sandbar Willow Thicket	29	0.41
Mulefat Thicket	30	35.21
Disturbed Mulefat Thicket	31	85.12
Golden Current Thicket	32	3.38
Riparian Herb		**2.71**
Smartweed–Cocklebur Patch	33	2.71
Marsh		**0.76**
Cattail Marsh	34	0.76
Seep		**2.05**
Freshwater Seep	35	0.23
Disturbed Freshwater Seep	36	1.82
Forest/Woodland		**96.47**
Coast Live Oak Woodland	37	84.04
Bigcone Douglas Fir–Canyon Live Oak Forest	38	9.75
California Sycamore Woodland	39	2.68
Riparian Invasive		**14.68**
Tamarisk Thicket	40	5.05
Mulefat Thicket–Giant Reed Break	41	5.97
Giant Reed Break	42	0.92
Broom Patch	43	1.69
Fennel Patch	44	1.05
Ornamental Plantings		**19.55**
Native Planting	45	9.55
Non-native Planting	46	10.00

TABLE 1
VEGETATION TYPES AND OTHER LANDCOVERS IN THE SURVEY AREA

Vegetation Type or Landcover	Code	Area (Acres)
Rock/Cliff		**34.12**
Cliff	47	34.12
Open Water		**91.91**
Open Water	48	91.91
Alluvium		**9.68**
Dry Wash	49	9.68
Other Landcover		**318.55**
Disturbed	50	53.93
Developed/Ornamental	51	264.62
Total		**2,320.66**

Sage Scrub

1: California Sagebrush Scrub

California sagebrush scrub occurs in upland areas adjacent to Big Tujunga Creek. This vegetation type is dominated by California sagebrush (*Artemisia californica*). Co-occurring species include thick-leaved yerba santa (*Eriodictyon crassifolium* var. *crassifolium*), tufted cottonthorn (*Tetradymia comosa*), and golden current (*Ribes aureum*). Some areas contain non-native species such as grayish shortpod mustard (*Hirschfeldia incana*) and red brome (*Bromus madritensis* ssp. *rubens*). These areas were not previously mapped.

2: California Buckwheat Scrub

California buckwheat scrub occurs in upland areas adjacent to Big Tujunga Creek. This vegetation type is dominated by California buckwheat (*Eriogonum fasciculatum*). Co-occurring species include Whipple's chaparral yucca (*Hesperoyucca whipplei*). The majority of the mapped California buckwheat scrub in the Action Area was not previously mapped. Some of the areas previously mapped as California annual grassland in Maple Canyon now have California buckwheat as the dominant species and are now mapped as California buckwheat scrub.

3: Disturbed California Buckwheat Scrub

Disturbed California buckwheat scrub occurs in upland areas along the access roads to Big Tujunga Dam. This vegetation type is dominated by California buckwheat in the shrub layer. It is disturbed by previous grading/terracing of the slopes and the presence of non-native species such as red brome, ripgut grass (*Bromus diandrus*), and Russian thistle (*Salsola tragus*). These areas were previously classified as coastal sage scrub during previous mapping.

4: California Sagebrush–California Buckwheat Scrub

California sagebrush–California buckwheat scrub occurs in upland areas adjacent to Big Tujunga Creek and around the Hansen Dam spreading grounds. This vegetation type is co-dominated by California sagebrush and California buckwheat, although the relative cover varies from patch to patch. Co-occurring species include deerweed(*Acmispon glaber*), black sage (*Salvia mellifera*), and mule fat (*Baccharis salicifolia* ssp. *salicifolia*). The understory often contains non-native bromes (*Bromus* spp.), oats (*Avena* sp.), and grayish shortpod mustard. The vegetation along Stoneyvale Road includes some restoration plantings. These areas were not previously mapped.

5: Laurel Sumac Scrub

Laurel sumac scrub occurs in upland areas adjacent to Big Tujunga Creek and on the slopes above Maple Canyon. This vegetation type is dominated by laurel sumac (*Malosma laurina*) in the shrub layer. Co-occurring species include California sagebrush, California buckwheat, thick-leaved yerba santa, chamise (*Adenostoma fasciculatum*), birch-leaf mountain-mahogany (*Cercocarpus betuloides*), and Whipple's chaparral yucca. The shrub cover is quite open in the Action Area. In steep, rocky areas, there is little herbaceous cover. Gentler slopes have a herbaceous layer dominated by non-native grasses (e.g., bromes and oats). These areas were previously classified as mixed chaparral during previous mapping.

Alluvial Scrub

6: Scale Broom Scrub

Scale broom scrub occurs along the alluvial terraces and floodplain of Big Tujunga Creek. This vegetation type is characterized by the presence of scaly scale-broom (*Lepidospartum squamatum*), although the species may not be dominant in terms of cover. California buckwheat is present in most patches, often as the dominant species. Other co-occurring perennials include sessileflower goldenaster (*Heterotheca sessiliflora*), thick-leaved yerba santa, California sagebrush, white sage (*Salvia apiana*), Whipple's chaparral yucca, seaside prickly-pear (*Opuntia littoralis*), cane cholla (*Cylindropuntia californica* var. *parkeri*), and mule fat. Some areas have a sparse cover of annuals including bromes and oats. The overall vegetation density varies across the creek. The active floodplain and lowest terraces, which experience the most frequent flood events, have sparse cover. Vegetation density is greater on the higher terraces. The majority of the mapped scale broom scrub in the Action Area was not previously mapped. Some areas mapped upstream of Big Tujunga Reservoir were previously mapped as willow riparian scrub.

Chaparral

7: Thick Leaf Yerba Santa Scrub

Thick leaf yerba santa scrub occurs in upland areas adjacent to the upper reaches of Big Tujunga Creek. This vegetation type is dominated by thick-leaved yerba santa. Co-occurring species include mule fat, California sagebrush, California buckwheat, Whipple's chaparral yucca, and chamise, with an understory of bromes. These areas were previously classified as mixed chaparral during previous mapping.

8: Chamise Chaparral

Chamise chaparral occurs in upland areas adjacent to the upper reaches of Big Tujunga Creek and on south-facing slopes above Maple Canyon. This vegetation type is dominated by chamise. Co-occurring species include birch-leaf mountain-mahogany, holly-leaved cherry (*Prunus ilicifolia*), California sagebrush, California buckwheat, and Whipple's chaparral yucca. These areas were previously classified as chamise chaparral during previous mapping.

9: Chamise Chaparral–Thick Leaf Yerba Santa Scrub

Chamise chaparral–thick leaf yerba santa scrub occurs in upland areas adjacent to the upper reaches of Big Tujunga Reservoir. The species composition is similar to thick leaf yerba santa scrub and chamise chaparral, but thick-leaved yerba santa and chamise co-dominate here. These areas were previously classified as mixed chaparral or chamise chaparral during previous mapping.

10: Scrub Oak Chaparral

Scrub oak chaparral occurs primarily on the north-facing slopes of the Maple Canyon SPS. This vegetation type is dominated by scrub oak (*Quercus berberidifolia*), with some areas co-dominated by canyon live oak (*Quercus chrysolepis*). Co-occurring species include heart-leaved bush penstemon (*Keckiella cordifolia*), bush poppy (*Dendromecon rigida*), California buckwheat, chaparral clematis (*Clematis lasiantha*), and California brickellbush (*Brickellia californica*). The understory includes species such as California poppy (*Eschscholzia californica*) and bromes. These areas were previously classified as scrub oak chaparral during previous mapping.

11: Hoary Leaf Ceanothus Chaparral

Hoary leaf ceanothus chaparral occurs in upland areas along the access road to Big Tujunga Dam. This vegetation type is dominated by hoaryleaf ceanothus (*Ceanothus crassifolius*). Other species include chaparral whitethorn (*Ceanothus lecodermis*), thick-leaved yerba santa, sugar bush (*Rhus ovata*), canyon live oak, and Whipple's chaparral yucca. These areas were previously classified as mixed chaparral during previous mapping.

12: Birch Leaf Mountain Mahogany Chaparral

Birch leaf mountain mahogany chaparral occurs in upland areas adjacent to the upper reaches of Big Tujunga Creek. This vegetation type is dominated by birch-leaf mountain-mahogany, although the overall shrub cover varies across the survey area. Co-occurring species include chamise, sugar bush, California buckwheat, thick-leaved yerba santa, and Whipple's chaparral yucca. Some areas also contain chaparral whitethorn, hoaryleaf ceanothus, few-flowered California-lilac (*Ceanothus oliganthus*), and big berry manzanita (*Arctostaphylos glauca*). These areas were previously classified as mixed chaparral during previous mapping.

Grassland

13: Annual Brome Grassland

Annual brome grassland occurs in disturbed areas (e.g., along trails or roads). This vegetation type is dominated by non-native grasses, such as ripgut grass, red brome, and oat. This vegetation type was previously classified as California annual grassland during previous mapping.

14: Upland Mustards

Upland mustards occur in disturbed areas (e.g., along trails or roads). This vegetation type is dominated by the non-native, invasive grayish shortpod mustard. Co-occurring species include Russian thistle and cocklebur (*Xantium strumarium*). These areas were not previously mapped.

15: Maltese Star-thistle Patch

Maltese star-thistle occurs in a disturbed area in the Hansen Dam spreading grounds. This vegetation type is dominated by the non-native, invasive Maltese star-thistle (*Centaurea melitensis*). Co-occurring species include grayish shortpod mustard, common horehound (*Marrubium vulgare*), and filaree (*Erodium* sp.). These areas were not previously mapped.

16: Russian Thistle Field

Russian thistle field occurs in disturbed areas (e.g., along trails or roads). This vegetation type is dominated by Russian thistle. Co-occurring species include grayish shortpod mustard and cocklebur. These areas were previously classified as California annual grassland during previous mapping.

17: Tree Tobacco Patch

A tree tobacco patch occurs in a disturbed area along Big Tujunga Canyon Road. This vegetation type is dominated by the non-native invasive tree tobacco (*Nicotiana glauca*) with grayish shortpod mustard also occurring. These areas were not previously mapped.

Riparian Forest

18: White Alder Grove–California Sycamore Woodland

White alder grove–California sycamore woodland occurs along Big Tujunga Creek upstream of Big Tujunga Reservoir. This vegetation type is co-dominated by mature white alder (*Alnus rhombifolia*) and western sycamore (*Platanus racemosa*) in a closed canopy. These patches lack a substantial cover of willows (*Salix* spp.). These areas were not previously mapped.

19: White Alder Grove–Willow Thicket

White alder grove–willow thicket occurs throughout the upper reaches of Big Tujunga Creek, from Vogel Flat Road to the upstream end of the Action Area. This vegetation type contains a variety of mature riparian tree species and has a closed canopy. In these areas, white alder is co-dominant with a variety of willow species, while Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) cover is low. Other tree species in this vegetation type include red willow (*Salix laevigata*), Pacific willow (*Salix lasiandra* var.

lasiandra), Goodding's black willow (*Salix gooddingii*), arroyo willows (*Salix lasiolepis*), and western sycamore. In the vicinity of Vogel Flat Road, Chinese elm (*Ulmus parvifolia*) and tree of heaven (*Ailanthus altissima*) are also present. In some areas, the understory in the interior of stands is very open, with abundant debris. Understory species along the margins include southern cattail (*Typha domingensis*), California blackberry (*Rubus ursinus*), mugwort (*Artemisia douglasiana*), California brickellbush, hoary nettle (*Urtica dioica* ssp. *holosericea*), and water cress (*Nasturtium officinale*). Along several portions of the stream, cattails extended throughout the active channel. Much of this area was classified as white alder–Fremont cottonwood–willow riparian forest or willow riparian forest during previous mapping.

20: California Sycamore Woodland–Fremont Cottonwood Forest

California sycamore woodland–Fremont cottonwood forest occurs on a high terrace adjacent to Big Tujunga Creek at the terminus of Stonyvale Road. This vegetation type consists of a stand of western sycamore and Fremont cottonwood with an understory of species found in the adjacent scale broom scrub. This area was not previously mapped.

21: California Sycamore Woodland–Red Willow Thicket

California sycamore woodland–red willow thicket occurs along Big Tujunga Creek at the upstream end of the Action Area. This vegetation type is similar to the adjacent riparian forest but is co-dominated by western sycamore and red willow and lacks white alder. This area was not previously mapped.

22a: Fremont Cottonwood Forest

Fremont cottonwood forest occurs along the low flow channel and in the floodplain of the middle and lower reaches of Big Tujunga Creek. This vegetation type is dominated by mature Fremont cottonwood. Some areas contain a low cover of red willow, scaly scale-broom, mule fat, and giant reed (*Arundo donax*). Note that this vegetation type was split based on vegetation structure (i.e., scrub versus forest); these areas were composed of taller trees with a more closed canopy and were grouped with riparian forest. These areas were not previously mapped.

23: Fremont Cottonwood Forest–Arroyo Willow Thicket

Fremont cottonwood forest–arroyo willow thicket occurs along the lower middle reaches of Big Tujunga Creek near Oro Vista Avenue. This vegetation type is co-dominated by mature Fremont cottonwood and arroyo willow. Co-occurring species include white alder, coast live oak (*Quercus agrifolia*), laurel sumac, and mule fat at relatively low densities. These areas were not previously mapped.

24a: Fremont Cottonwood Forest–Giant Reed Break

Fremont cottonwood forest–giant reed break occurs along the lower reaches of Big Tujunga Creek. This vegetation type consists of an open canopy of mature Fremont cottonwood intermixed with stands of the non-native, highly invasive giant reed. Note that this vegetation type was split based on vegetation structure (i.e., scrub versus forest); these areas were composed of taller trees and were grouped with riparian forest. These areas were not previously mapped.

25: Black Willow Thicket

Black willow thicket occurs throughout the Hansen Dam spreading grounds and in the lower reaches of Big Tujunga Creek. This vegetation type has mature Goodding's black willow as the dominant species in the tree canopy. This vegetation type was grouped with riparian forest because most areas have a dense, closed canopy. Co-occurring trees include western sycamore, Fremont cottonwood, and arroyo willow at relatively low densities. The understory is largely unvegetated. Shrubby species such as mule fat, Hinds' willow (*Salix exigua* var. *hindsiana*), and cocklebur are present along the margins. These areas were not previously mapped.

26: Disturbed Black Willow Thicket

Disturbed black willow thicket is present in the Hansen Dam spreading grounds. This vegetation type has mature Goodding's black willow as the dominant tree species; however, it has an open canopy and the trees are relatively sparse. It is degraded by the presence of non-native, invasive species such as giant reed, saltcedar (*Tamarix ramosissima*), and grayish shortpod mustard. These areas were not previously mapped.

27: Black Willow Thicket–Fremont Cottonwood Forest

Black willow thicket–Fremont cottonwood forest occurs throughout the middle and lower reaches of Big Tujunga Creek, from just upstream of the Hansen Dam area to Vogel Flat Road. This vegetation type is co-dominated by mature Goodding's black willow and Fremont cottonwood; the tree cover is generally continuous. Other co-occurring tree species at lower densities include arroyo willow, red willow, western sycamore, white alder, and coast live oak. Mule fat and scaly scale-broom occur along the margins, while southern cattail occurs along the waterline in some areas. Along several portions of the stream, cattails extended throughout the active channel. Some areas contain patches of giant reed that are too small to be mapped separately. It should be noted that an area south of Christy Avenue burned in 2016. These areas were not previously mapped.

Riparian Scrub

22b: Fremont Cottonwood Forest

Fremont cottonwood forest occurs along the low flow channel and in the floodplain of Big Tujunga Creek. This vegetation type is similar in composition to the riparian forest vegetation, but has been mapped separately per the vegetation structure (i.e., it has a more open canopy and younger trees). Note that this vegetation type was split based on vegetation structure (i.e., scrub versus forest); these areas were composed of shrubbier trees with a more open canopy and were grouped with riparian scrub. These areas were not previously mapped.

24b: Fremont Cottonwood Forest–Giant Reed Break

Fremont cottonwood forest–giant reed break occurs along the low flow channel of Big Tujunga Creek. This vegetation type is similar in composition to the riparian forest vegetation but has been mapped separately per the vegetation structure (i.e., it has a more open canopy and younger trees). Note that this vegetation type was split based on vegetation structure (i.e., scrub versus forest); these areas were composed of shrubbier trees with a more open canopy and were grouped with riparian scrub. These areas were not previously mapped.

28: Arroyo Willow Thicket

Arroyo willow thickets occur in the upper reaches of Big Tujunga Creek, upstream of the reservoir. This vegetation type is dominated by the shrubby arroyo willow and is more open than riparian forest vegetation. Co-occurring species include mule fat, red willow, and Goodding's black willow. The understory contains western poison oak (*Toxicodendron diversilobum*), mugwort, branching phacelia (*Phacelia ramosissima*), crofton weed (*Ageratina adenophora*), white sweetclover (*Melilotus albus*), and various monkeyflowers (*Mimulus* spp.). Much of this area was previously classified as willow riparian scrub during previous mapping.

29: Sandbar Willow Thicket

Sandbar willow thickets occur in a few scattered patches along the low flow channel of Big Tujunga Creek. This vegetation type is dominated by Hinds' willow; mule fat is also generally present. These areas were previously classified as willow riparian scrub during previous mapping.

30: Mulefat Thicket

Mulefat thickets occur throughout the Action Area. This vegetation type is dominated by mule fat. It occurs along the low flow channels of Big Tujunga Creek. In these areas, mule fat grows sparsely on either side of the narrow low flow channels; some areas have scattered emergent Fremont cottonwood. Many of these areas were not previously mapped; areas that were previously mapped were previously classified as willow riparian scrub.

31: Disturbed Mulefat Thicket

Disturbed mulefat thickets occur in the Hansen Dam spreading grounds. This vegetation type is dominated by mule fat; co-occurring species include Hinds' willow, blue elderberry (*Sambucus nigra* ssp. *caerulea*), and scattered emergent Goodding's black willow and Fremont cottonwood. The vegetation is degraded by the presence of non-native, invasive species such as Italian thistle (*Carduus pycnocephalus* ssp. *pycnocephalus*), Maltese star-thistle, giant reed, prickly lettuce (*Lactuca serriola*), and bromes. These areas were not previously mapped.

32: Golden Current Thicket

A golden current thicket occurs at the southeastern end of the Hansen Dam spreading grounds. This vegetation type consists of a large patch of golden current. Co-occurring species include grayish shortpod mustard and horseweed (*Erigeron canadensis*). These areas were not previously mapped.

Riparian Herb

33: Smartweed–Cocklebur Patch

Smartweed–cocklebur patches occur upstream of the reservoir in Big Tujunga Creek. This vegetation type is dominated by cocklebur. Other herbaceous species include willow weed (*Persicaria lapathifolia*), red-dotted monkeyflower (*Mimulus guttatus*), bentgrass (*Agrostis* sp.), smilo grass (*Stipa miliacea* var. *miliacea*), long-leaved rush (*Juncus macrophyllus*), tall evening primrose (*Oenothera elata*), water speedwell (*Veronica anagallis-aquatica*), water cress, common beggar-ticks (*Bidens pilosa*), annual beard grass (*Polypogon monspeliensis*), crofton weed, white sweetclover, red monkeyflower (*Mimulus*

cardinalis), cock's spur barnyard grass (*Echinochloa crus-galli*), false daisy (*Eclipta prostrata*), and lovegrass flatsedge (*Cyperus eragrostis*). These areas were classified as riparian herb during previous mapping.

Marsh

34: Cattail Marsh

Cattail marsh occurs at the outlet structure on the south side of the Hansen Dam spreading grounds. This vegetation type is dominated by southern cattail. Flatsedge (*Cyperus* sp.) and white sweetclover also occur; peplis-like false loosestrife (*Ludwigia peploides*) is present in the standing water. These areas were not previously mapped.

It should be noted that cattails are often in the understory of other common riparian vegetation types along the active channel; however, if there was a tree or shrub canopy over them, the areas were mapped according to the higher canopies (e.g., white alder grove–willow thicket and black willow thicket–Fremont cottonwood forest) as described in the methodology.

Seep

35: Freshwater Seep

Freshwater seep occurs along the canyon walls along Big Tujunga Creek upstream of the reservoir. This vegetation type is dominated by stream orchid (*Epipactis gigantea*), California maidenhair (*Adiantum jordanii*), red monkeyflower, and western blue-eyed-grass (*Sisyrinchium bellum*). These areas were not previously mapped.

36: Disturbed Freshwater Seep

Disturbed freshwater seep occurs along the canyon walls adjacent to the access road below Big Tujunga Dam and on a cliff adjacent to the reservoir. This vegetation type contains an underlying native component of stream orchid, California maidenhair, red monkeyflower, and western blue-eyed-grass. However, it is disturbed by the presence of non-native crofton weed, barbed Mediterranean schismus (*Schismus barbatus*), fescue (*Festuca* sp.), and bromes. These areas were classified as disturbed freshwater seep during previous mapping.

Forest/Woodland

37: Coast Live Oak Woodland

Coast live oak woodland occurs along the margins of Big Tujunga Creek throughout the Action Area. This vegetation type is dominated by coast live oak in the tree canopy. The understory includes species such as holly-leaved cherry, western poison oak, birch-leaf mountain mahogany, thick-leaved yerba santa, Whipple's chaparral yucca, California sagebrush, California buckwheat, black sage, and deerweed. These areas were previously classified as coast live oak stands during previous mapping.

38: Bigcone Douglas Fir–Canyon Live Oak Forest

Bigcone Douglas fir–canyon live oak forest occurs on the steep slopes and side canyons of upper Big Tujunga Creek throughout the middle to upper reaches of the Action Area. This vegetation type is dominated by bigcone Douglas-fir (*Pseudotsuga macrocarpa*) in the tree canopy. Co-occurring species include canyon live oak, coast live oak, sugar bush, and laurel sumac. These areas were previously classified as bigcone Douglas fir–canyon live oak forest.

39: California Sycamore Woodland

California sycamore woodland occurs at Maple Canyon SPS and along Big Tujunga Creek on higher terraces above the creek. This vegetation type consists of an open canopy of western sycamore. Sage scrub species (e.g., California sagebrush, California buckwheat, and thick-leaved yerba santa) and annual grasses (e.g., bromes) are present in the understory. The area in Maple Canyon SPS was previously mapped as California sycamore woodland; other areas were not mapped during previous mapping.

Riparian Invasive

40: Tamarisk Thicket

Tamarisk thickets occur in patches in the Hansen Dam spreading grounds. This vegetation type is dominated by the non-native, highly invasive saltcedar. Co-occurring species include giant reed. These areas were not previously mapped.

41: Mulefat Thicket–Giant Reed Break

Mulefat thicket–giant reed break occurs along the low flow channel and in the floodplain along the middle and lower reaches of Big Tujunga Creek. This vegetation type is co-dominated by mule fat and the non-native, invasive giant reed. These areas were not previously mapped.

42: Giant Reed Break

Giant reed break consists of a relatively large, dense monoculture of giant reed in the floodplain of the middle reaches of Big Tujunga Creek. These areas were not previously mapped.

43: Broom Patch

Broom patches occur in a few patches on terraces and in upland areas along the upper middle reaches of Big Tujunga Creek. This vegetation type is dominated by the non-native, highly invasive Spanish broom (*Spartium junceum*). Brome grasses occur in the understory. These areas were not previously mapped.

44: Fennel Patch

A fennel patch occurs in a disturbed area in the Hansen Dam spreading grounds. This vegetation type consists of a monoculture of fennel (*Foeniculum vulgare*). This area was not previously mapped.

Ornamental/Non-native Plantings

45: Native Planting

Native plantings occur in Maple Canyon SPS and in the vicinity of development. This vegetation type consists of landscaping that utilizes native tree species. The species vary by location, but include coast live oak, Fremont cottonwood, and western sycamore. The graded, terraced slopes going up Maple Canyon contain fill material with planted coast live oaks. This area was mapped as California annual grassland during the previous mapping.

46: Non-native Planting

Non-native plantings occur in the vicinity of development. This vegetation type consists of landscaping that utilizes non-native tree species. The species vary by location, but include pepper tree (*Schinus molle*), gum tree (*Eucalyptus* sp.), tree of heaven, pine (*Pinus* spp.), and European olive (*Oleo europaea*). Understory species vary and include mule fat, blue elderberry, tree tobacco, grayish shortpod mustard, and brome grasses. These areas were previously classified as ornamental during the previous mapping.

Rock/Cliff

47: Cliff

Cliffs primarily occur adjacent to Big Tujunga Reservoir and along the upper reaches of Big Tujunga Creek; they also occur in smaller areas adjacent to the middle and lower reaches of Big Tujunga Creek. These areas have steep, sometimes vertical, topography and consist of exposed rock. Areas mapped as cliff are unvegetated; steep, rocky slopes with scattered vegetation are mapped as the vegetation type corresponding to the dominant plant species. It should be noted that, due to the nature of mapping on aerial imagery, the vertical cliffs in the upper Big Tujunga Canyon are not always visible in the plan view. The actual surface area of cliffs immediately above the canyon floor is larger than shown on the map. These areas were classified as cliff during previous mapping.

Open Water

48: Open Water

Open water occurs where surface water is present and not covered by a vegetation canopy. It primarily occurs in Big Tujunga Reservoir, in the Hansen Dam area, on the fairways of the Angeles National Golf Club, and along unvegetated portions of Big Tujunga Creek. In the Hansen Dam area and golf course, the lake/pond margins contain flatsedge, southern cattail, and/or white sweetclover; these areas were too small to be mapped separately. These areas were classified as open water during the previous mapping.

Alluvium

49: Dry Wash

Dry wash occurs in alluvial areas, generally in the low flow channels and active floodplains. These areas consist of sandy, gravelly, or cobbly substrate that has been scoured of vegetation. Alluvium present under a vegetative canopy is mapped as the vegetation type that corresponds to the dominant plant species. These areas were classified as streambed during the previous mapping.

Other Landcover

50: Disturbed

Disturbed areas consist of unvegetated or very sparsely vegetated bare ground that is not alluvial. This includes dirt trails, roads, road shoulders, and graded lots. These areas were not previously mapped.

51: Developed/Ornamental

Developed/ornamental areas consist of human-made structures and closely associated landscaping. These areas include buildings, paved roads, picnic areas, the Angeles National Golf Club, and flood control structures such as rip-rap, concrete bank lining, and Big Tujunga Dam. Ornamental landscaping includes species such as European olive, pine, pepper trees, blue jacaranda (*Jacaranda mimosifolia*), common oleander (*Nerium oleander*), and turf grass of indeterminate species. These areas were classified as ornamental and developed during the previous mapping.

SPECIAL STATUS SPECIES OBSERVED

During the vegetation mapping, the locations of any HCP Proposed Covered Species were recorded (Exhibit 1).

Arroyo chub (*Gila orcuttii*; California Species of Special Concern) was observed in the Vogel Flats area along Big Tujunga Creek. Arroyo chub is known to occur in this area. A California Natural Diversity Database (CNDDB) form will not be submitted for this observation because a CNDDB form for this species with quantified survey data will be submitted as part of the 2017 long-term monitoring effort (Psomas, in preparation).

A total of eight least Bell's vireo (*Vireo bellii pusillus*; federally and State-listed Endangered) were observed in the Action Area. Seven of them were observed in the vicinity of Hanson Dam, and the remaining location was upstream of Big Tujunga Reservoir in the same location where it was incidentally observed during the 2017 focused surveys (Psomas 2017). Least Bell's vireo were generally known to occur in these areas (BonTerra 2010; Psomas 2017). A CNDDB form reporting these observations is included in Attachment C.

A willow flycatcher of indeterminate subspecies (*Empidonax traillii*; State-listed Endangered) was also incidentally observed (based on visual and aural identification). The willow flycatcher is a migratory species with multiple recognized subspecies that cannot be identified to subspecies except by where they breed. In August (when the vegetation mapping was conducted), multiple subspecies are moving through southern California. Therefore, it is unknown whether the willow flycatcher observed was the southwestern willow flycatcher (*Empidonax traillii extimus,* federally listed Endangered) that breeds in southern California, or whether it was one of the other subspecies. A CNDDB form will not be submitted for this observation because breeding was not confirmed, so the individual is assumed to be a migrant.

Other special status species incidentally observed included coastal whiptail (*Aspidoscelis tigris stejnegeri*; California Species of Special Concern), peregrine falcon (*Falco peregrinus*; Fully Protected), and yellow warbler (*Setophaga petechia*; California Species of Special Concern). A CNDDB form will not be prepared for the peregrine falcon because it was recently observed and reported during the 2017 focused surveys (Psomas 2017). CNDDB forms for coastal whiptail and yellow warbler are included in Attachment C.

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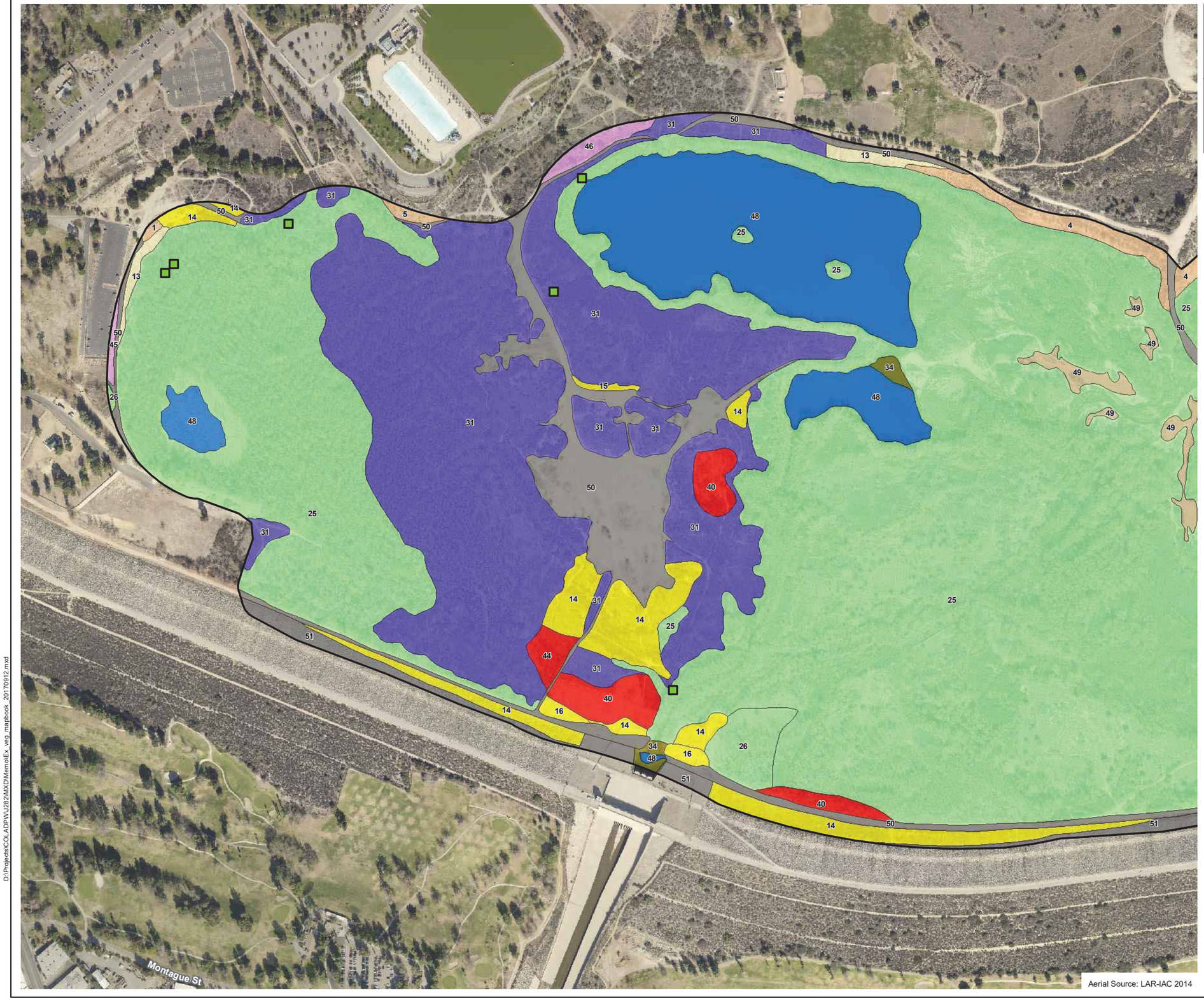

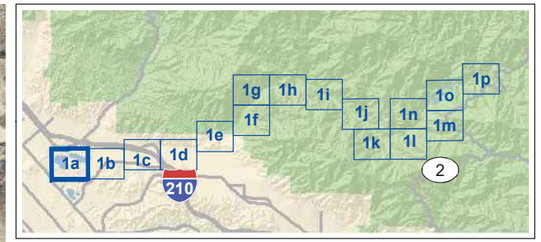

- Action Area
- least Bell's vireo (6 on page)
- Sage Scrub
  - 1 : California Sagebrush Scrub
  - 4 : California Sagebrush–California Buckwheat Scrub
  - 5 : Laurel Sumac Scrub
- Grassland
  - 13 : Annual Brome Grassland
- Ruderal
  - 14 : Upland Mustards
  - 15 : Maltese Star-thistle Patch
  - 16 : Russian Thistle Field
- Riparian Forest
  - 25 : Black Willow Thicket
  - 26 : Disturbed Black Willow Thicket
- Riparian Scrub
  - 31 : Disturbed Mulefat Thicket
- Marsh
  - 34 : Cattail Marsh
- Riparian Invasive
  - 40 : Tamarisk Thicket
  - 44 : Fennel Patch
- Ornamental Plantings
  - 45 : Native Planting
  - 46 : Non-native Planting
- Open Water
  - 48 : Open Water
- Alluvium
  - 49 : Dry Wash
- Other Landcover
  - 50 : Disturbed
  - 51 : Developed/Ornamental

500 250 0 500 Feet

N W E S

Aerial Source: LAR-IAC 2014

Biological Resources Exhibit 1a

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS

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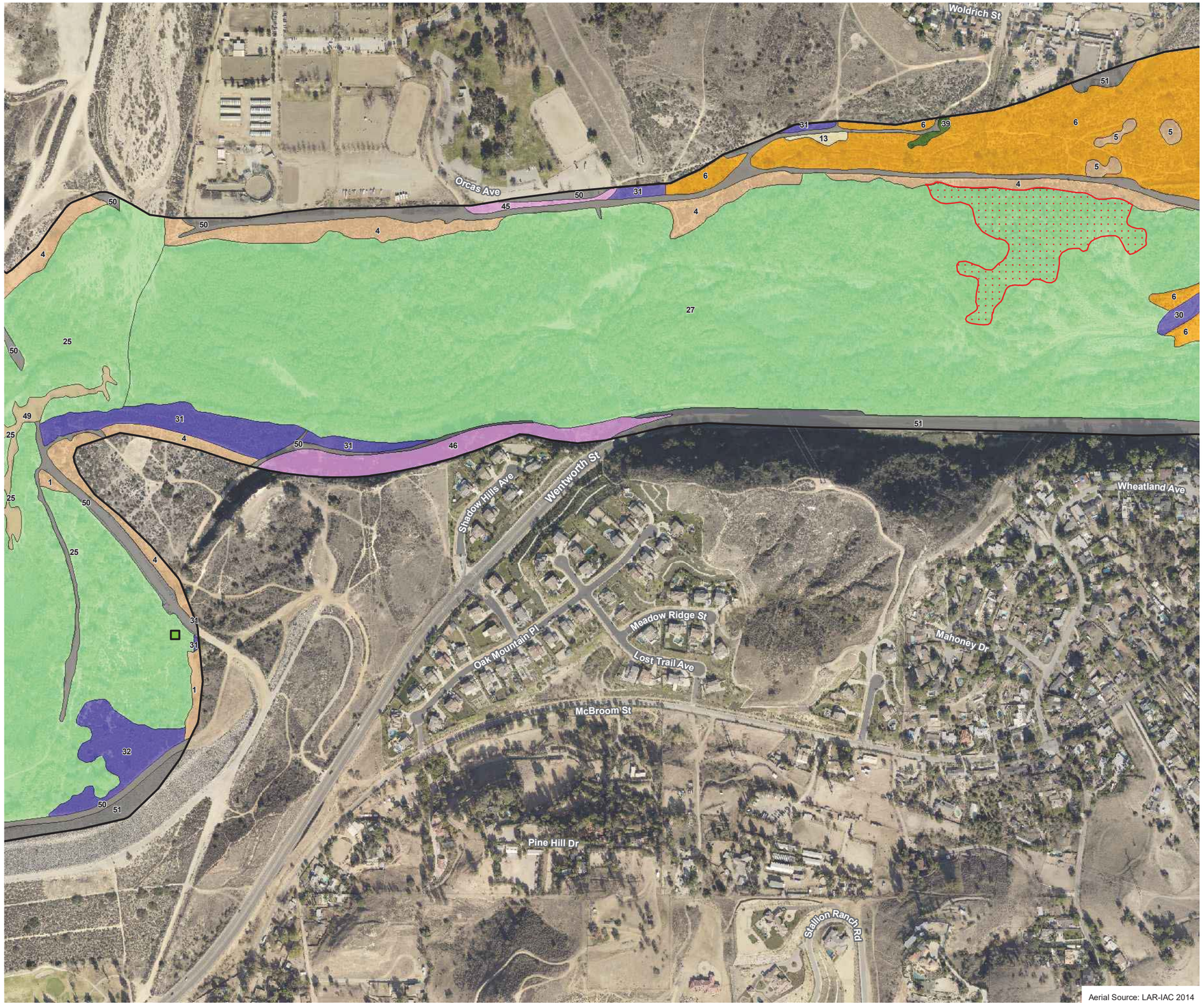

Aerial Source: LAR-IAC 2014

Biological Resources Exhibit 1b

Big Tujunga Dam Operation and Maintenance Plan Project

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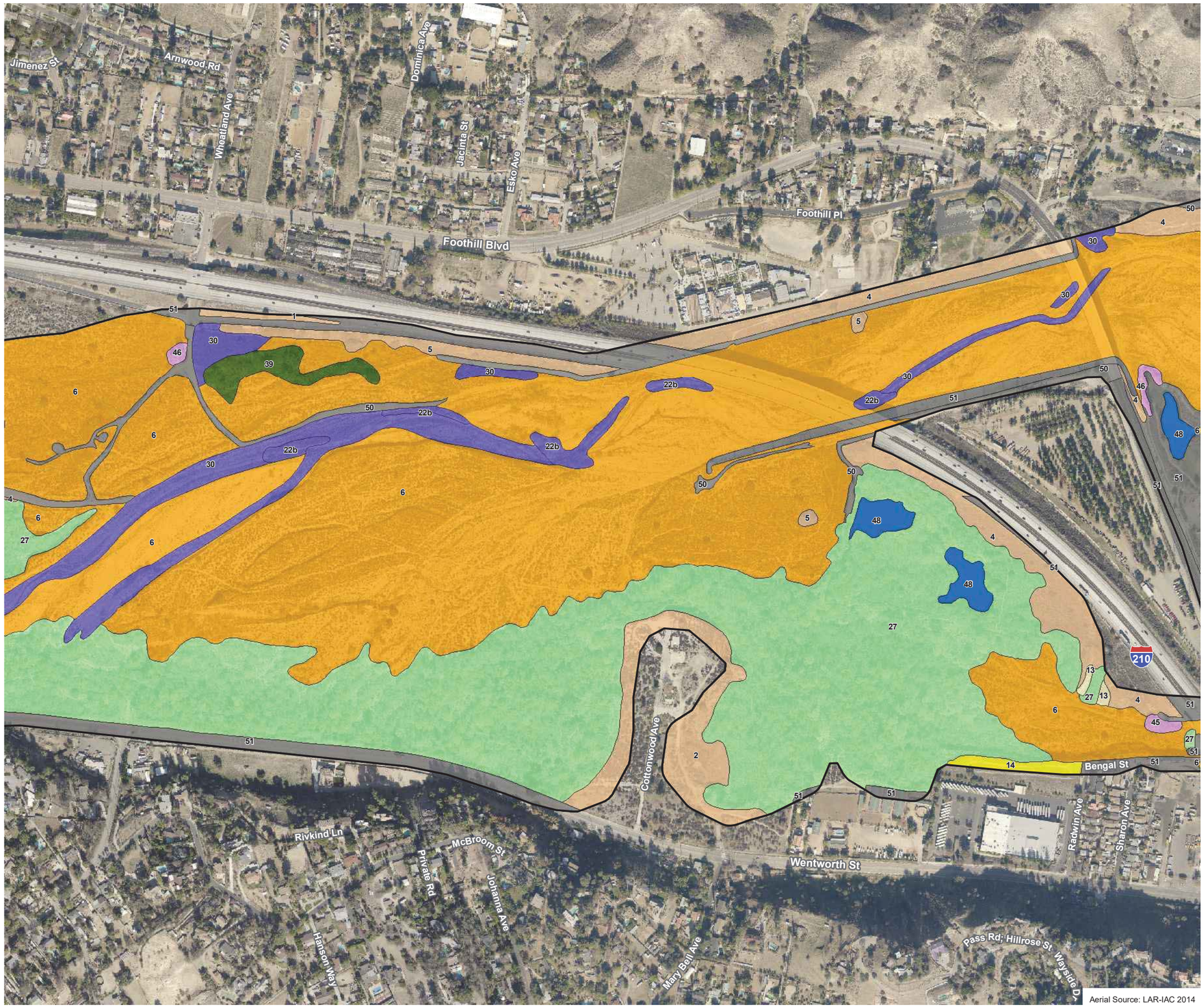

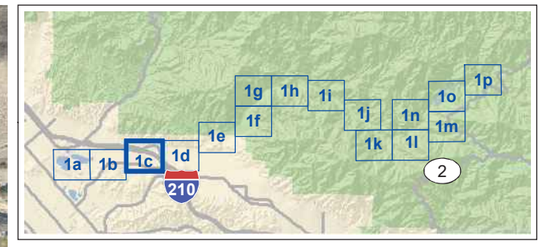

- Action Area
- Sage Scrub
  - 1 : California Sagebrush Scrub
  - 2 : California Buckwheat Scrub
  - 4 : California Sagebrush–California Buckwheat Scrub
  - 5 : Laurel Sumac Scrub
- Alluvial Scrub
  - 6 : Scale Broom Scrub
- Grassland
  - 13 : Annual Brome Grassland
- Ruderal
  - 14 : Upland Mustards
- Riparian Forest
  - 27 : Black Willow Thicket–Fremont Cottonwood Forest
- Riparian Scrub
  - 22b : Fremont Cottonwood Forest
  - 30 : Mulefat Thicket
- Forest/Woodland
  - 39 : California Sycamore Woodland
- Ornamental Plantings
  - 45 : Native Planting
  - 46 : Non-native Planting
- Open Water
  - 48 : Open Water
- Other Landcover
  - 50 : Disturbed
  - 51 : Developed/Ornamental

500 250 0 500 Feet

N W E S

Biological Resources Exhibit 1c

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS

Aerial Source: LAR-IAC 2014

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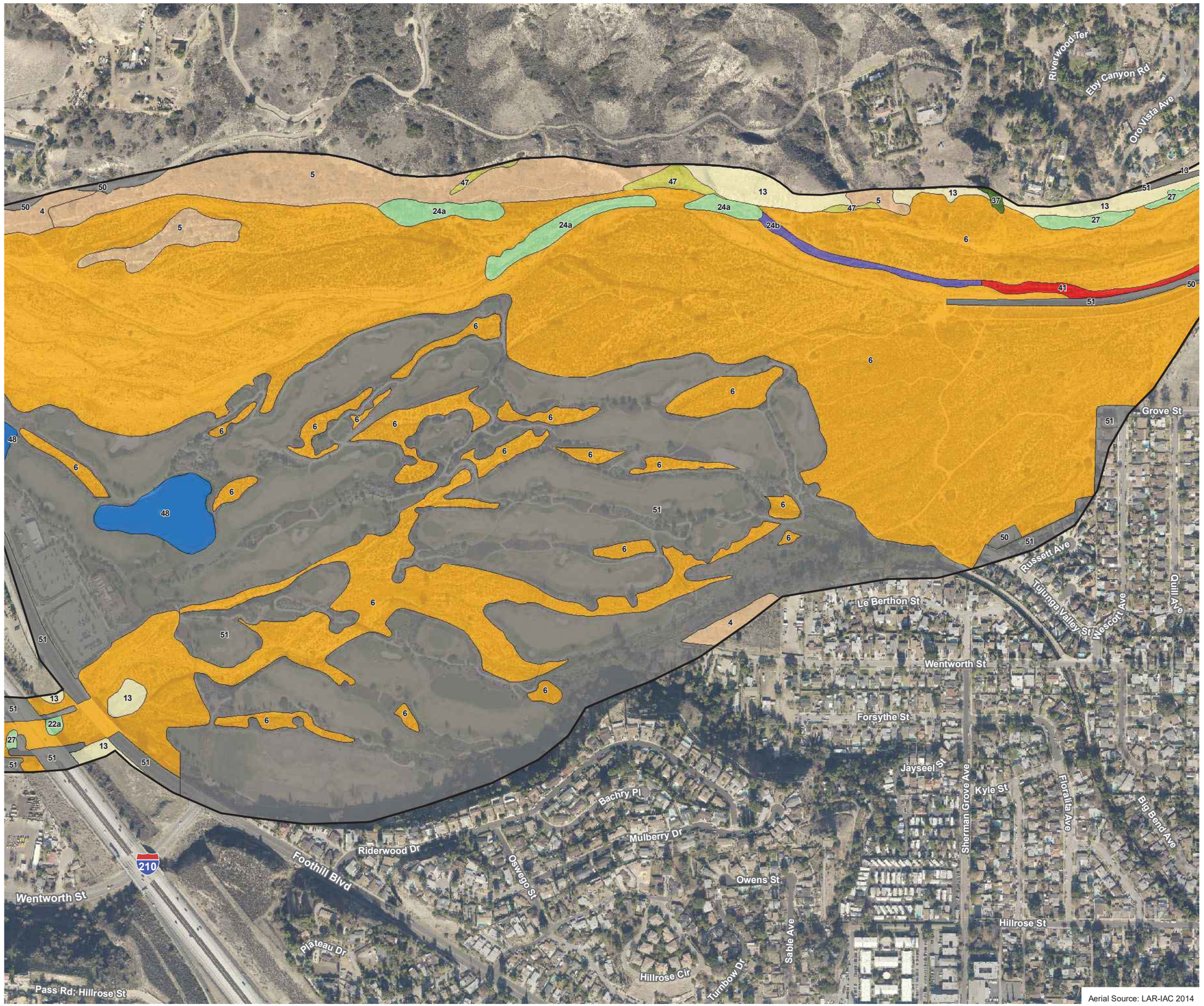

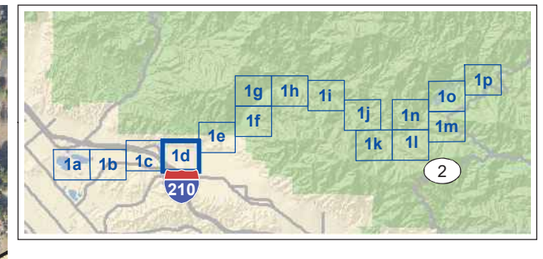

- Action Area
- Sage Scrub
  - 4 : California Sagebrush–California Buckwheat Scrub
  - 5 : Laurel Sumac Scrub
- Alluvial Scrub
  - 6 : Scale Broom Scrub
- Grassland
  - 13 : Annual Brome Grassland
- Riparian Forest
  - 22a : Fremont Cottonwood Forest
  - 24a : Fremont Cottonwood Forest/Giant Reed Break
  - 27 : Black Willow Thicket–Fremont Cottonwood Forest
- Riparian Scrub
  - 24b : Fremont Cottonwood Forest/Giant Reed Break
- Forest/Woodland
  - 37 : Coast Live Oak Woodland
- Riparian Invasive
  - 41 : Mulefat Thicket–Giant Reed Break
- Cliff/Rock
  - 47 : Cliff
- Open Water
  - 48 : Open Water
- Other Landcover
  - 50 : Disturbed
  - 51 : Developed/Ornamental

500 250 0 500 Feet

N W E S

Biological Resources Exhibit 1d

Big Tujunga Dam Operation and Maintenance Plan Project

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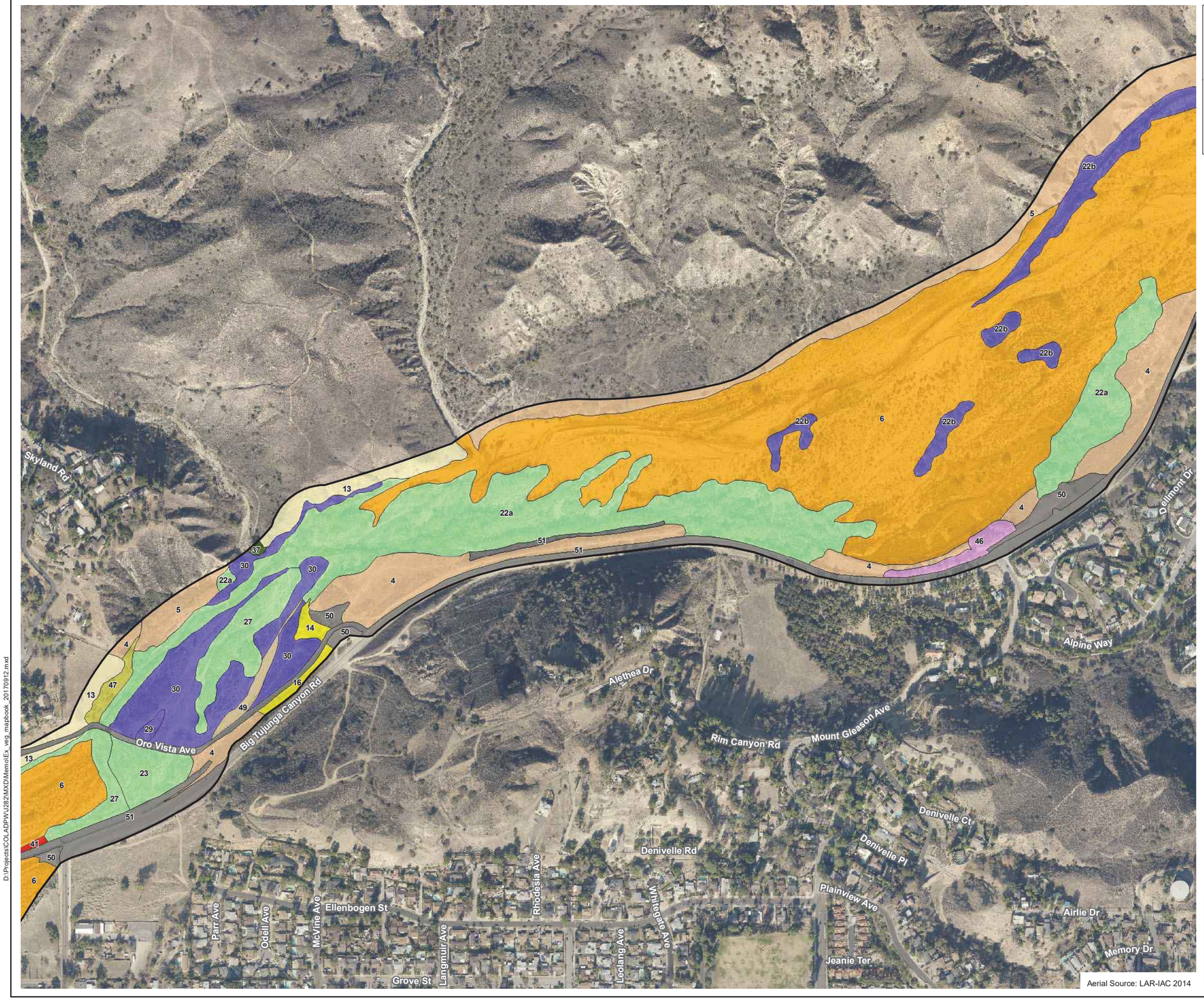

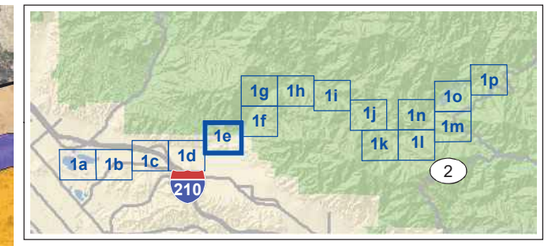

- Action Area
- Sage Scrub
  - 4 : California Sagebrush–California Buckwheat Scrub
  - 5 : Laurel Sumac Scrub
- Alluvial Scrub
  - 6 : Scale Broom Scrub
- Grassland
  - 13 : Annual Brome Grassland
- Ruderal
  - 14 : Upland Mustards
  - 16 : Russian Thistle Field
- Riparian Forest
  - 22a : Fremont Cottonwood Forest
  - 23 : Fremont Cottonwood Forest–Arroyo Willow Thicket
  - 27 : Black Willow Thicket–Fremont Cottonwood Forest
- Riparian Scrub
  - 22b : Fremont Cottonwood Forest
  - 29 : Sandbar Willow Thicket
  - 30 : Mulefat Thicket
- Forest/Woodland
  - 37 : Coast Live Oak Woodland
- Riparian Invasive
  - 41 : Mulefat Thicket–Giant Reed Break
- Ornamental Plantings
  - 46 : Non-native Planting
- Cliff/Rock
  - 47 : Cliff
- Alluvium
  - 49 : Dry Wash
- Other Landcover
  - 50 : Disturbed
  - 51 : Developed/Ornamental

500 250 0 500 Feet

N W E S

Aerial Source: LAR-IAC 2014

Biological Resources Exhibit 1e

Big Tujunga Dam Operation and Maintenance Plan Project

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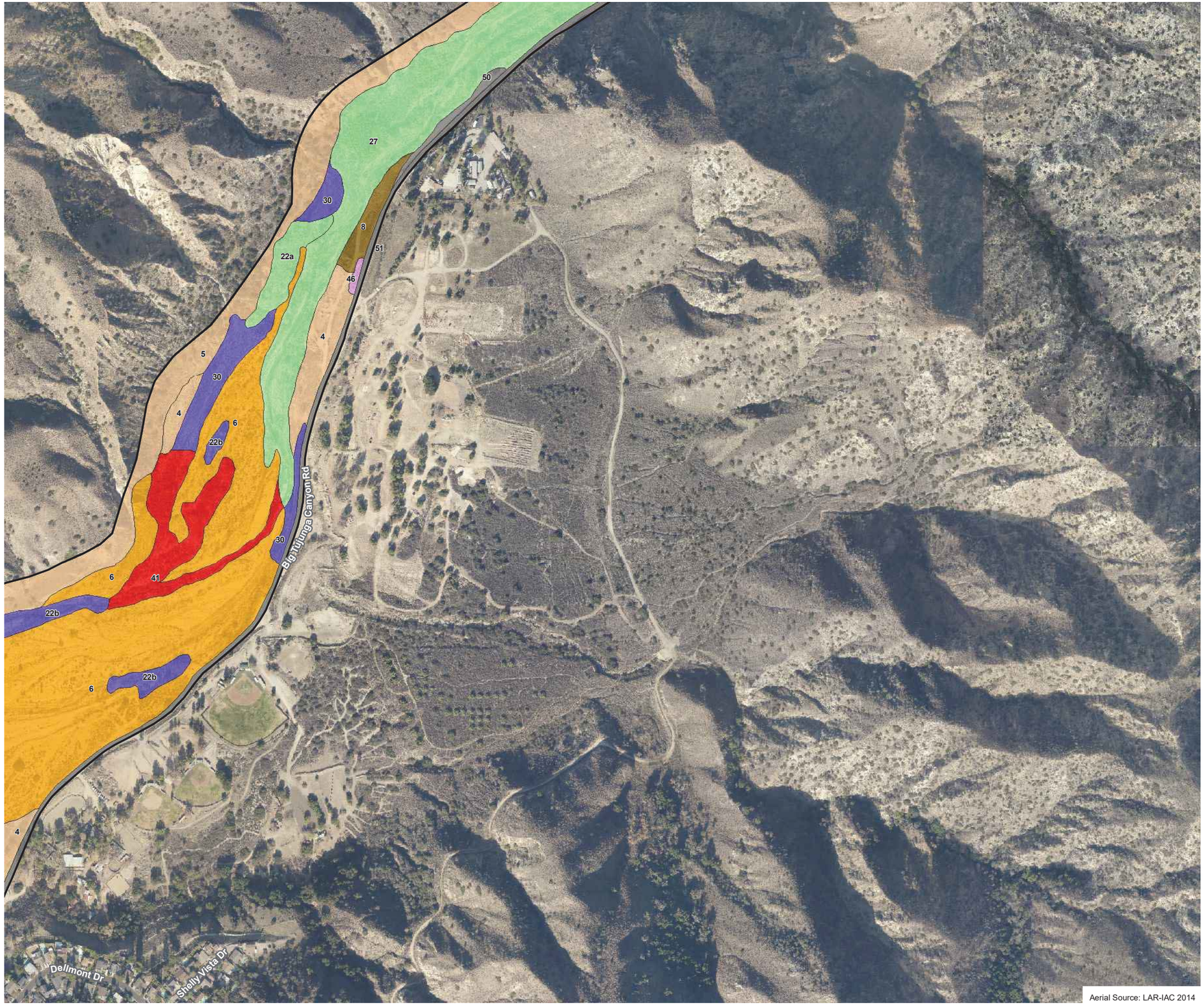

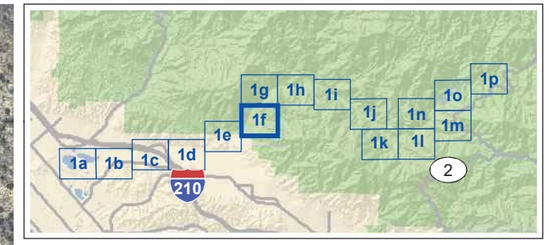

- Action Area
- Sage Scrub
  - 4 : California Sagebrush–California Buckwheat Scrub
  - 5 : Laurel Sumac Scrub
- Alluvial Scrub
  - 6 : Scale Broom Scrub
- Chaparral
  - 8 : Chamise Chaparral
- Riparian Forest
  - 22a : Fremont Cottonwood Forest
  - 27 : Black Willow Thicket–Fremont Cottonwood Forest
- Riparian Scrub
  - 22b : Fremont Cottonwood Forest
  - 30 : Mulefat Thicket
- Riparian Invasive
  - 41 : Mulefat Thicket–Giant Reed Break
- Ornamental Plantings
  - 46 : Non-native Planting
- Other Landcover
  - 50 : Disturbed
  - 51 : Developed/Ornamental

500 250 0 500 Feet

N W E S

Aerial Source: LAR-IAC 2014

Biological Resources Exhibit 1f

Big Tujunga Dam Operation and Maintenance Plan Project

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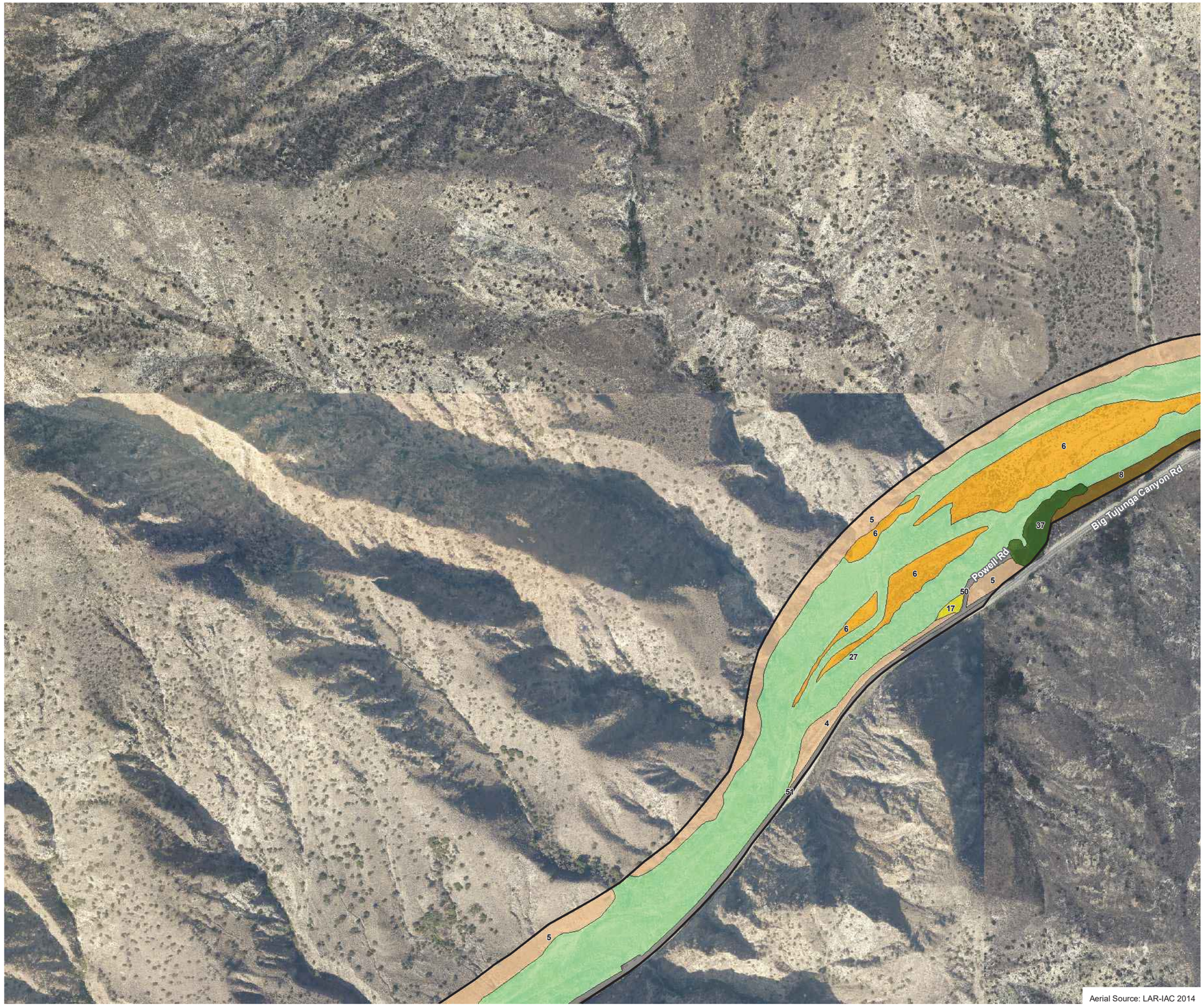

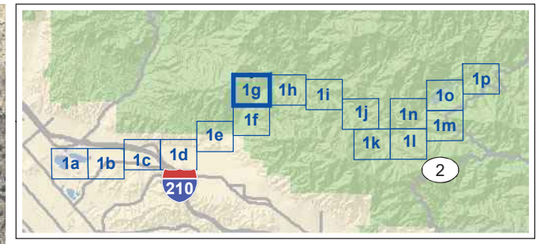

Action Area

Sage Scrub
- 4 : California Sagebrush–California Buckwheat Scrub
- 5 : Laurel Sumac Scrub

Alluvial Scrub
- 6 : Scale Broom Scrub

Chaparral
- 8 : Chamise Chaparral

Ruderal
- 17 : Tree Tobacco Patch

Riparian Forest
- 27 : Black Willow Thicket–Fremont Cottonwood Forest

Forest/Woodland
- 37 : Coast Live Oak Woodland

Other Landcover
- 50 : Disturbed
- 51 : Developed/Ornamental

500 250 0 500 Feet

N W E S

Aerial Source: LAR-IAC 2014

Biological Resources Exhibit 1g

Big Tujunga Dam Operation and Maintenance Plan Project

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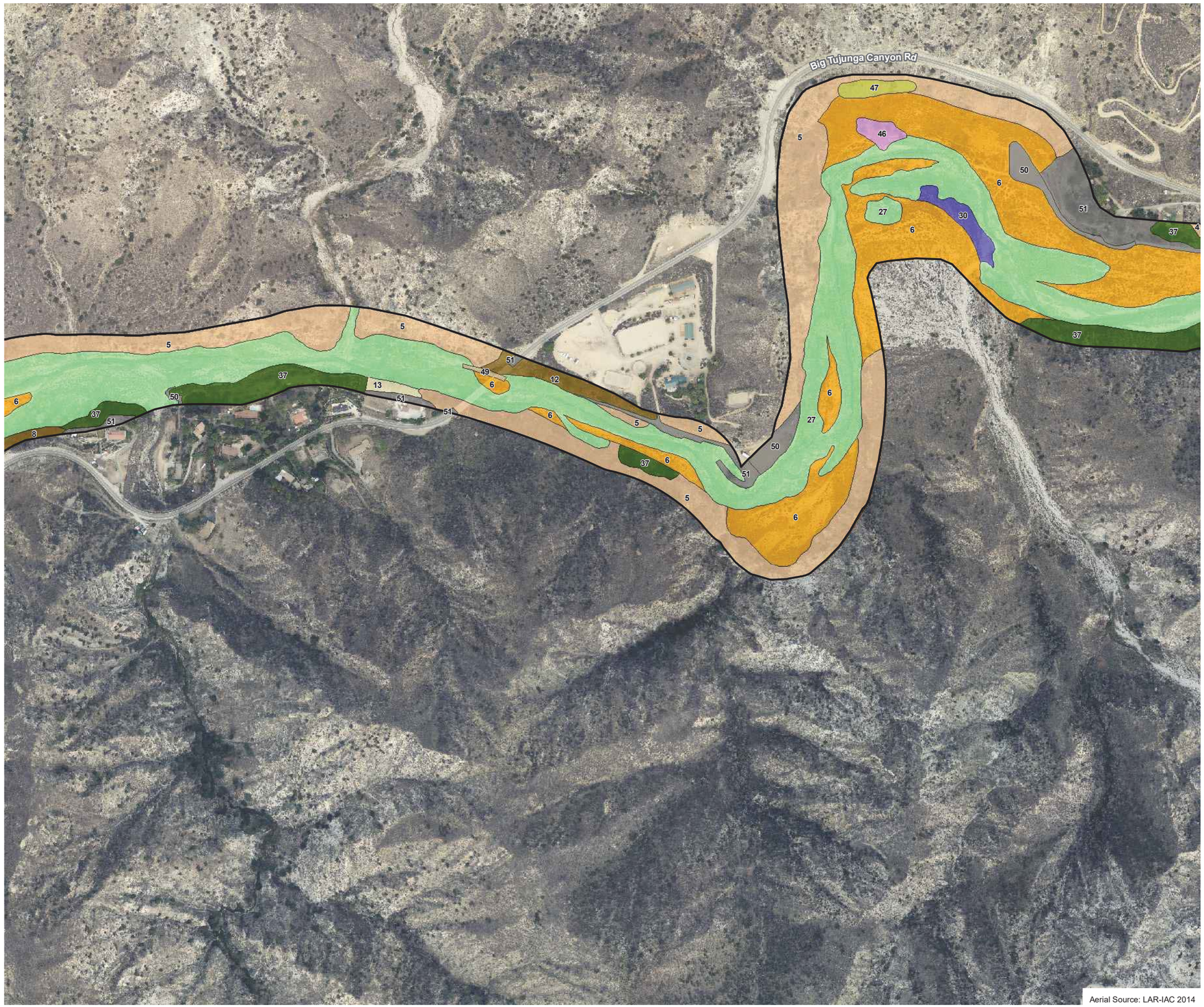

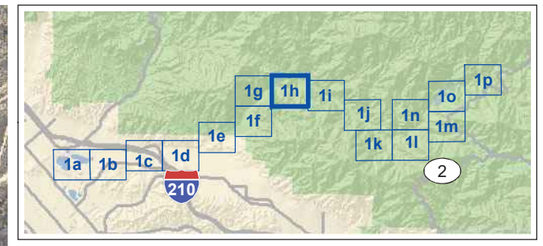

- Action Area
- Sage Scrub
  - 4 : California Sagebrush–California Buckwheat Scrub
  - 5 : Laurel Sumac Scrub
- Alluvial Scrub
  - 6 : Scale Broom Scrub
- Chaparral
  - 8 : Chamise Chaparral
  - 12 : Birch Leaf Mountain Mahogany Chaparral
- Grassland
  - 13 : Annual Brome Grassland
- Riparian Forest
  - 27 : Black Willow Thicket–Fremont Cottonwood Forest
- Riparian Scrub
  - 30 : Mulefat Thicket
- Forest/Woodland
  - 37 : Coast Live Oak Woodland
- Ornamental Plantings
  - 46 : Non-native Planting
- Cliff/Rock
  - 47 : Cliff
- Alluvium
  - 49 : Dry Wash
- Other Landcover
  - 50 : Disturbed
  - 51 : Developed/Ornamental

500 250 0 500 Feet

N W E S

Aerial Source: LAR-IAC 2014

Biological Resources Exhibit 1h

Big Tujunga Dam Operation and Maintenance Plan Project

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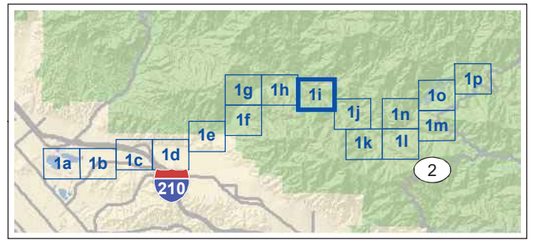

- Action Area
- Sage Scrub
  - 4 : California Sagebrush–California Buckwheat Scrub
  - 5 : Laurel Sumac Scrub
- Alluvial Scrub
  - 6 : Scale Broom Scrub
- Chaparral
  - 7 : Thick Leaf Yerba Santa Scrub
- Grassland
  - 13 : Annual Brome Grassland
- Riparian Forest
  - 27 : Black Willow Thicket–Fremont Cottonwood Forest
- Riparian Scrub
  - 30 : Mulefat Thicket
- Forest/Woodland
  - 37 : Coast Live Oak Woodland
- Riparian Invasive
  - 42 : Giant Reed Break
- Ornamental Plantings
  - 46 : Non-native Planting
- Other Landcover
  - 50 : Disturbed
  - 51 : Developed/Ornamental

500 250 0 500 Feet

N W E S

Biological Resources Exhibit 1i

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS

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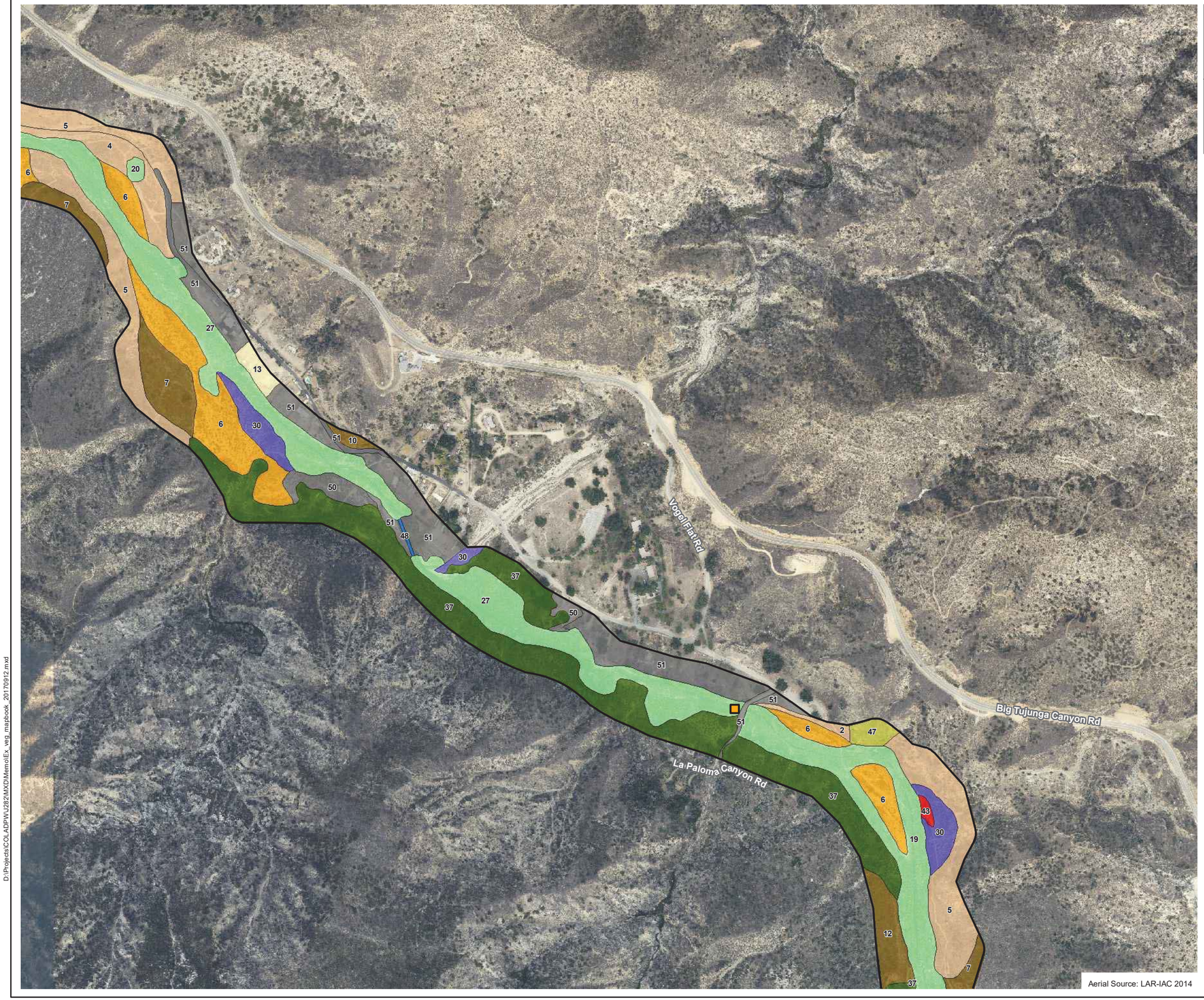

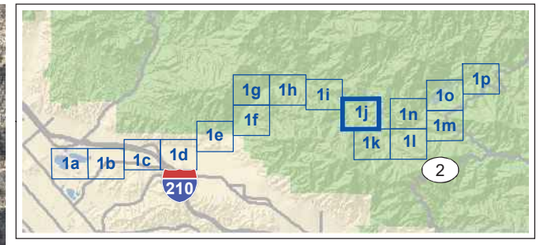

- Action Area
- arroyo chub (1 on page)
- Sage Scrub
  - 2 : California Buckwheat Scrub
  - 4 : California Sagebrush–California Buckwheat Scrub
  - 5 : Laurel Sumac Scrub
- Alluvial Scrub
  - 6 : Scale Broom Scrub
- Chaparral
  - 7 : Thick Leaf Yerba Santa Scrub
  - 10 : Scrub Oak Chaparral
  - 12 : Birch Leaf Mountain Mahogany Chaparral
- Grassland
  - 13 : Annual Brome Grassland
- Riparian Forest
  - 19 : White Alder Grove–Willow Thicket
  - 20 : California Sycamore Woodland–Fremont Cottonwood Forest
  - 27 : Black Willow Thicket–Fremont Cottonwood Forest
- Riparian Scrub
  - 30 : Mulefat Thicket
- Forest/Woodland
  - 37 : Coast Live Oak Woodland
- Riparian Invasive
  - 43 : Broom Patch
- Cliff/Rock
  - 47 : Cliff
- Open Water
  - 48 : Open Water
- Other Landcover
  - 50 : Disturbed
  - 51 : Developed/Ornamental

500 250 0 500 Feet

N W E S

Aerial Source: LAR-IAC 2014

Biological Resources Exhibit 1j

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS

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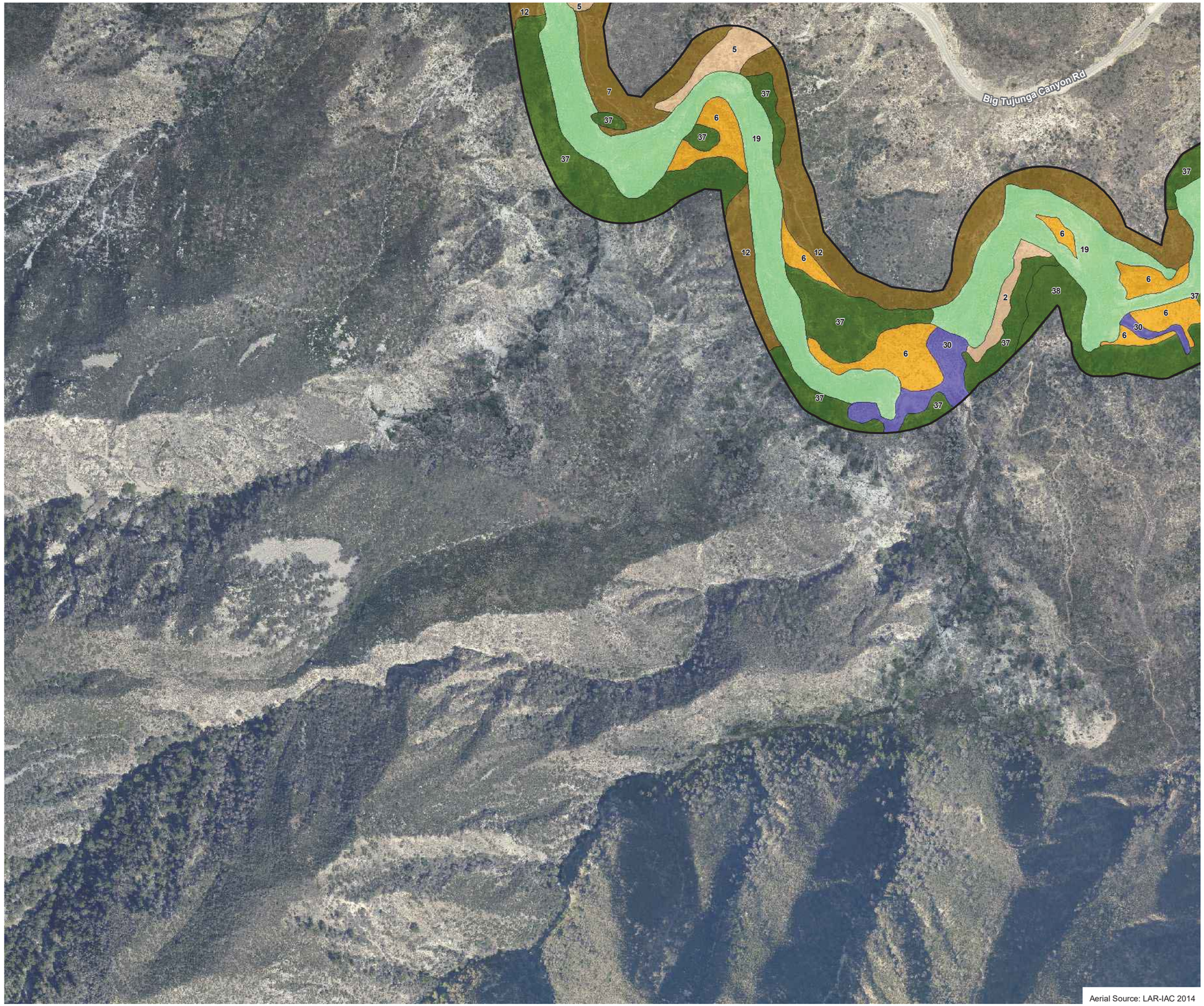

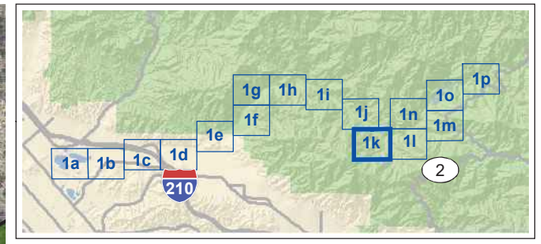

Action Area

Sage Scrub
- 2 : California Buckwheat Scrub
- 5 : Laurel Sumac Scrub

Alluvial Scrub
- 6 : Scale Broom Scrub

Chaparral
- 7 : Thick Leaf Yerba Santa Scrub
- 12 : Birch Leaf Mountain Mahogany Chaparral

Riparian Forest
- 19 : White Alder Grove–Willow Thicket

Riparian Scrub
- 30 : Mulefat Thicket

Forest/Woodland
- 37 : Coast Live Oak Woodland
- 38 : Bigcone Douglas Fir–Canyon Live Oak Forest

500 250 0 500 Feet

N W E S

Aerial Source: LAR-IAC 2014

Biological Resources Exhibit 1k

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS

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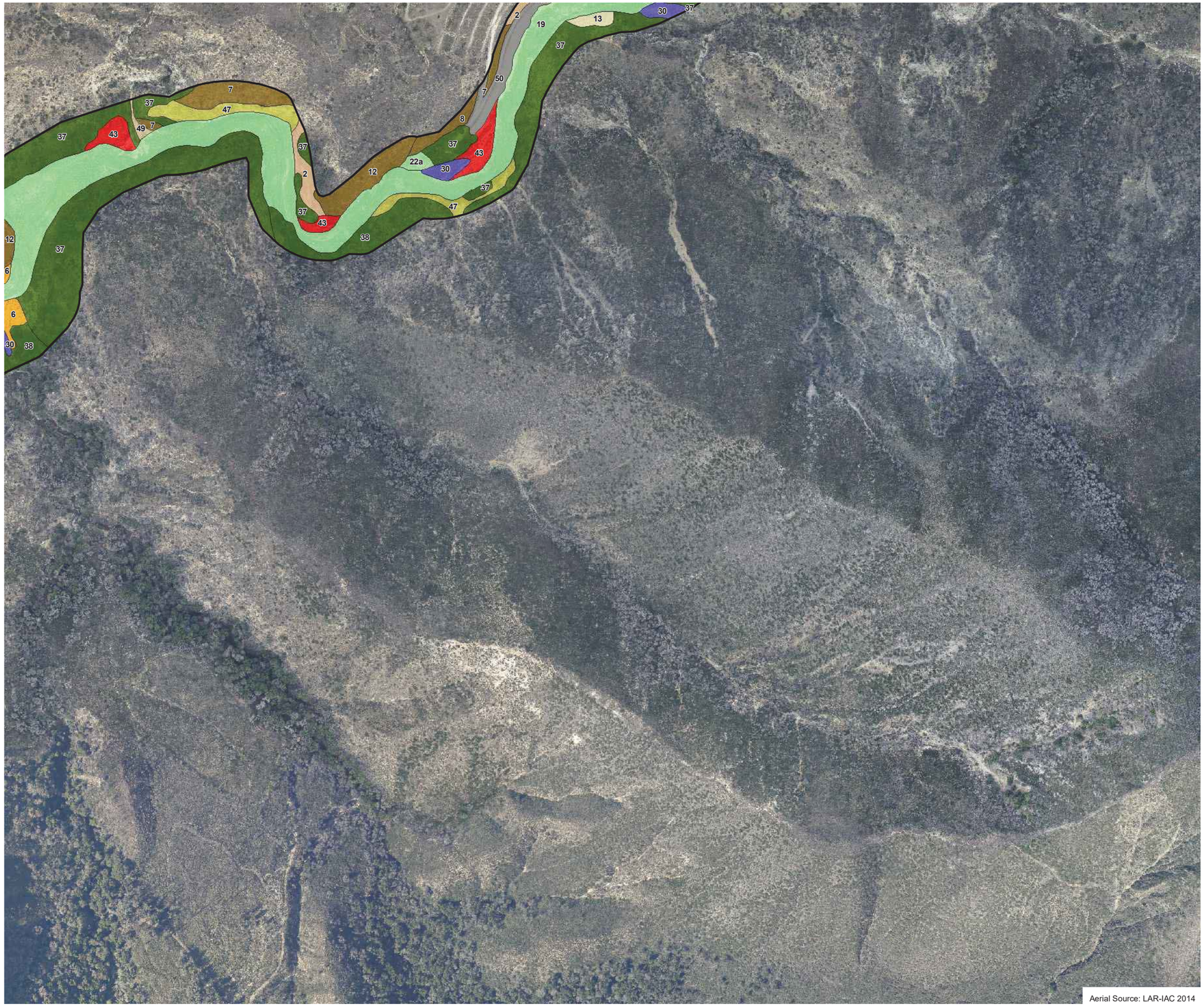

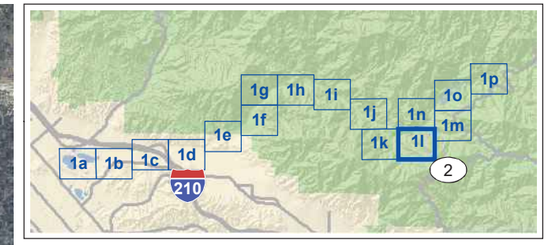

- Action Area
- Sage Scrub
  - 2 : California Buckwheat Scrub
- Alluvial Scrub
  - 6 : Scale Broom Scrub
- Chaparral
  - 7 : Thick Leaf Yerba Santa Scrub
  - 8 : Chamise Chaparral
  - 12 : Birch Leaf Mountain Mahogany Chaparral
- Grassland
  - 13 : Annual Brome Grassland
- Riparian Forest
  - 19 : White Alder Grove–Willow Thicket
  - 22a : Fremont Cottonwood Forest
- Riparian Scrub
  - 30 : Mulefat Thicket
- Forest/Woodland
  - 37 : Coast Live Oak Woodland
  - 38 : Bigcone Douglas Fir–Canyon Live Oak Forest
- Riparian Invasive
  - 43 : Broom Patch
- Cliff/Rock
  - 47 : Cliff
- Alluvium
  - 49 : Dry Wash
- Other Landcover
  - 50 : Disturbed

500 250 0 500 Feet

N W E S

Aerial Source: LAR-IAC 2014

Biological Resources Exhibit 1l

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS

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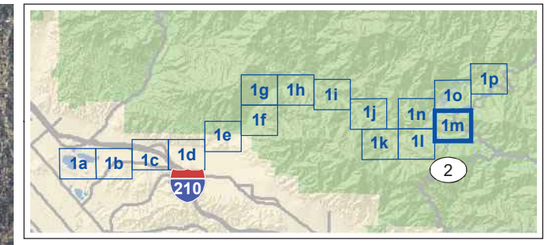

- Action Area
- Sage Scrub
  - 2 : California Buckwheat Scrub
  - 5 : Laurel Sumac Scrub
- Chaparral
  - 7 : Thick Leaf Yerba Santa Scrub
  - 8 : Chamise Chaparral
  - 10 : Scrub Oak Chaparral
- Grassland
  - 13 : Annual Brome Grassland
- Forest/Woodland
  - 37 : Coast Live Oak Woodland
  - 39 : California Sycamore Woodland
- Ornamental Plantings
  - 45 : Native Planting
  - 46 : Non-native Planting
- Cliff/Rock
  - 47 : Cliff
- Other Landcover
  - 51 : Developed/Ornamental

500 250 0 500 Feet

N W E S

Biological Resources Exhibit 1m

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS

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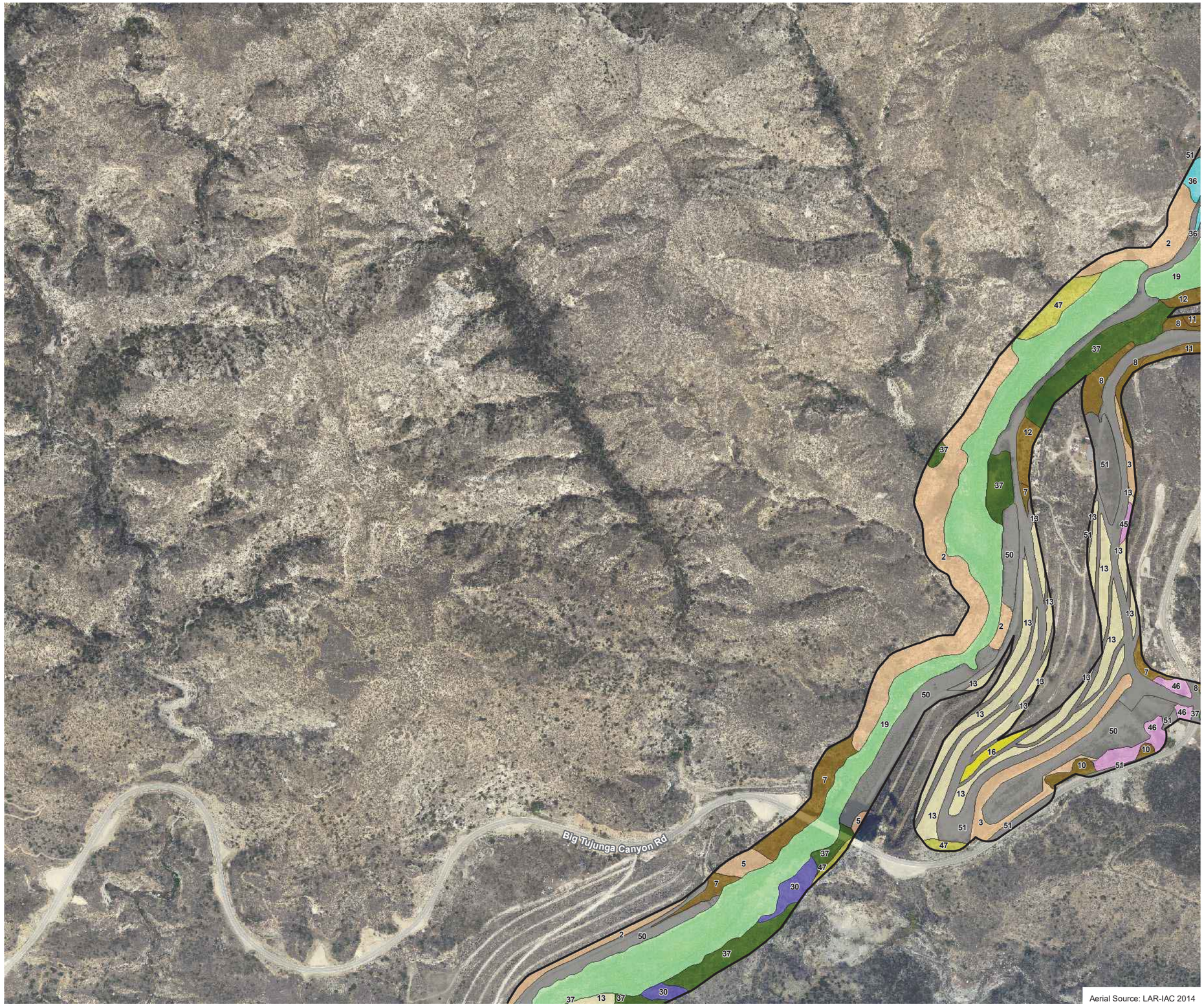

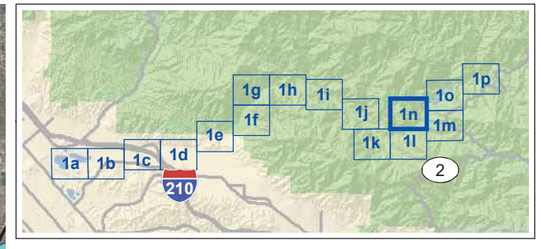

- Action Area
- Sage Scrub
  - 2 : California Buckwheat Scrub
  - 3 : Disturbed California Buckwheat Scrub
  - 5 : Laurel Sumac Scrub
- Chaparral
  - 7 : Thick Leaf Yerba Santa Scrub
  - 8 : Chamise Chaparral
  - 10 : Scrub Oak Chaparral
  - 11 : Hoary Leaf Ceanothus Chaparral
  - 12 : Birch Leaf Mountain Mahogany Chaparral
- Grassland
  - 13 : Annual Brome Grassland
- Ruderal
  - 16 : Russian Thistle Field
- Riparian Forest
  - 19 : White Alder Grove–Willow Thicket
- Riparian Scrub
  - 30 : Mulefat Thicket
- Seep
  - 36 : Disturbed Freshwater Seep
- Forest/Woodland
  - 37 : Coast Live Oak Woodland
- Ornamental Plantings
  - 45 : Native Planting
  - 46 : Non-native Planting
- Cliff/Rock
  - 47 : Cliff
- Other Landcover
  - 50 : Disturbed
  - 51 : Developed/Ornamental

500 250 0 500 Feet

N W E S

Aerial Source: LAR-IAC 2014

Biological Resources Exhibit 1n

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS

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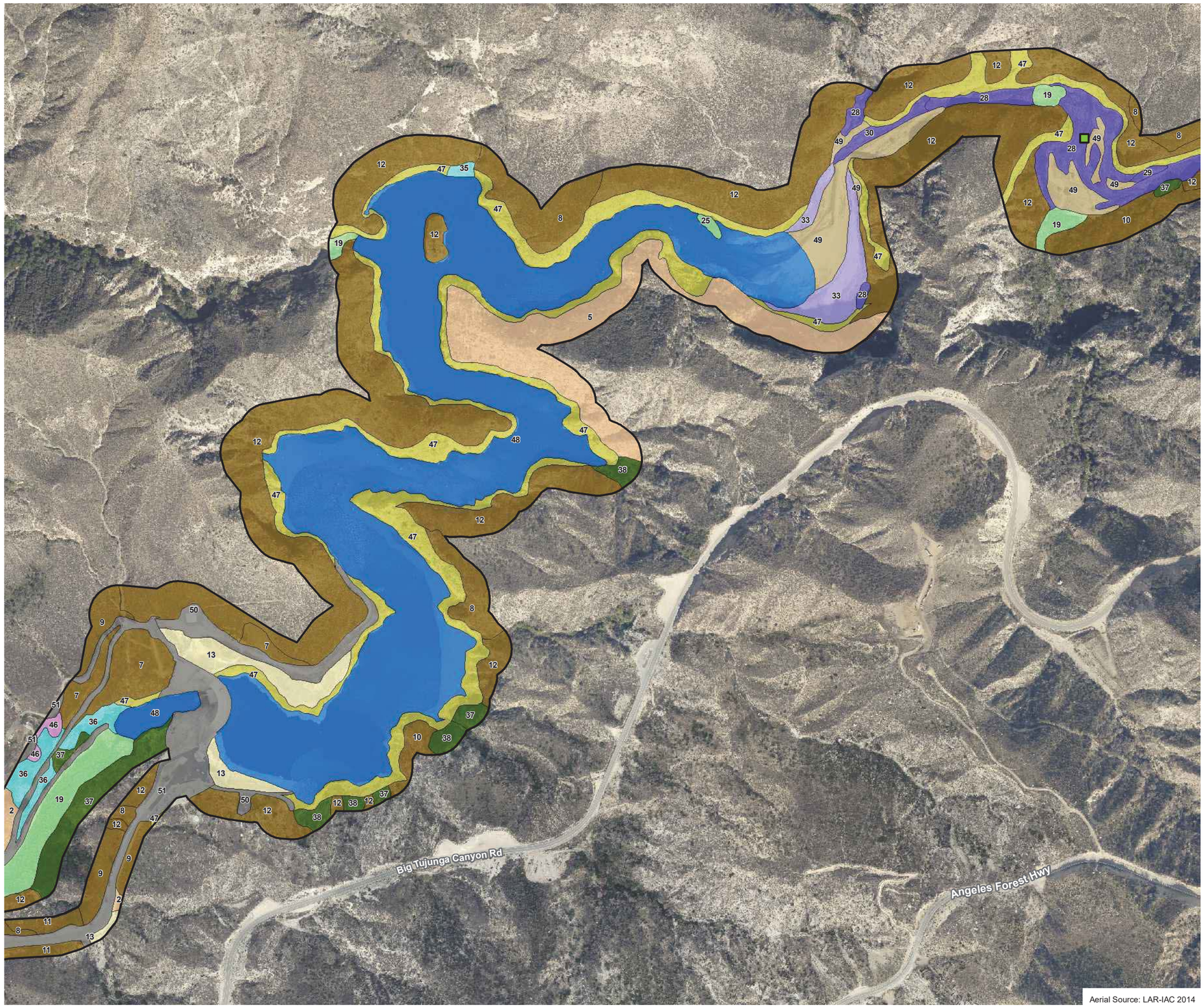

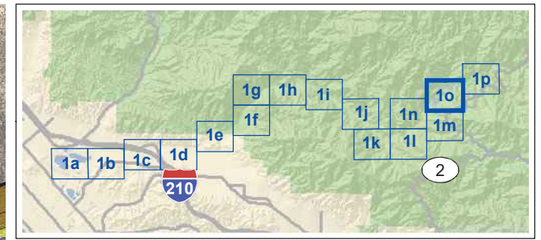

Action Area

least Bell's vireo (1 on page)

Sage Scrub
- 2 : California Buckwheat Scrub
- 5 : Laurel Sumac Scrub

Chaparral
- 7 : Thick Leaf Yerba Santa Scrub
- 8 : Chamise Chaparral
- 9 : Chamise Chaparral–Thick Leaf Yerba Santa Scrub
- 10 : Scrub Oak Chaparral
- 11 : Hoary Leaf Ceanothus Chaparral
- 12 : Birch Leaf Mountain Mahogany Chaparral

Grassland
- 13 : Annual Brome Grassland

Riparian Forest
- 19 : White Alder Grove–Willow Thicket
- 25 : Black Willow Thicket

Riparian Scrub
- 28 : Arroyo Willow Thicket
- 29 : Sandbar Willow Thicket
- 30 : Mulefat Thicket

Riparian Herb
- 33 : Smartweed–Cocklebur Patch

Seep
- 35 : Freshwater Seep
- 36 : Disturbed Freshwater Seep

Forest/Woodland
- 37 : Coast Live Oak Woodland
- 38 : Bigcone Douglas Fir–Canyon Live Oak Forest

Ornamental Plantings
- 46 : Non-native Planting

Cliff/Rock
- 47 : Cliff

Open Water
- 48 : Open Water

Alluvium
- 49 : Dry Wash

Other Landcover
- 50 : Disturbed
- 51 : Developed/Ornamental

500 250 0 500 Feet

N W E S

Aerial Source: LAR-IAC 2014

Biological Resources Exhibit 1o

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS

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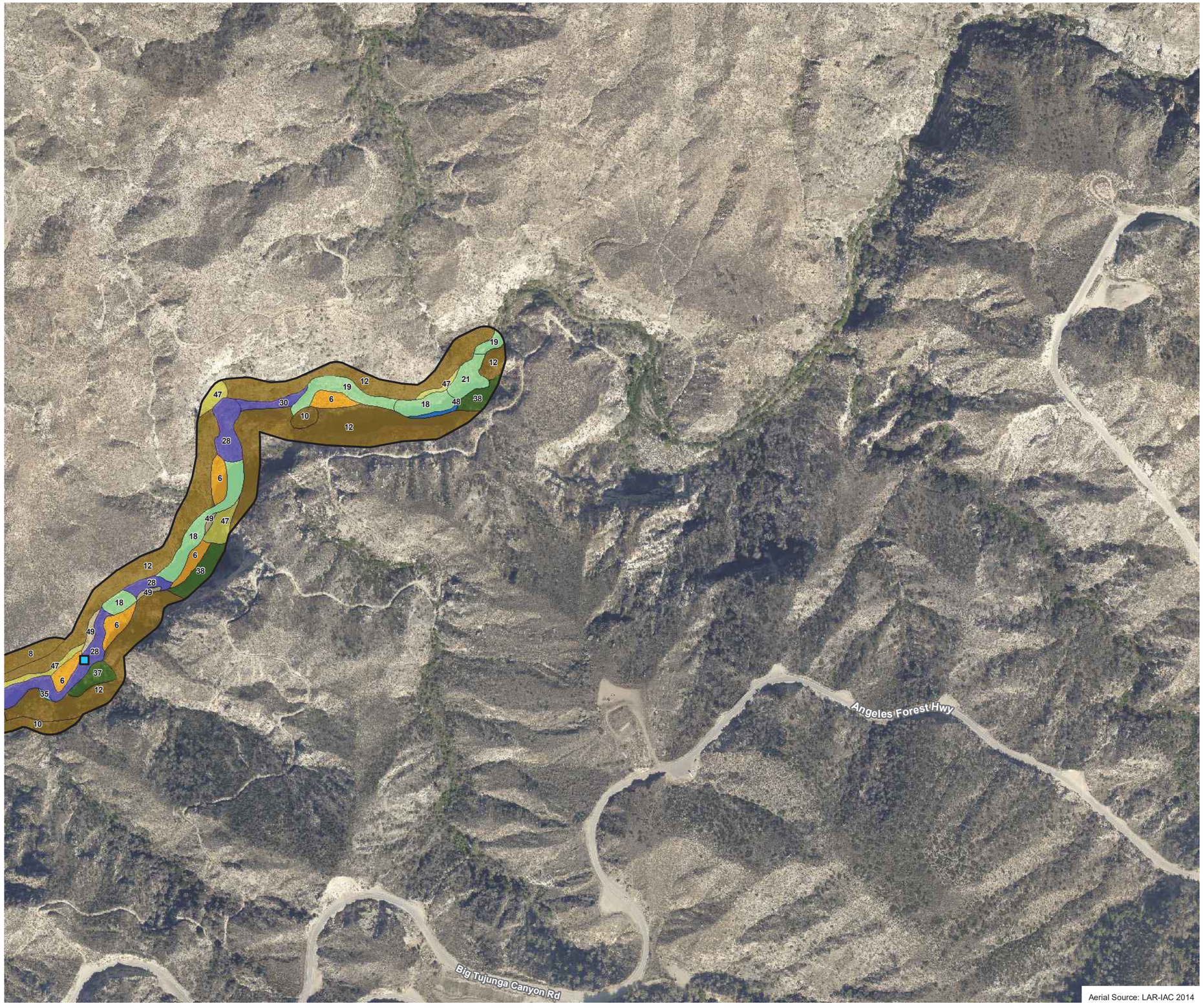

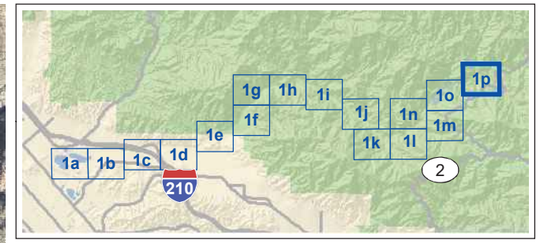

- Action Area
- willow flycatcher (indeterminate subspecies) (1 on page)
- Alluvial Scrub
  - 6 : Scale Broom Scrub
- Chaparral
  - 8 : Chamise Chaparral
  - 10 : Scrub Oak Chaparral
  - 12 : Birch Leaf Mountain Mahogany Chaparral
- Riparian Forest
  - 18 : White Alder Grove–California Sycamore Woodland
  - 19 : White Alder Grove–Willow Thicket
  - 21 : California Sycamore Woodland–Red Willow Thicket
- Riparian Scrub
  - 28 : Arroyo Willow Thicket
  - 30 : Mulefat Thicket
- Seep
  - 35 : Freshwater Seep
- Forest/Woodland
  - 37 : Coast Live Oak Woodland
  - 38 : Bigcone Douglas Fir–Canyon Live Oak Forest
- Cliff/Rock
  - 47 : Cliff
- Open Water
  - 48 : Open Water
- Alluvium
  - 49 : Dry Wash

500 250 0 500 Feet

N W E S

Aerial Source: LAR-IAC 2014

Biological Resources Exhibit 1p

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS

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ATTACHMENT A

REPRESENTATIVE SITE PHOTOGRAPHS



Photo 1 - California sagebrush scrub at the edge of the Hansen Dam spreading grounds.



Photo 2 - California buckwheat scrub adjacent to Big Tujunga Creek.

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Representative Photographs

Attachment A-1

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS



Photo 3 - Disturbed California buckwheat scrub along access road below Big Tujunga Dam.



Photo 4 - California sagebrush–California buckwheat scrub at the edge of the Hansen Dam spreading grounds.

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Representative Photographs

Attachment A-2

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS



Photo 5 - Laurel sumac scrub at the edge of the Hansen Dam spreading grounds.



Photo 6 - Thick leaf yerba santa scrub adjacent to Big Tujunga Creek.

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Representative Photographs

Attachment A-3

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS



Photo 7 - Chamise chaparral (center) adjacent to Big Tujunga Creek.



Photo 8 - Chamise chaparral–thick leaf yerba santa scrub on slopes above Big Tujunga Reservoir.

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Representative Photographs

Attachment A-4

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS



Photo 9 - Scrub oak chaparral on slopes of Maple Canyon.



Photo 10 - Hoary leaf ceanothus chaparral along access road below Big Tujunga Dam.

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Photo 11 - Birch leaf mountain mahogany chaparral on canyon walls above Big Tujunga Creek.



Photo 12 - Upland mustards (foreground) at the edge of the Hansen Dam spreading grounds.

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Photo 13 - Broom patch adjacent to Big Tujunga Creek.



Photo 14 - White alder grove–California sycamore woodland in upper Big Tujunga Creek.

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Representative Photographs

Attachment A-7

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS



Photo 15 - White alder grove–willow thicket in Big Tujunga Creek.



Photo 16 - Representative understory of white alder grove–willow thicket.

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Representative Photographs

Attachment A-8

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS



Photo 17 - California sycamore woodland (background) adjacent to Big Tujunga Creek.



Photo 18 - California sycamore woodland–Fremont cottonwood forest adjacent to Big Tujunga Creek.

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Photo 19 - Fremont cottonwood forest in lower Big Tujunga Creek.



Photo 20 - Black willow thicket (background) and annual brome grassland (foreground) at the Hansen Dam spreading grounds.

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Photo 21 - Disturbed black willow thicket (background) and Russian thistle field (foreground) at the Hansen Dam spreading grounds.



Photo 22 - Sandbar willow thicket in upper Big Tujunga Creek.

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Representative Photographs

Attachment A-11

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS



Photo 23 - Mulefat thicket in active floodplain of Big Tujunga Creek.



Photo 24 - Disturbed mulefat thicket in the Hansen Dam spreading grounds.

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Photo 25 - Mulefat thicket–giant reed break in Big Tujunga Creek.



Photo 26 - Scale broom scrub on the high terraces above Big Tujunga Creek.

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Representative Photographs

Attachment A-13

Big Tujunga Dam Operation and Maintenance Plan Project

PSOMAS



Photo 27 - Golden current thicket in the Hansen Dam spreading grounds.



Photo 28 - Cattail marsh in the Hansen Dam spreading grounds.

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Photo 29 - Disturbed freshwater seep along access road below Big Tujunga Dam.



Photo 30 - Coast live oak woodland adjacent to Big Tujunga Creek.

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Photo 31 - Bigcone Douglas fir–canyon live oak forest adjacent to upper Big Tujunga Creek.



Photo 32 - Native planting of Fremont cottonwood (background), annual brome grassland (left), and disturbed trail (center) adjacent to the Hansen Dam spreading grounds.

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Photo 33 - Non-native planting of pepper tree.



Photo 34 - Cliff above Big Tujunga Reservoir.

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Photo 35 - Open water in the Hansen Dam spreading grounds.



Photo 36 - Dry wash in the Hansen Dam spreading grounds.

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ATTACHMENT B

SPECIES OBSERVED DURING THE SURVEY EFFORT

TABLE B-1
PLANT SPECIES OBSERVED DURING THE 2017 SURVEY

Species		Special Status
Scientific Name	**Common Name**	
FERNS		
PTERIDACEAE – BRAKE FAMILY		
Adiantum jordanii	California maidenhair	
GYMNOSPERMS		
PINACEAE – PINE FAMILY		
*Pinus canariensis**	Canary Island pine	
Pinus coulteri	Coulter pine	
EUDICOTS		
ADOXACEAE – MUSKROOT FAMILY		
Sambucus nigra ssp. *caerulea*	blue elderberry	
ANACARDIACEAE – SUMAC FAMILY		
Malosma laurina	laurel sumac	
Rhus ovata	sugar bush	
*Schinus molle**	pepper tree	
Toxicodendron diversilobum	western poison oak	
APIACEAE – CARROT FAMILY		
*Foeniculum vulgare**	fennel	
APOCYNACEAE – DOGBANE FAMILY		
*Nerium oleander**	common oleander	
ASTERACEAE – SUNFLOWER FAMILY		
*Ageratina adenophora**	crofton weed	
Ambrosia acanthicarpa	annual bur-sage	
Artemisia californica	California sagebrush	
Artemisia douglasiana	mugwort	
Baccharis pilularis ssp. *consanguinea*	coyote brush	
Baccharis salicifolia ssp. *salicifolia*	mule fat	
Brickellia californica	California brickellbush	
Carduus pycnocephalus ssp. *pycnocephalus**	Italian thistle	
*Centaurea melitensis**	Maltese star-thistle	
Corethrogyne filaginifolia	filago-leaved sand-aster	
Eclipta prostrata	false daisy	
Erigeron canadensis	horseweed	
Helianthus annuus	annual sunflower	
Heterotheca grandiflora	telegraph weed	
Heterotheca sessiliflora	sessileflower goldenaster	
Lepidospartum squamatum	scaly scale-broom	
Lessingia glandulifera	glandular lessingia	
Tetradymia comosa	tufted cottonthorn	
Xanthium strumarium	cocklebur	
BETULACEAE – BIRCH FAMILY		
Alnus rhombifolia	white alder	
BIGNONIACEAE – BIGNONIA FAMILY		
*Jacaranda mimosifolia**	blue jacaranda	

TABLE B-1
PLANT SPECIES OBSERVED DURING THE 2017 SURVEY

Species		Special Status
Scientific Name	**Common Name**	
BORAGINACEAE – BORAGE FAMILY		
Eriodictyon crassifolium var. *crassifolium*	thick-leaved yerba santa	
Phacelia ramosissima	branching phacelia	
BRASSICACEAE – MUSTARD FAMILY		
*Hirschfeldia incana**	grayish shortpod mustard	
Nasturtium officinale	water cress	
CACTACEAE – CACTUS FAMILY		
Cylindropuntia californica var. *parkeri*	cane cholla	
Opuntia littoralis	seaside prickly-pear	
CHENOPODIACEAE – GOOSEFOOT FAMILY		
*Salsola tragus**	Russian thistle	
CUCURBITACEAE – GOURD FAMILY		
Marah macrocarpa	chilicothe	
ERICACEAE – HEATH FAMILY		
Arctostaphylos glauca	big berry manzanita	
EUPHORBIACEAE – SPURGE FAMILY		
Croton californicus	California croton	
*Ricinus communis**	common castor bean	
FABACEAE – LEGUME FAMILY		
Acmispon glaber	deerweed	
Cercis occidentalis	western redbud	
*Cytisus multiflorus**	Spanish broom	
*Melilotus albus**	white sweetclover	
FAGACEAE – OAK FAMILY		
Quercus agrifolia	coast live oak	
Quercus berberidifolia	scrub oak	
Quercus chrysolepis	canyon live oak	
Quercus durata var. *gabrielensis*	San Gabriel oak	CRPR 4.2
GERANIACEAE – GERANIUM FAMILY		
Erodium sp.	filaree	
GROSSULARIACEAE – GOOSEBERRY FAMILY		
Ribes aureum	golden currant	
LAMIACEAE – MINT FAMILY		
*Marrubium vulgare**	common horehound	
Salvia apiana	white sage	
Salvia mellifera	black sage	
MYRTACEAE – MYRTLE FAMILY		
*Eucalyptus sp.**	gum tree	
OLEACEAE – OLIVE FAMILY		
*Olea europaea**	European olive	
ONAGRACEAE – EVENING PRIMROSE FAMILY		
*Ludwigia peploides**	peplis-like false loosestrife	
Oenothera elata	tall evening primrose	

TABLE B-1
PLANT SPECIES OBSERVED DURING THE 2017 SURVEY

Species		Special Status
Scientific Name	**Common Name**	
PAPAVERACEAE – POPPY FAMILY		
Dendromecon rigida	bush poppy	
Ehrendorferia chrysantha	golden eardrops	
Eschscholzia californica	California poppy	
Romneya coulteri	Coulter's matilija poppy	CRPR 4.2
PHRYMACEAE – LOPSEED FAMILY		
Mimulus aurantiacus	orange monkeyflower	
Mimulus cardinalis	red monkeyflower	
Mimulus guttatus	red-dotted monkeyflower	
Mimulus pilosus	downy monkey flower	
PLANTAGINACEAE – PLANTAIN FAMILY		
Keckiella cordifolia	heart-leaved bush penstemon	
PLATANACEAE – SYCAMORE FAMILY		
Platanus racemosa	western sycamore	
POLYGONACEAE – BUCKWHEAT FAMILY		
Eriogonum fasciculatum	California buckwheat	
RANUNCULACEAE – BUTTERCUP FAMILY		
Clematis lasiantha	chaparral clematis	
RHAMNACEAE – BUCKTHORN FAMILY		
Ceanothus crassifolius	hoaryleaf ceanothus	
Ceanothus leucodermis	chaparral whitethorn	
Ceanothus oliganthus	few-flowered California-lilac	
Rhamnus ilicifolia	hollyleaf redberry	
ROSACEAE – ROSE FAMILY		
Adenostoma fasciculatum	chamise	
Cercocarpus betuloides	birch-leaf mountain-mahogany	
Prunus ilicifolia	holly-leaved cherry	
Prunus ilicifolia ssp. *ilicifolia*	holly-leaved cherry	
Rubus ursinus	California blackberry	
SALICACEAE – WILLOW FAMILY		
Populus fremontii ssp. *fremontii*	Fremont cottonwood	
Salix exigua var. hindsiana	Hinds' willow	
Salix gooddingii	Goodding's black willow	
Salix laevigata	red willow	
Salix lasiandra var. *lasiandra*	Pacific willow	
Salix lasiolepis	arroyo willow	
SIMAROUBACEAE – SIMAROUBA FAMILY		
*Ailanthus altissima**	tree of heaven	
SOLANACEAE – NIGHTSHADE FAMILY		
Datura wrightii	Wright's jimsonweed	
*Nicotiana glauca**	tree tobacco	
TAMARICACEAE – TAMARISK FAMILY		
*Tamarix ramosissima**	saltcedar	

TABLE B-1
PLANT SPECIES OBSERVED DURING THE 2017 SURVEY

Species		Special Status
Scientific Name	**Common Name**	
ULMACEAE – ELM FAMILY		
*Ulmus parvifolia**	Chinese elm	
URTICACEAE – NETTLE FAMILY		
Urtica dioica ssp. *holosericea*	hoary nettle	
MONOCOTS		
AGAVACEAE – AGAVE FAMILY		
Hesperoyucca whipplei	Whipple's chaparral yucca	
ARECACEAE – PALM FAMILY		
*Washingtonia robusta**	Mexican fan palm	
CYPERACEAE – SEDGE FAMILY		
Cyperus eragrostis	lovegrass flatsedge	
Cyperus sp.	flatsedge	
JUNCACEAE – RUSH FAMILY		
Juncus macrophyllus	long-leaved rush	
ORCHIDACEAE – ORCHID FAMILY		
Epipactis gigantea	stream orchid	
POACEAE – GRASS FAMILY		
Agrostis sp.	bentgrass	
*Arundo donax**	giant reed	
Avena sp.*	oat	
*Bromus diandrus**	ripgut grass	
Bromus madritensis ssp. *rubens**	red brome	
*Echinochloa crus-galli**	cock's spur barnyard grass	
*Festuca myuros**	rattail sixweeks grass	
*Pennisetum setaceum**	crimson fountain grass	
*Schismus barbatus**	barbed Mediterranean grass	
TYPHACEAE – CATTAIL FAMILY		
Typha domingensis	southern cattail	

CRPR: California Rare Plant Rank

* non-native species

Species Status:

CRPR

4 Plants of limited distribution - watch list

CRPR Threat Code Extension

.2 Moderately threatened in California (20–80% of occurrences threatened; moderate degree and immediacy of threat)

TABLE B-2
WILDLIFE SPECIES OBSERVED DURING THE 2017 SURVEY

Species		Special Status
Scientific Name	**Common Name**	
FISH		
CYPRINIDAE - MINNOW FAMILY		
Gila orcutti	arroyo chub	SSC
*Pimephales promelas**	fathead minnow	
LIZARDS		
PHRYNOSOMATIDAE - SPINY LIZARD FAMILY		
Sceloporus occidentalis	western fence lizard	
Uta stansburiana	common side-blotched lizard	
TEIIDAE - WHIPTAIL LIZARD FAMILY		
Aspidoscelis tigris stejnegeri	coastal whiptail	
BIRDS		
ANATIDAE - SWAN, GOOSE, AND DUCK FAMILY		
Branta canadensis	Canada goose	
Anas platyrhynchos	mallard	
ODONTOPHORIDAE - NEW WORLD QUAIL FAMILY		
Callipepla californica	California quail	
COLUMBIDAE - PIGEON AND DOVE FAMILY		
*Columba livia**	rock pigeon	
Zenaida macroura	mourning dove	
APODIDAE - SWIFT FAMILY		
Aeronautes saxatalis	white-throated swift	
TROCHILIDAE - HUMMINGBIRD FAMILY		
Calypte anna	Anna's hummingbird	
Selasphorus sasin	Allen's hummingbird	
RALLIDAE - RAIL AND COOT FAMILY		
Fulica americana	American coot	
SCOLOPACIDAE - SANDPIPER FAMILY		
Actitis macularius	spotted sandpiper	
ARDEIDAE - HERON FAMILY		
Ardea herodias	great blue heron	
Ardea alba	great egret	
CATHARTIDAE - NEW WORLD VULTURE FAMILY		
Cathartes aura	turkey vulture	
ACCIPITRIDAE - HAWK FAMILY		
Buteo lineatus	red-shouldered hawk	
PICIDAE - WOODPECKER FAMILY		
Melanerpes formicivorus	acorn woodpecker	
Picoides nuttallii	Nuttall's woodpecker	
Colaptes auratus	northern flicker	
FALCONIDAE - FALCON FAMILY		
Falco peregrinus	peregrine falcon	FP (delisted)
TYRANNIDAE - TYRANT FLYCATCHER FAMILY		
Empidonax traillii	willow flycatcher	SE

TABLE B-2
WILDLIFE SPECIES OBSERVED DURING THE 2017 SURVEY

Species		Special Status
Scientific Name	**Common Name**	
Empidonax difficilis	Pacific-slope flycatcher	
Sayornis nigricans	black phoebe	
Myiarchus cinerascens	ash-throated flycatcher	
VIREONIDAE - VIREO FAMILY		
Vireo bellii pusillus	least Bell's vireo	FE, SE
CORVIDAE - JAY AND CROW FAMILY		
Aphelocoma californica	California scrub-jay	
Corvus brachyrhynchos	American crow	
Corvus corax	common raven	
HIRUNDINIDAE - SWALLOW FAMILY		
Hirundo rustica	barn swallow	
AEGITHALIDAE - BUSHTIT FAMILY		
Psaltriparus minimus	bushtit	
TROGLODYTIDAE - WREN FAMILY		
Salpinctes obsoletus	rock wren	
Catherpes mexicanus	canyon wren	
Troglodytes aedon	house wren	
Thryomanes bewickii	Bewick's wren	
POLIOPTILIDAE - GNATCATCHER FAMILY		
Polioptila caerulea	blue-gray gnatcatcher	
MIMIDAE - MOCKINGBIRD AND THRASHER FAMILY		
Mimus polyglottos	northern mockingbird	
STURNIDAE - STARLING FAMILY		
*Sturnus vulgaris**	European starling*	
FRINGILLIDAE - FINCH FAMILY		
Haemorhous mexicanus	house finch	
Spinus psaltria	lesser goldfinch	
PARULIDAE - WOOD-WARBLER FAMILY		
Setophaga petechia	yellow warbler	SSC
EMBERIZIDAE - SPARROW FAMILY		
Pipilo maculatus	spotted towhee	
Melozone crissalis	California towhee	
Melospiza melodia	song sparrow	
ICTERIDAE - BLACKBIRDS AND ORIOLES		
Quiscalus mexicanus	great-tailed grackle	
MAMMALS		
DIDELPHIDAE - AMERICAN OPPOSSUM FAMILY		
Didelphia virginiana	Virginia opossum (tracks)	
SCIURIDAE - SQUIRREL FAMILY		
Otospermophilus beecheyi	California ground squirrel	
LEPORIDAE - HARE AND RABBIT FAMILY		
Sylvilagus audubonii	desert cottontail	

TABLE B-2
WILDLIFE SPECIES OBSERVED DURING THE 2017 SURVEY

Species		Special Status
Scientific Name	**Common Name**	
FELIDAE - CAT FAMILY		
Lynx rufus	bobcat	
CANIDAE - CANID FAMILY		
Canis latrans	coyote (tracks and scat)	
Urocyon cinereoargenteus	common gray fox (tracks)	
URSIDAE - BEAR FAMILY		
*Ursus americanus**	black bear (tracks and scat)	
PROCYONIDAE - PROCYONID FAMILY		
Procyon lotor	northern raccoon (tracks)	
CERVIDAE - CERVID FAMILY		
Odocoileus hemionus	southern mule deer	

* non-native species

Species Status:

Federal (USFWS)	**State (CDFW)**
FE Endangered	SE Endangered
	FP Fully Protected
	SSC Species of Special Concern

ATTACHMENT C

CNDDB FORMS

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/22/2017

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Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Vireo bellii pusillus*

Common Name: least Bell's vireo

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 8 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Lindsay Messett
Address: 3 Hutton Centre Dr. Suite 200, Santa Ana, CA 92707
E-mail Address: lindsay.messett@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

8 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description *(please attach map AND/OR fill out your choice of coordinates, below)*

See attached spreadsheet

County: Los Angeles Landowner / Mgr.: Los Angeles County Department of Public Works

Quad Name: San Fernando and Sunland, Condor Peak Elevation: 998 to 2282 feet

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐

Source of Coordinates (GPS, topo. map & type): GPS

GPS Make & Model Garmin Etrex

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐

Horizontal Accuracy +/- 10 feet meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: See attached spreadsheet. The LBV location upstream of resevoir was previously reported with the 2017 arroyo toad focused survey report for Big Tujunga Sediment Removal Project.

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*

Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

7 of the 8 LBV's were observed or detected at Hansen Dam within thick, riparian vegetation. All 7 were singing males on territories. The vegetation communities consisted of black willow thicket and disturbed mulefat thicket. Dominant plant species in this vegetation type were mature Goodding's black willow, western sycamore, Fremont cottonwood, arroyo willow, mule fat, Hinds' willow, and blue elderberry. The 8th LBV was was a singing male which was observed upstream of Big Tujunga Reservoir within riparian scrub vegetation that consisted of arroyo willow thicket, sandbar willow thicket and mulefat thicket vegetation communities. Dominant plant species were arroyo willow, mule fat, red willow, and Goodding's black willow, and Hinds' willow.

Please fill out separate form for other rare taxa seen at this site. yellow warbler,coastal whiptail,arroyo chub,peregrine falcon,willow flycatcher

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: open space, USFS, Big Tujunga Dam

Visible disturbances: Recreation

Threats: non-native species, fire, human presence

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Least Bell’s vireo (LBV)

least Bell’s vireo	3792762	371713
least Bell’s vireo	3792776	371727
least Bell’s vireo	3792838	371909
least Bell’s vireo	3792727	372327
least Bell’s vireo	3792906	372373
least Bell’s vireo	3792096	372509
least Bell’s vireo	3792188	373576
least Bell’s vireo	3796219	392070

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/22/2017

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Aspidoscelis tigris stejnegeri*

Common Name: coastal whiptail

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 2 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Lindsay Messett
Address: 3 Hutton Centre Dr. Suite 200, Santa Ana, CA 92707
E-mail Address: lindsay.messett@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown
2				

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☑ other

Location Description *(please attach map AND/OR fill out your choice of coordinates, below)*

County: Los Angeles Landowner / Mgr.: Los Angeles County Department of Public Works
Quad Name: San Fernando, Condor Peak Elevation: 1018 to 2306 feet
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Etrex
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy +/- 10 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 3792574, 372361
3796257, 392357

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

2 adult coastal whiptails were observed within scalebroom scrub habitat. Dominant plant species in this community included scaly scale-broom, California buckwheat, sessileflower goldenaster, thick-leaved yerba santa, California sagebrush, white sage, Whipple's chaparral yucca, seaside prickly-pear, cane cholla, and mule fat. Multiple areas containing native ants were also observed throughout these areas.

Please fill out separate form for other rare taxa seen at this site. yellow warbler,least Bell's vireo,arroyo chub,peregrine falcon,willow flycatcher

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor
Immediate AND surrounding land use: open space, USFS, Big Tujunga Dam
Visible disturbances: Recreation
Threats: non-native species, fire, human presence
Comments:

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/22/2017

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Setophaga petechia*

Common Name: yellow warbler

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 8 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Lindsay Messett
Address: 3 Hutton Centre Dr. Suite 200, Santa Ana, CA 92707
E-mail Address: lindsay.messett@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

8 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

***Location Description* (please attach map AND/OR fill out your choice of coordinates, below)**

See attached spreadsheet

County: Los Angeles Landowner / Mgr.: Los Angeles County Department of Public Works

Quad Name: San Fernando Elevation: 996 to 1008 feet

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Etrex

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy +/- 10 feet meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: See attached spreadsheet

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

All 8 yellow warblers were observed or detected at Hansen Dam within thick, riparian vegetation. All 8 were singing and assumed to be on breeding territories. The vegetation communities consisted of black willow thicket and disturbed mulefat thicket. Dominant plant species in this vegetation type were mature Goodding's black willow, western sycamore, Fremont cottonwood, arroyo willow, mule fat, Hinds' willow, and blue elderberry.

Please fill out separate form for other rare taxa seen at this site. leastBell's vireo,arroyo chub,peregrine falcon,willow flycatcher,coastal whiptail

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: open space, USFS, Big Tujunga Dam

Visible disturbances: Recreation

Threats: non-native species, fire, human presence

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: experience with species

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Yellow Warbler (YEWA)

yellow warbler	3792590	371674
yellow warbler	3792815	371853
yellow warbler	3792763	372313
yellow warbler	3792933	372424
yellow warbler	3792070	372496
yellow warbler	3792810	372627
yellow warbler	3792629	372926
yellow warbler	3792552	373295

APPENDIX C

PHASE 1 CULTURAL RESOURCES ASSESSMENT

CULTURAL RESOURCES ASSESSMENT

BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT

Prepared For

Kristin Starbird
Psomas
225 South Lake Avenue, Suite 1000
Pasadena, California 91101

and

County of Los Angeles
Department of Public Works
900 South Fremont Avenue, 2nd Floor
Alhambra, CA 91803-1331



Prepared By

VCS Environmental
EXPERT SOLUTIONS | CEQA-NEPA . Biology . Regulatory

Patrick O. Maxon, M.A., RPA
Director, Cultural Services
VCS Environmental
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, California 92765

October 2017

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EXHIBITS

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No table of figures entries found.

APPENDICES

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B: Paleontological Resources Records Search (LACM)
C: Native American Consultation (NAHC)
D: Forest Service Permit
E: Historic Resources Evaluation Report (Daly 2017)
F: Personnel Qualifications

NATIONAL ARCHAEOLOGICAL DATABASE (NADB) INFORMATION SHEET

CULTURAL RESOURCES ASSESSMENT

BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT

by

Patrick Maxon, M.A., RPA

October 2017

Submitted by:

VCS Environmental
Patrick O. Maxon, M.A., RPA
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, California 92675
(949) 489-2700

Submitted to:

Kristin Starbird
Psomas
225 South Lake Avenue, Suite 1000
Pasadena, California 91101

USGS ***Condor Peak*** 7.5 Minute Quadrangle in Township 2 and 3 North; Range 12 and 13 West, Section 1 (*S.B.B.M*).

VCS Environmental

Key Words: Big Tujunga Dam and Reservoir, USGS Condor Peak, Hansen's Lodge

EXECUTIVE/MANAGEMENT SUMMARY

PURPOSE AND SCOPE

VCS Environmental (VCS) undertook this study to assess the potential impacts to Cultural Resources/Historic Properties that may result from the implementation of the Big Tujunga Reservoir Sediment Removal Project. This document has been prepared to satisfy the requirements of the U.S. Army Corps of Engineer's (USACE's) compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.) and, due to the need for a Section 404 Clean Water Act Permit, Section 106 of the National Historic Preservation Act (NHPA) of 1966 (36 CFR 800) and USACE's implementing regulations at 33 CFR 325 Appendix C. The format of this report follows *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* (Office of Historic Preservation 1990).

DATES OF INVESTIGATION

Patrick Maxon, RPA conducted a cultural resources literature review on October 6, 2011, at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton and Archaeologist Albert Knight conducted a literature review at the United States Department of Agriculture Forest Service (USFS) offices in the City of Arcadia on October 13, 2011 (Appendix A). A paleontological review request was received from Samuel McLeod of the Natural History Museum of Los Angeles County on October 27, 2011 (Appendix B). Native American consultation was initiated on September 26, 2011, with a letter to the Native American Heritage Commission (NAHC). Letters were sent to Native American tribes and individuals on September 27, 2011. (Appendix C). A cultural resources survey of the property was conducted by Albert Knight on October 13, 2011 (refer to United States Department of Agriculture Forest Service Permit #LAR9040CRI in Appendix D). A Historic Resources Evaluation Report was completed by Pam Daly of Daly and Associates in October, 2017 (Appendix E). Mr. Maxon and Christopher Drover, Ph.D. prepared and completed a California Environmental Quality Act (CEQA) draft of this technical report in July 2012, and a second version for the U.S. Forest Service's NEPA compliance in December 2012. This version of the report to meet USACE requirements, was completed in October 2017. Resumes of project staff are located in Appendix F.

FINDINGS OF THE INVESTIGATION

No previously unknown significant cultural resources were discovered within the Area of Potential Effects (APE)/Permit Area (PA) during the survey. Four recorded cultural resources are within the APE/PA. Big Tujunga Dam (USFS#05-01-55-221) has previously been evaluated and is considered eligible for listing on the National Register of Historic Places (NRHP). The remaining three resources [SCE Transmission Line Road (P-19-186877; USFS#05-01-55-187), Verdugo Circuit (P-19-186860; USFS#05-01-51-138), and the Hansen's Lodge location (USFS#05-01-55-00017) were evaluated during this project. In summation, other than the Big Tujunga Dam itself, there are no built-environment historic-period resources located within the Project APE, that appear to meet National Register and California Register criteria to be considered eligible for listing in the registries as significant historic resources.

INVESTIGATION CONSTRAINTS

Dense vegetation and non-native grasses cover as much as 70 percent of the APE/PA. Both native and non-native vegetation remains on site. The APE/PA is developed with the dam and reservoir, access roads, and the debris previously placed in Maple Canyon Sediment Placement Site.

EFFECTS ANALYSIS

This impact analysis is provided to assist the Los Angeles County Flood Control District (LACFCD) and USACE in fulfilling its compliance responsibilities under NEPA. Section 106 of NHPA and its implementing regulations at 36 CFR, 800 were used to identify historic properties within the APE/PA. The criteria of adverse effects codified at 36 CFR 800.5 were used to assess the effects of the proposed project on the four historic properties identified within the APE/PA. In summary, only the Big Tujunga Dam is eligible for listing on the California and National Registers. The remaining three are not deemed eligible. None of the four identified resources will be subject to adverse effects as a result of the project (Daly 2017).

RECOMMENDATIONS

Retention of an Archaeologist prior to ground-disturbing activities in the APE/PA, or as a monitor during implementation, is at the discretion of LACFCD and its CEQA compliance responsibilities. However, if cultural resources or human remains are discovered during any ground disturbing activities, the USACE will be notified by either the project archaeologist or by LACFCD onsite personnel. All work in the vicinity of the discovery will cease until the USACE evaluates the nature and significance of the find, and determines the level of documentation necessary and potential consultation required with the NAHC, State Historic Preservation Officer (SHPO), Native American tribes, and any others. In the case of an inadvertent discovery of Human Remains, the proponent will immediately notify the responsible Federal official and County Coroner, and once determined to be of Native American origin by the coroner, the Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulations at 43 CFR 10 will be followed to manage and resolve the discovery and determine the final disposition of the remains.

DISPOSITION OF DATA

This report will be filed with LACFCD; with the USACE; with Psomas; with VCS, and at the SCCIC. All field notes and other documentation related to the study are on file at VCS.

1.0 UNDERTAKING INFORMATION/INTRODUCTION

1.1 CONTRACTING DATA

Psomas retained VCS to conduct a Phase I Cultural Resources Study for the proposed Big Tujunga Reservoir Sediment Removal Project (Project). This report details the findings of the investigation and offers management recommendations and mitigation measures to reduce the impact of the project to a less than significant level. Survey activities were conducted under United States Department of Agriculture Forest Service Permit #LAR9040CRI.

1.2 UNDERTAKING

The Big Tujunga Reservoir (BTR) is located in the San Gabriel Mountains within the Angeles National Forest (ANF), which is located within the unincorporated County of Los Angeles on land owned by the U.S. Government and managed by the U.S. Forest Service (USFS). The BTR is located along Big Tujunga Canyon Road, approximately 4.5 miles north of La Crescenta-Montrose and approximately 7 miles northeast of the community of Sunland. Maple Canyon Sediment Placement Site (Maple Canyon SPS) is located approximately 1.8 miles south of BTR and just east of Big Tujunga Canyon Road.

The proposed Project involves the removal of sediment from the Big Tujunga Reservoir (BTR) and placement of the sediment in the adjacent Maple Canyon Sediment Placement Site (SPS), which is located approximately 1.8 miles (when traveling via existing access roads) from the plunge pool of BTR to the upper reach of Maple Canyon SPS. The Project does not involve new construction, expansion or alteration of the BTR, but only involves sediment removal to restore capacity to the BTR and to allow it to adequately perform its main functions of flood control, debris flow reduction, and water conservation.

The Project has the potential to remove up to 4.4 million cubic yards (mcy) of sediment from BTR, which equates to the remaining capacity for sediment placement within Maple Canyon SPS. The actual amount of sediment removal would depend on the amount of rainfall and sediment deposition in coming years. It is anticipated that sediment removal could be accomplished within five years.

Prior to the annual excavation of the accumulated sediment from BTR, the reservoir must be dewatered. All sediment removal operations that would occur within BTR—including dewatering, sediment removal activities, and equipment set-up and break-down—would be conducted annually from approximately April 16 to October 14 (i.e., the dry or non-storm season). Once the dewatering is complete, the excavation and transport of sediment from the BTR to Maple Canyon SPS via hauling trucks would commence. The LACFCD's Contractor would pave approximately 2 miles of currently unpaved haul routes (with the exception of existing access roads behind the Dam structure, which would be repaired to restore access to the reservoir bottom) to comply with South Coast Air Quality Management District thresholds for particulate matter (PM10).

If encountered during sediment excavation, large rocks would be set aside and processed/crushed in the reservoir. Some material suitable for re-use would then be temporarily placed at an on-site stockpile for subsequent beneficial reuse within the Forest by the Los Angeles County Public Works' Flood Maintenance (FMD) and Road Maintenance Divisions (RMD) for routine maintenance activities that are unrelated to the BTR Sediment Removal Project. During the storm season (i.e. October 15 to April 15), all sediment removal equipment/trucks would be removed from BTR, and normal operations would resume and the Dam would continue to perform its main functions of flood control, debris flow reduction, and water conservation.

The closure of Maple Canyon SPS is considered to be a part of the proposed Project, as sediment removal activities from BTR have the potential to fill the remaining capacity (i.e., 4.4 mcy) at Maple Canyon SPS. These closure activities are set forth in the *Maple Canyon Sediment Placement Site Revegetation and Ultimate Completion Guidance Document* and include a 5-year revegetation monitoring program; efforts to improve the visual aspects of the site upon closure of Maple Canyon SPS, including removal of irrigation and water tanks; and removal of the asphalt covering of the access road.

1.3 AREA OF POTENTIAL EFFECTS/PROJECT LIMITS

Exhibit 1 depicts the Big Tujunga Reservoir Sediment Removal Project vicinity and specific location on a portion of the U.S. Geological Survey (USGS) Condor Peak 7.5-minute quadrangle. The Study Area Boundary includes the sediment removal area behind Big Tujunga Dam, the plunge pool downstream of the Dam, the access roads for trucking, and the Maple Canyon Sediment Placement Site. Exhibit 2 depicts the Area of Potential Effects (APE)/Permit Area (PA) on an aerial photograph. The APE/PA was determined by following the Waters of the United State (WOUS) determinations from the Jurisdictional Delineation, plus a 50-foot buffer. Exhibit 2 also depicts the locations of the four cultural resources present within the APE/PA: The Big Tujunga Dam (USFS#05-01-55-221); a portion of Southern California Edison's Verdugo Circuit (P-19-186860/USFS #05-01-51-138); a portion of the USFS Transmission Line Road Alignment (P-19-186877/USFS# 05-01-55-187); and the location of the former Hansen's Lodge (USFS#05-01-55-00017).

1.4 PROJECT PERSONNEL

Albert Knight completed the USFS cultural resources literature review and background research for the project and performed the cultural resources survey. Patrick Maxon, M.A., RPA completed a literature review at the SCCIC, Pamela Daly of Daly and Associates completed the historic built environment evaluations, and Mr. Maxon and Christopher Drover, PhD., RPA authored this report. Refer to Appendix F for staff qualifications.

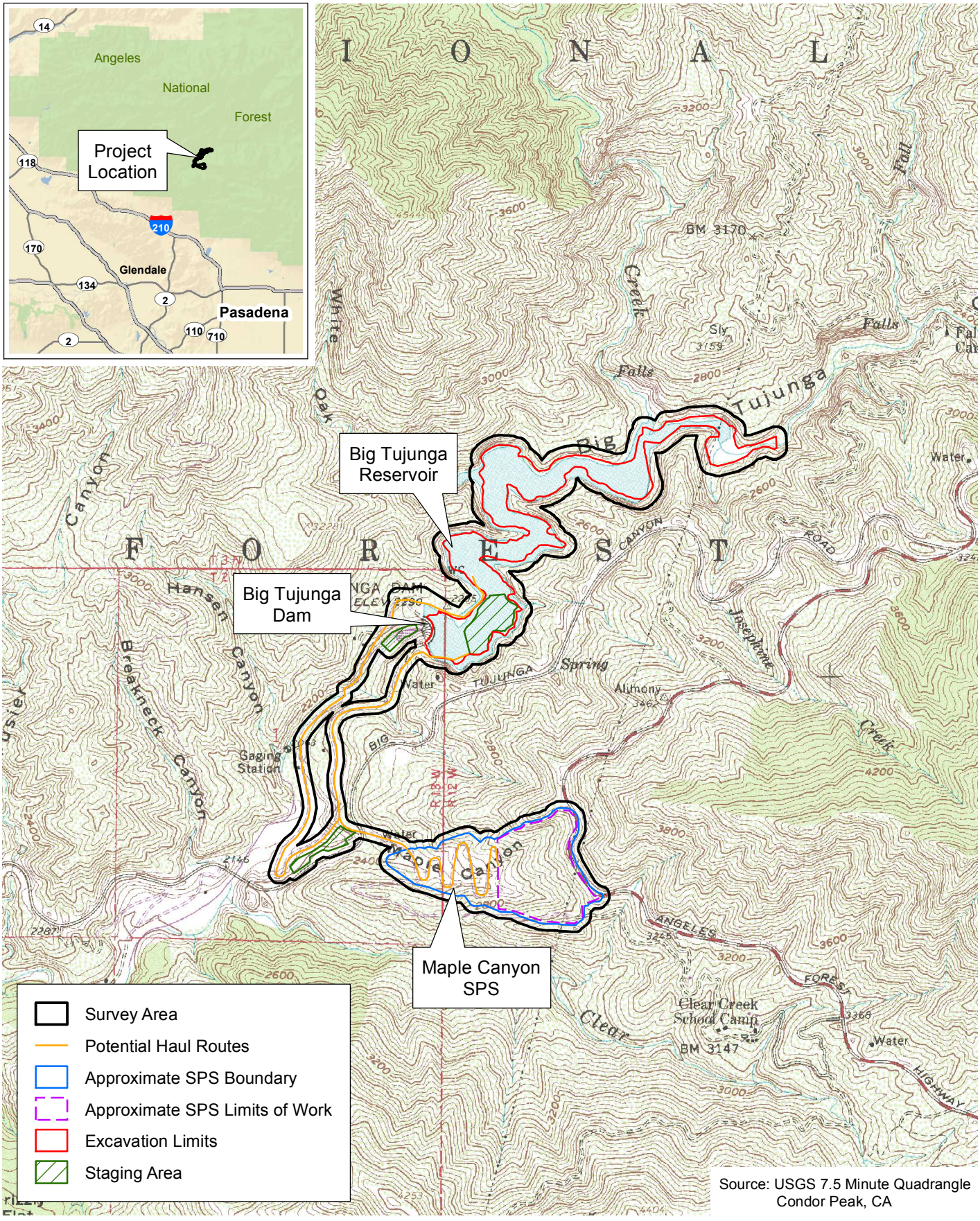
2.0 REGULATORY SETTING

This section contains a discussion of the applicable laws, ordinances, regulations, and standards that govern cultural resources and must be adhered to both prior to and during project implementation. The report is intended to satisfy the requirements for a federal action under the National Environmental Policy Act (NEPA) and an analysis pursuant to Section 106 of the National Historic Preservation Act (16 *United States Code* [USC] 470f) and its implementing regulations listed in the *Code of Federal Regulations* (36 CFR, 800, Protection of Historic Properties).

2.1 FEDERAL

Cultural resources are considered during federal undertakings chiefly under Section 106 of National Historic Preservation Act (NHPA) of 1966 (as amended) through one of its implementing regulations (36 CFR 800, Protection of Historic Properties) and NEPA. Properties of traditional religious and cultural importance to Native Americans are considered under Section 101(d)(6)(A) of NHPA. Other federal laws include the Archaeological Data Preservation Act of 1974, the American Indian Religious Freedom Act (AIRFA) of 1978, the Archaeological Resources Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1989, among others.

Section 106 of NHPA (16 USC 470f) requires federal agencies to take into account the effects of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (NRHP) and to afford the Advisory Council



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Project Site

Exhibit 1

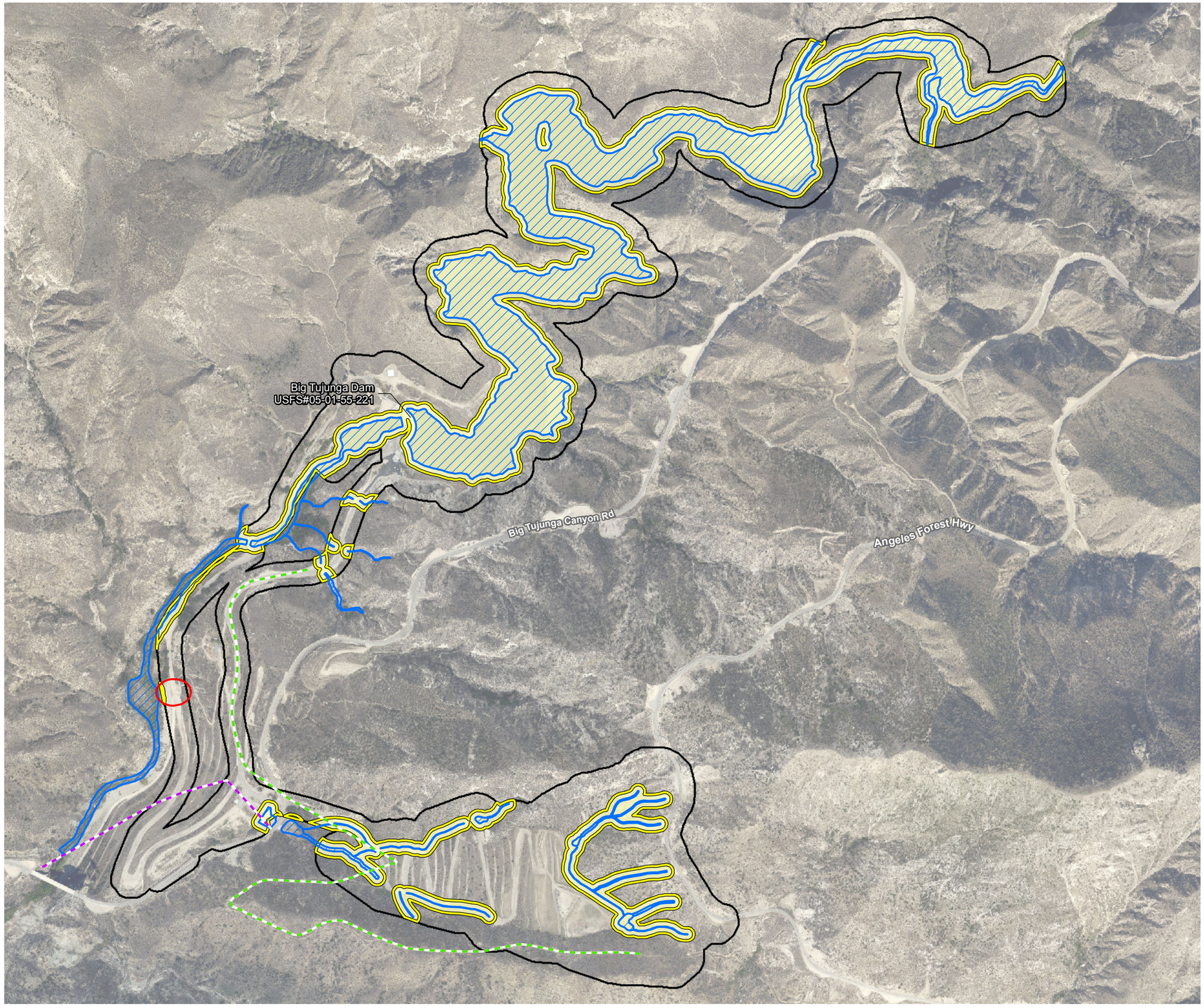
Big Tujunga Reservoir Sediment Removal Project

N
W E
S

2,000 1,000 0 2,000

Feet

VCS Environmental



Area of Potential Effects (APE)

Project Area

USACE “waters of the U.S.”

Hansen’s Lodge (estimated)
USFS#05-01-55-00017

Verdugo Circuit Transmission Line
(P-19-186860)

Transmission Line Road (P-19-186877)

N
W E
S

800 400 0 800
Feet

Aerial Source: LAR-IAC 2014

Area of Potential Effects Exhibit 2

Big Tujunga Reservoir Sediment Removal Project

(Rev: 08/10/2017 MMD) R:\Projects\DPW\3DPW029305\Graphics\InHouse\ex_APE_20170810.pdf

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on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings (36 CFR 800.1). Under Section 106, the significance of any adversely affected cultural resource is assessed. If there is determined to be an effect, consultation to resolve the effect is undertaken per 36 CFR 800.6(b). Significant cultural resources are those resources that are listed or are eligible for listing in the NRHP per the criteria listed at 36 CFR 60.4 below:

> The quality of significance in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association and that:
>
> (a) Are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) Are associated with the lives of persons significant in our past; or
>
> (c) Embody the distinctive characteristics of a type, period, or method of installation, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) Have yielded, or may be likely to yield, information important in prehistory or history.

The USACE fulfills its Section 106 responsibilities through its implementing regulations at 33 CFR 325 Appendix C.

2.2 HUMAN REMAINS

Section 7050.5 of the *California Health and Safety Code* provides for the disposition of accidentally discovered human remains. Section 7050.5 states that, if human remains are found, no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined the appropriate treatment and disposition of the human remains.

Section 5097.98 of the Public Resources Code states that, if remains are determined by the Coroner to be of Native American origin, the Coroner must notify the NAHC within 24 hours which, in turn, must identify the person or persons it believes to be the most likely descended from the deceased Native American. Once determined to be of Native American origin, the Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulations at 43 CFR 10 will be followed to determine the final disposition of the remains.

3.0 SETTING

3.1 NATURAL

The area surrounding BTR is undeveloped and comprised of natural vegetation types, including several chaparral sub-types (e.g., chamise chaparral, scrub oak chaparral, and mixed chaparral). Much of the area surrounding BTR was burned in the 2009 Station Fire but is now recovering. Chamise chaparral, mixed chaparral, willow riparian forest, coast live oak stands, disturbed freshwater seep, and ornamental plantings are found along existing roads that would be used to haul material from BTR to Maple Canyon SPS. Scrub oak chaparral, chamise chaparral, California annual grassland, and unvegetated cliff faces are found within Maple Canyon SPS. Tributaries at the upper end of the Maple Canyon SPS contain small areas of burned riparian herb, sycamore woodland, and willow riparian scrub; however, these areas are beginning to resprout (BonTerra Consulting 2011). None of this vegetation would be disturbed as a part of the proposed project.

Steep vertical walls border the majority of the BTR to the top of the 100 percent contour (i.e. the reservoir's sediment capacity elevation contour), which is surrounded by mountains. The topography steeply slopes down into the canyon; elevations range from approximately 2,150 to 3,400 feet above mean sea level (msl).

3.2 CULTURAL

3.2.1 Prehistoric

The prehistory of coastal Southern California has been described by a number of authors who generally agree on at least four major prehistoric periods (Wallace 1955; Warren 1968; Koerper and Drover 1983). These four sequential periods of time, sometimes called Horizons and sometimes Traditions, are each characterized by time-sensitive artifacts. The periods then are not arbitrary, but likely reflect material/cultural changes at those times.

The earliest occupations of the Southern California coast are debated to begin as early as 50,000 years before present, or "B.P." (Bada et al. 1974).[1] The earliest radiocarbon dates, however, were derived from Los Angeles Man and Laguna Woman at 23,600 and 17,150 B.P. respectively (Berger et al. 1971). Unfortunately, little is known of the material culture of finds of this antiquity. The earliest archaeological culture known in any detail is that of San Dieguito, named after the drainage of the same name near Del Mar, California where implements dating to 8,000 B.P. were found. Although the subsistence strategy of this tradition is unknown, Warren (1968:2) has inferred a hunting economy (cf. Koerper and Drover 1983; Drover et al. 1983). Typical artifacts would include percussion flaked implements, elongated knives, domed scrapers, teshoa flakes, crescentics and an absence of millingstone tools. The San Dieguito culture is defined primarily from its single type site, the Harris Site of San Diego County, CA-SDi-149 (Warren 1966).

After San Dieguito, the next prehistoric period for coastal Southern California is termed "Millingstone" and "Encinitas" by Wallace (1955) and Warren (1968), respectively. The Millingstone Horizon or Encinitas Tradition are very similar as described by each author and have a time span beginning about 7,000 to 8,000 B.P. and ending between 3,000 to 4,000 B.P. The onset of Holocene climatic conditions may have brought about the cultural changes associated with this period. Processing tools like manos and metates (millingstone) reflect an increased dependence on plant foods. Projectiles are rare, but, when found, suggest the use of the atlatl or

[1] "Before Present" assumes that 1950 is "present".

throwing stick. The material culture characteristic of this period is longer-lived the further one travels south of Santa Barbara.

The third period following Encinitas, or Millingstone, is known as the “Intermediate Horizon” and “Campbell Tradition” by Wallace (1955) and Warren (1968), respectively. This period is strongly represented north of the Los Angeles area and is only suggested in the San Diego area. Numerous, smaller projectile points suggesting increased hunting and the introduction of the use of the bow and arrow characterize this period. It is during the Intermediate Horizon, or Campbell Tradition that true maritime exploitation and occupation of the Channel Islands flourishes (Meighan 1959). The duration of this period is roughly 3,000 to 1,000 B.P. In general, the emphasis seems to shift from the hard seed orientation of the Milling Stone Tradition to the growing practice of balanophagy (acorn consumption) and processing of other soft, pulpy seeds. While mortars and pestles become more common in comparison to manos and metates, the latter survive into European contact times attesting to the use of hard seeds in the diet.

In the southern end of Los Angeles County, several traits make an appearance rather late in the Tradition; these include pottery and ground painting, which give rise to speculation that significant culture contact from the southeast was occurring (Meighan 1954). This complex is thought to owe its basic cultural orientations to the Southwestern United States.

A general picture emerges through time of growing population pressure resulting in intensified land use patterns. Increases in population or siltation of coastal estuaries are examples of intensifying the local carrying capacity (e.g., Newport Bay during the Milling Stone Tradition). Occasionally, siltation may actually progress to the point of making an estuary less productive as in the case of northern Orange County (Newport Back Bay) resulting in local populations adapting to other environments such as acorn processing.

Table 1 depicts an overview of Southern California Prehistory in relation to North America.

TABLE 1
SOUTHERN CALIFORNIA PREHISTORY

<table>
<tr><th>Time BP</th><th>Newport Coast</th><th>Los Angeles</th><th colspan="2">San Diego</th><th colspan="2">Deserts</th><th>North America</th><th></th></tr>
<tr><td></td><td>Peterson et al. 1991</td><td>Wallace 1955</td><td>Warren 1968</td><td>Moriarity 1966</td><td>M. Rogers 1966</td><td>Wallace 1962</td><td>Willey + Phillips 1955</td><td>Climate</td></tr>
<tr><td></td><td>LP 2</td><td>Historic</td><td rowspan="2">Yuman-Shoshonean</td><td>Diegueno II</td><td>Diegueno-Luiseno</td><td rowspan="2">Prehistoric Yuman-Shoshonean</td><td>Post Classic</td><td rowspan="3">Medithermal</td></tr>
<tr><td>1,000</td><td rowspan="3">LP 1</td><td>Horizon IV-Late Prehistoric</td><td rowspan="4">Diegueno I</td><td rowspan="2">Prehistoric Yuman-Shoshonean</td><td>Classic-Urban</td></tr>
<tr><td></td><td rowspan="4">Horizon III-Intermediate</td><td rowspan="3"></td><td>Amargosa</td><td rowspan="3">Formative-food production</td></tr>
<tr><td>2,000</td><td rowspan="3">Intermediate Period</td><td rowspan="4">La Jollan-Amargosa II</td></tr>
<tr><td></td><td rowspan="4">Pinto</td><td rowspan="4">Little Pluvial</td></tr>
<tr><td>3,000</td><td rowspan="3">MS 3</td><td rowspan="4">Horizon II-Millingstone</td><td>La Jolla III</td></tr>
<tr><td></td><td rowspan="3">La Jolla II</td><td rowspan="3">Archaic-broad-based hunting, collecting-emphasis on plant foods</td></tr>
<tr><td>4,000</td><td rowspan="3">Campbell</td></tr>
<tr><td></td><td rowspan="3">MS 2</td><td rowspan="3">Haitus</td><td rowspan="3">Altithermal</td></tr>
<tr><td>5,000</td><td rowspan="4">Horizon I-Early Man</td></tr>
<tr><td></td><td rowspan="3">MS 1</td><td rowspan="3">Encinitas</td><td rowspan="3">La Jolla</td><td rowspan="3">Lake Mojave</td><td rowspan="3">Lithic-hunting, collecting-emphasis on hunting(?)</td></tr>
<tr><td>6,000</td><td rowspan="2">Anathermal</td></tr>
<tr><td></td><td rowspan="3">Paleo-Coastal</td><td rowspan="3">San Dieguito</td><td rowspan="3">San Dieguito</td><td>Haitus</td></tr>
<tr><td>7,000</td><td rowspan="2">San Dieguito III</td></tr>
<tr><td></td><td rowspan="2">Little Pluvial</td></tr>
<tr><td>8,000</td><td rowspan="2">Altithermal</td></tr>
<tr><td></td><td rowspan="2">Anathermal</td></tr>
<tr><td>9,000</td></tr>
<tr><td></td><td rowspan="2">Paleo-Coastal</td><td rowspan="2">San Dieguito</td><td rowspan="2">San Dieguito</td><td colspan="2">Haitus</td><td rowspan="2">Anathermal</td></tr>
<tr><td>10,000</td><td>San Dieguito III</td></tr>
<tr><td colspan="9">LP: Late Prehistoric; MS: Millingstone; BP: Before Present
Source: Christopher Drover 2012</td></tr>
</table>

3.2.2 Ethnographic

Gabrielino

While of limited use to much of prehistory, data acquired in contact times is somewhat useful as an analogy to the Late Prehistoric Period. At the time of contact in 1769, the Gabrielino Native Americans occupied the area around the APE/PA. The Spanish named the Gabrielino after the Mission San Gabriel Archangel. The Gabrielino spoke Takic (Shoshonean) languages.

Settlement

According to Bean and Smith (1978:538), the Gabrielino is, in many ways, one of the least known groups of California's native inhabitants. In addition to much of the Los Angeles Basin, they

occupied the offshore islands of Santa Catalina, San Nicolas, and San Clemente. Gabrielino populations are difficult to reconstruct. However, at any one time, as many as 50 to 100 villages were simultaneously occupied. Like the prehistoric culture before them, the Gabrielino were a hunter/gatherer group who lived in small sedentary or semi-sedentary groups of 50 to 100 persons, termed rancherias. These rancherias were occupied by at least some of the people all of the time. Location of the encampment was determined by water availability. Houses were circular in form and constructed of sticks covered with thatch or mats. Each village had a sweat lodge as well as a sacred enclosure (Bean and Smith 1978). Although the earliest description of the Gabrielino dates back to the Cabrillo expedition of 1542, the most important and extensive accounts were those written by Father Geronimo Boscana about 1822 and Hugo Reid in 1852.

Subsistence

Gabrielino subsistence relied heavily on plant foods, but was supplemented with a variety of meat, especially from marine resources. Food procurement consisted of hunting and fishing by men and gathering of plant foods and shellfish by women. Hunting technology included use of bow and arrow for deer and smaller game, throwing sticks, snares, traps, and slings. Fishing was conducted with the use of shell fishhooks, bone harpoons, and nets. Seeds were gathered with beaters and baskets. Seeds and other foods were stored in baskets. Seeds were prepared with manos and metates and/or mortars and pestles. Food was cooked in baskets coated with asphaltum, in stone pots, on steatite frying pans, and by roasting in earthen ovens (Bean and Smith 1978).

Trade

Most trade between settlements was through reciprocity (barter), indicated by strings of Olivella shell beads used as a medium of exchange throughout Southern California (Ruby 1970). Gabrielino and Juaneño from the mainland probably traded trade beads, game, and plant foods in exchange for shell beads and steatite, and plant foods from the islanders. Steatite artifacts along with fish, shell money, and animal pelts were traded by the mainlander Gabrielino into the interior for seeds and deer skin. According to Bean (1972), the Gabrielino traded with the Serrano and the Cahuilla to the east. The Gabrielino traded goods such as shell beads, dried fish, sea otter pelts, asphaltum, and steatite for goods such as salt, obsidian, deer hides, furs, and acorns. There is evidence of trade between the Arizona Hohokam and the Gabrielino, probably with the Mojave people as middleman (Koerper in Mason 1997 et al.). *Glycymeri*s shell bracelets, ceramics, and blankets may have been exchanged for Pacific shells and shell beads (Koerper in Mason 1997).

Religion

Aside from shamanistic curing rituals, principal religious activity is related to the Chinigchinich cult that emphasized correct behavior as promulgated by a mythical figure, Chinigchinich. The Chinigchinich religion developed in Gabrielino territory and spread southeast to the Juaneño/Luiseño, Cupeño, and Ipai. It is a cult that is tied into an older creation myth. Chinigchinich is said to give laws and punishment for those who are disobedient in which shamans were given responsibilities to oversee the cult. It was an extensive system of polar opposites (duality) that are united under higher principals (unity) (Applegate 1979). Male-Female dualism found in the creation myth is also present in the origin myth (Applegate 1979). Chinigchinich cult ceremonies included boys' puberty ceremonies using *toloache,* a drug made from Jimson Weed (*Datura stramonium*). During the vision quest, a personal protector or totemic animal was acquired. Such totems could be bear, coyote, crow, or rattlesnake. Other ceremonies were to obtain vengeance on enemies, to express thanks for victory, and to commemorate the dead. The focus of the ceremonies was a circular sacred enclosure found in each village. The emphasis on male rites of passage and war may be a response to the increasing population and resultant

competition for territory and access to resources. Or it may be a response to the arrival of the Spanish since the Chinigchinich religion seems to be of recent (not prehistoric) origin.

Both inhumation (burial in a grave) and cremation was practiced. During cremations, the goods of the deceased and his hut were often buried with him. Annual mourning ceremonies were held in the late summer for all who had died during the previous year. Clothes of the deceased and an image of the deceased were often burned at this time. Eagles were sacrificed for recently deceased chiefs (Applegate 1979).

3.2.3 Local History

In the 1770s, the California Mission systems were founded by Junipero Serra, who established a series of missions northward from San Diego to San Francisco, one day's horse ride apart. Mission names were often adopted to refer to Native American groups (such as "Gabrielino" derived from Mission San Gabriel). The missions controlled large areas of land until 1824, when the Mexican government declared its independence from Spain. The majority of mission lands were then secularized and distributed by land grants to specific individuals. As stated by Yamada (2011):

> One of the earliest land grants was awarded to Jose Maria Verdugo a native of Loreto, in Baja California, was serving as a military guard at the mission at San Gabriel. In 1784 he received one of the first land grants made in Alta California by the King of Spain and one of the largest ever issued during the Spanish occupation. That land now incorporates a good part of present day Glendale, Burbank, Eagle Rock, Highland Park, the west part of Pasadena and the area in the triangle formed by the junction of the Arroyo Seco and the Los Angeles River, according to Carroll W. Parcher in his chronicle, Glendale Community Book.

The general APE/PA is within the region historically occupied by Gabrielino Indians, likely the group known as Fernandeño (Bean and Smith 1978) or the Tongva. The unpublished notes of J.P. Harrington indicate the name *Magunga* as the name for Big Tujunga Canyon (Singer 1985). Most of the Gabrielino villages were abandoned around 1805 due to rapid decline from European-introduced diseases (Singer 1985). Baptismal records from Mission San Fernando and Mission San Gabriel indicate that the population of the village of Tujunga at the mouth of the canyon had a population of 92 people baptized between 1783 and 1811 (Merriam 1968:102, 120; Singer 1985).

The 20th Century development in the area included commerce, mining, and residential development often spurned by individuals seeking good health suffering from respiratory illnesses. Many health sanitoria dotted the area, which eventually attracted Dr. Homer Hansen, a prominent individual who came to develop land within the APE/PA (Hitt 2002:24).

Please refer to the Historic Resources Evaluation Report (Daly 2017) in Appendix E for a more detailed historic context.

4.0 METHODS

4.1 CULTURAL RESOURCES RECORDS SEARCH

A literature review of documents on file at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton was completed by Patrick Maxon on October 6, 2011, and Albert Knight completed a second records search at the USFS offices in Arcadia on October 13, 2011 with assistance from USFS Archaeologist Darrell Vance (Appendix A). The SCCIC review consisted of an examination of the U.S. Geological Survey's (USGS) Condor Peak, California 7.5-minute quadrangle to evaluate the APE/PA for any sites recorded or cultural resources studies conducted on the parcel and within a one-mile radius. The SCCIC is the designated branch of the California Historical Resources Information System (CHRIS) and houses records concerning archaeological and historic resources in Los Angeles, Orange, and Ventura Counties. The records search provided data on known archaeological and built environment resources as well as previous studies within one mile of the APE/PA. Data sources consulted at the SCCIC included archaeological records, Archaeological Determinations of Eligibility (DOE), historic maps, and the Historic Property Data File (HPDF) maintained by the California Office of Historic Preservation (OHP). The HPDF contains listings for the CRHR and/or NRHP, California Historical Landmarks (CHL), and California Points of Historical Interest (CPHI). Additional research was undertaken by Pamela Daly of Daly and Associates during the historic evaluation of the built environment at the project site.

4.2 PALEONTOLOGICAL RESOURCES RECORDS SEARCH

A paleontological records search for the Project was requested on October 3, 2011, from the Natural History Museum of Los Angeles County. A response was received on October 28, 2011, by Samuel McLeod, Vertebrate Paleontologist (see Appendix B).

4.3 NATIVE AMERICAN CONSULTATION

An inquiry was made of the NAHC located in Sacramento to request a review of its Sacred Lands File database regarding the possibility of Native American cultural resources and/or sacred places in the project vicinity that are not documented on other databases. On September 26, 2011, the NAHC also provided a list of Native American groups and individuals who may have knowledge regarding Native American cultural resources not formally listed on any database. Each of these groups and individuals were mailed an informational letter September 27, 2011, describing the project and requesting any information regarding resources that may exist on or near the APE/PA.

Information regarding the results of the Native American coordination/consultation is provided in Appendix C.

4.4 CULTURAL RESOURCES FIELD SURVEY

A systematic archaeological survey of the APE/PA was conducted by Archaeologist Albert Knight under the supervision of Patrick Maxon, RPA on October 13, 2011. The entirety of the APE/PA was surveyed via parallel transects spaced approximately five meters apart where possible and included focused surveys in areas of concentrated cultural material. A survey of the reservoir's historic built environment was conducted by Pamela Daly on July 18, 2017.

5.0 RESULTS

5.1 CULTURAL RESOURCES RECORDS SEARCH

Sixteen archaeological surveys have been conducted within a one-mile radius of the APE/PA. Five of the surveys included at least a portion of the APE/PA.

Table 2 identifies the previous cultural resources studies that include at least a portion of the APE/PA.

TABLE 2
CULTURAL RESOURCES STUDIES WITHIN ONE MILE OF THE APE/PA

Report Number	Author(s) (Year)	Type of Study/Comments
LA1477	Clay Singer (1985)	Survey and Impact Assessment for the Proposed Maple Canyon Relief Drain.
LA3053	LSA Associates (1994)	Cultural Assessment of Angeles Forest Highway at Mile Marker 23.00.
LA7155	Bartoy (2003)	Survey for Los Angeles County Flood Control Tanks.
LA9746	Schmidt and Schmidt (2003)	Phase I Investigation; Southern California Edison, Verdugo Distribution Line Circuit. Recordation of sites 186860+186877.
LA10175	Applied Earthworks (2009)	Cultural Resources Report for the Tehachapi Transmission Project. 22 different USGS quadrangles.
USGS: U.S. Geological Survey		

Twelve previously recorded resources are located within one mile of the APE/PA. Three of these are located within the APE/PA (P-19-186860, P-19-186877, and USFS#05-01-55-221), including the Big Tujunga Dam itself; and a fourth (Hansen's Lodge - USFS#05-01-55-00017) is recorded there, but has been destroyed, leaving few surface remnants.

Table 3 describes the known cultural resources within one mile of the APE/PA. As indicated, four are within the APE/PA of the proposed project.

TABLE 3
CULTURAL RESOURCES ON OR WITHIN ONE MILE OF THE APE/PA

Site Number	Recorder (Year)	Comment	Resource Within APE/PA?
USFS#05-01-55-221	FEMA (1999)	Big Tujunga Dam	Yes
USFS#05-01-55-00017	Knight and Maxon (2011)	Extrapolated location of Hansen's Lodge (USFS)	Yes
P-19-003104	Cotterman, Peterson and Sander (2003)	4 structural foundations	No
P-19-003471	Panlagua (2003)	6 structural features (possibly early Clear Creek School Camp facilities)	No
P-19-003386	Brasket and Wallace (2004)	Concrete structural foundation	No
P-19-003986	Lichtenstein (2009)	Various cement slab features; former scenic overlook	No
P-19-100796	Norton (2009)	Plumb Bolo knife	No
P-19-186535	Arbuckle (1979)	The Angeles National Forest	No
P-19-186860 USFS#05-01-51-138	Schmidt (2003)	Wooden power poles/insulators. Verdugo Circuit	Yes

P-19-186877 USFS#05-01-55-187	Schmidt and Schmidt (2003)	26 miles of USFS road alignment; shown on USGS 1926 and 1931 maps.	Yes
P-19-186923	Vance (2001)	Mt. Lukens Road (2N76)	No
P-19-187713	Sander (2003)	Angeles Forest Highway; 25 mile alignment; Mill Creek Bridge built between 1939 and 1941; tunnel 1941	No
USFS: U.S. Forest Service FEMA: Federal Emergency Management Agency			

5.1.1 Resources Within the Area of Potential Effect/Permit Area

Big Tujunga Dam (USFS#05-01-55-221)

The Big Tujunga Dam is a variable-radius arch concrete dam. It was constructed in 1930-1931 as part of a flood control and water conservation program in Los Angeles County, passed in 1924, to build a network of dams and reservoirs to protect the growing community and provide water as demand increased. As part of the LACFCD and Federal Management Agency (FEMA) Spillway Modification/Seismic Strengthening Project, the dam was determined eligible in 1999 for listing in the National Register of Historic Places as a contributing element to the thematic district of 1924 Los Angeles County Dams by Daniel Abeyta, acting State Historic Preservation Officer (FEMA 1999). There will be no adverse effects to the dam due to the proposed project. It should be noted that the dam is not recorded on DPR 523 Site Recording forms and the SCCIC does not maintain the USFS site record in its files.

USFS Transmission Line Road Alignment (19-186877; USFS#05-01-55-187)

This site consists of a 26-mile-long alignment that includes parts of five Forest- and/or SCE-maintained roads (Schmidt and Schmidt 2003). The site includes all or part of Forest Roads 4N24, 3N27, 2N74, 2N75 and 2N77, as shown both on the 1926 and 1931 depictions of the ANF (USDAFS 1926, 1931), and on the 1936 USGS Mt Lowe 6-minute quadrangle (Schmidt and Schmidt 2003). Schmidt and Schmidt (2003) quote Robinson (1991) who describes the road as the first road “all the way across the backbone of the San Gabriels”. The SCE Verdugo Circuit (P19-186860) is directly associated with the SCE transmission line/maintenance road in the current project area-of-potential effects (APE). The service roads were used to construct the power network through the Angeles National Forest, and have continued to be used to maintain the system. The site does not appear eligible for listing on the National or California Registers under any of the four significance criteria (Daly 2017:29).

Verdugo Circuit (P-19-186860; USFS#05-01-51-138)

This site is Southern California Edison’s (SCE’s) Verdugo Circuit. It is directly associated with the SCE transmission line/maintenance road, also within the APE. The circuit is a linear arrangement of poles, the extreme western end of which extends over the access road west of the BTR where it had split. The northern fork terminates a short distance to the east, still south of the BTR; the south fork at one time extended through Maple Canyon, where it terminated at Angeles Forest Highway. The circuit now terminates near Big Tujunga Canyon Road. The poles are still in place (without power lines) on the maintenance road between where the transmission road runs along the south wall of Maple Canyon. The site does not appear eligible for listing on the National or California Registers under any of the four significance criteria (Daly 2017:28-29).

Hansen's Lodge (USFS#05-01-55-00017)

While the structures no longer visibly exist in their recorded location, a private residence and Hansen's Lodge was built within the APE/PA boundaries by Dr. Homer Hansen in the 1910s. The flood of 1926 destroyed Hansen's Lodge, but he rebuilt it, only to have it destroyed again in 1938 by one of the biggest floods to hit the area. All but stone fireplaces were destroyed and the structure was not rebuilt (Leadabrand 1970).

Hansen sold his land and buildings to LACFCD in 1930. The two-story lodge that was in the parcel was destroyed in 1938, and massive grading and hillside contouring have significantly altered the land surrounding where the lodge once stood. There is a pile of stones that are supposed to have come from the chimney that remained after the Lodge building had been demolished when the dam was crested in March of 1938 by excessive rains. The area measures approximately 298 feet long by 107 feet wide, approximately .732 acre, and there are large, mature oak trees in this location. There are no standing structures, or foundations in this site. Topographic maps and aerial photographs also provide information that the discharge from Big Tujunga Dam has changed the path of Big Tujunga Creek through the canyon, and the site where the Lodge was situated (Daly 2017). The site does not appear eligible for listing on the National or California Registers under any of the four significance criteria (Daly 2017:28).

5.2 PALEONTOLOGICAL RESOURCES RECORDS SEARCH

A paleontological records search for the proposed project was requested on October 3, 2011, from the Natural History Museum of Los Angeles County. A response was received on October 28, 2011, by Samuel McLeod, Vertebrate Paleontologist (see Appendix B). McLeod's response suggests that excavations in the igneous bedrock, which occurs throughout most of the APE/PA, as well as shallow excavations in Quaternary sedimentary deposits (gravel) in the southwestern portion of the APE/PA, near the access roads, probably would not uncover significant vertebrate fossils. He further mentioned that only deep excavation in the southwestern portion of the APE/PA may encounter significant fossil remains. Only excavations of substantial depth might require paleontological monitoring.

5.3 NATIVE AMERICAN CONSULTATION

5.3.1 CEQA Consultation

The NAHC Search of the Sacred Lands File on September 26, 2011, did not identify the presence of Native American cultural resources on the APE. In addition, the NAHC provided a list of Native American groups and individuals that may have knowledge of the religious and/or cultural significance of resources that may be in and near the APE/PA. The NAHC listed the following groups and individuals:

- Charles Cooke
- Beverly Salazar Folkes
- Randy Guzman-Folkes
- Ronnie Salas
- Ron Andrade
- John Valenzuela
- Delia Dominguez

Each of these groups and individuals were mailed an informational letter on September 27, 2011, describing the project and requesting any information regarding resources that may exist on or near the APE/PA. No responses have been received to date from the tribes and individuals contacted.

On June 21, 2012, follow-up telephone calls were made to ensure a reasonable and good faith effort to contact all tribes and individuals that were sent letters and failed to respond. Table 4 below summarizes the results of consultation, and all Native American correspondence can be viewed in Appendix C.

It should be noted that the implementation of this project predated the requirements of Assembly Bill 52.

TABLE 4
NATIVE AMERICAN CONSULTATION SUMMARY

Date Sent	Native American Contact	Date of Follow-Up Phone Call	Comments
9/26/11	Charles Cook	6/21/12	Mr. Cooke stated that the APE/PA is located in a sensitive area and that a Cultural Resources Monitor should be present on site.
9/26/11	Beverly Salazar Folkes	6/21/12	Ms. Salazar stated that, because the site is located within a sensitive area, a Native American Monitor should be present or on call.
9/26/11	Randy Guzman Folkes	6/21/12	Mr. Guzman-Folkes stated in an email that he believes Cultural Resources Monitoring is required for the Big Tujunga Sediment Removal Project.
9/26/11	Ronnie Salas	6/21/12	Rudy Ortega, responding for Mr. Salas, requested a copy of the original letter via email. The letter was emailed to Mr. Ortega.
9/26/11	Ron Andrade	6/21/12	Left voicemail. No response was received.
9/26/11	John Valenzuela	6/21/12	Mr. Valenzuela had no comments. He recommended that we contact Ann Brierty with the San Manuel Band of Mission Indians regarding the proposed project. Ms. Brierty does not appear on the NAHC contact list.
9/26/11	Delia Dominguez	6/21/12	Left voicemail. No response was received.
NAHC: Native American Heritage Commission.			

5.4 CULTURAL RESOURCES FIELD SURVEY

On October 13, 2011, Archaeologist Albert Knight conducted a pedestrian survey of the APE/PA. The survey area can be described as three distinct areas: Upstream/Reservoir-side of the Dam; downstream side of the Dam; and Maple Canyon. The photograph below, taken from the northeast and looking southwest, depicts the upstream side of the reservoir.



Big Tujunga Reservoir - View from northeast

5.4.1 Upstream/Reservoir-Side of the Dam

A large part of this area (mainly on the northwest side of the canyon) could be clearly seen from various vantage points just northwest of Big Tujunga Canyon Road. The upstream/reservoir-side of the Dam consists of a very narrow and steep gorge that is blocked by Big Tujunga Dam. The only exception is a small level area just north of the northern end of the Dam, which is well above the bottom of the canyon. This area was undoubtedly used as a staging/work area when the Dam was constructed. The BTR was nearly empty at the time and it was quite easy to see into the basin/canyon that forms the reservoir. The sides of the basin/canyon are very steep, often to vertical. This is true from the Dam all the way upstream to the head of the canyon, well above the BTR proper. With the exception of the small area near the Dam, there are no stream-side terraces or any other places where any archaeology sites, either prehistoric or historic, might be located. The material visible in the bottom of the canyon is mud, rock, and plant debris, much of which is burnt.

5.4.2 Downstream Side of the Dam

All but the northernmost end of this area could be clearly seen from various vantage points just north of Big Tujunga Canyon Road, especially from the concrete arch bridge just downstream from the Dam. The down-stream area is a continuation of the narrow and steep canyon above the Dam, although the canyon does widen out a small amount. The main drainage and the west side of the drainage are covered with natural riparian vegetation. The east side of the drainage is an embankment that is completely covered in cemented riprap to about 20 feet wide parallel to the drainage. A paved access road is immediately east of the riprap; both the road and riprap follow the drainage down-canyon from the north side of the dam to just above (north of) the arch bridge that carries Big Tujunga Canyon Road across the canyon (near contour level 2146). The hillside above (generally east) this paved road has been contoured for stability and drainage control, and much of the trace of the access road above the drainage between where the (paved) road leaves the canyon bottom and where it becomes part of the main Dam facilities (i.e., about where Maple Canyon joins Big Tujunga Canyon) has been destroyed or obscured by grading and vegetation. The section of road from the entrance of the facilities northeast to the south (or southeast) side of the dam could not be accessed. The part of this section of road that can be seen from the entrance is paved, and it may be paved all the way to the Dam.

The USFS believes that the site of Hansen's Lodge (USFS# 05015500017) was somewhere on the lower (now paved) part of the Dam access road, close by the drainage (and just southeast of Gauging Station 2063) near UTM 11:3794522N; 390151E. This part of the access road is paved and has cemented riprap between it and the active part of the drainage; any traces of the lodge, if such still exist, may be buried and not visible. This location, however, seems to be very close to the drainage. It is possible that the lodge was actually slightly higher on the hillside above the river (although the lodge is known to have been flooded at least twice). Hansen Dam, down-stream several miles, was named for the patriarch Dr. Homer Hansen, and is considered to be eligible for the NRHP. The areas where the BTR and its facilities are located were also once owned by the Hansen family, and a small canyon on the northwest side of the reservoir is still known as "Hansen Canyon".

The site location and its nearest vicinity was examined by Pam Daly of Daly and Associates during the current study. Very few remnants, other than a small pile of river rocks and large, mature oaks in this location, remain.

5.4.3 Maple Canyon

This area, as shown in the following two photographs, was easily accessed on foot via a paved access road. One of two water tanks (shown on the topographic map just above contour "2400") has the words "Maple Canyon" painted on it. The entrance to the canyon is directly east of and across the road from the entrance to the Dam complex. The bottom of the canyon and the hillsides in the lower parts of Maple Canyon above (i.e., east of) Big Tujunga Canyon Road for 100–150 meters remain natural although the vegetation was burnt in the Station Fire. There are no stream-side terraces or other places where an archaeological site might be located in this part of the canyon. Beyond (east of) this, the canyon has been filled with many tons of soil and rock deposited from earlier clearing of debris out of the Dam basin.



Maple Canyon Sediment Placement Site – View from the Northwest



Maple Canyon Sediment Placement Site – View from On Site

6.0 EFFECTS ANALYSIS

This impact analysis is provided to assist the LACFCD and USACE in fulfilling its compliance responsibilities under NEPA. Section 106 of NHPA and its implementing regulations at 36 CFR, 800 were used to identify historic properties within the APE/PA. The criteria of adverse effects codified at 36 CFR 800.5 are used to assess the effects of the proposed project on the four historic properties identified within the APE/PA. This section is summarized from Daly (2017)

6.1 ASSESSMENT OF ADVERSE EFFECTS

Big Tujunga Dam (USFS#05-01-55-221)

The Dam, determined eligible for listing in the National Register of Historic Places (FEMA 1999), is within the APE/PA of the proposed project; however, since the project entails removal of sediment from behind the dam and no alteration of the dam structure is planned, there will be no adverse effects to the dam as a result of the project.

The proposed project involves the excavation of sediment accumulated behind the Dam and the grading of a ramp that will extend into the BTR to facilitate access by grading equipment. There is, therefore, a possibility that historical and/or archaeological material would be uncovered during necessary excavations for the construction of the vehicle access road behind the Dam structure into the reservoir. Although the likelihood of encountering archaeological resources on the APE/PA is considered low, there is a possibility that buried resources are in the area.

It should be noted that the dam is not recorded on DPR 523 Site Recording forms and the SCCIC does not maintain the USFS site record in its files.

Verdugo Circuit (P-19-186860; USFS#05-01-51-138)

Unlike the systems that provided electricity to the Boulder Dam/Hoover Dam project, local circuits associated utility poles, and construction/maintenance roads are found in rural/forested areas throughout California. While the survey for the current project did not allow for the evaluation of the SCE road and Verdugo circuit outside of the APE, it appears that the utility poles and power lines within the current APE should not be considered more than ordinary and ubiquitous

structures (Daly 2017). The circuit does not appear eligible for listing on the National or California Registers under any of the four significance criteria and it will not be adversely impacted by the project. No mitigation is therefore necessary for the Verdugo Circuit.

USFS Transmission Line Road Alignment (19-186877; USFS#05-01-55-187)

Construction/maintenance roads such as the road that runs under the Verdugo Circuit in the APE are found in rural/forested areas throughout California. While the survey for the current project did not allow for the evaluation of the SCE road and Verdugo circuit outside of the APE, it appears that the utility poles and power lines should not be considered more than ordinary and ubiquitous structures. The construction/maintenance road does not appear to have the potential to be considered a historic resource as it does not meet any of the four significance criteria for eligibility (Daly 2017). The road alignment is not a historic resource and mitigation is therefore not necessary.

Hansen's Lodge (USFS#05-01-55-00017)

The flood of 1926 destroyed the lodge, but it was rebuilt, only to be destroyed again in 1938 by another, larger flood. Only stone fireplaces remained and the structure was not rebuilt (Leadabrand 1970). The last remnants of the lodge are said to have been knocked down years ago to deter weekend partygoers.

The site was investigated during the current project for any physical remains of the Hansen Lodge building. Other than three piles of river rocks that are supposed to have been from the stone chimney of the lodge, there are no physical attributes of a building that was located here. The site does not possess any physical aspects of integrity such as design, setting, materials, workmanship, feeling, and association, which could convey the history of Hansen's Lodge along Big Tujunga Creek and his patent homestead. It does not meet any of the four significance criteria for eligibility (Daly 2017).

While remnants of the lodge may be present under or adjacent to the access roads southwest of the dam, because the paving of existing roads is not anticipated to require substantial grading that could impact native sediments or require grading outside the existing access road footprint, no adverse effects to this site, if it still exists, are anticipated.

7.0 RECOMMENDATIONS

Retention of an Archaeologist prior to ground-disturbing activities in the APE/PA, or as a monitor during implementation, is at the discretion of LACFCD and its CEQA compliance responsibilities; however, if cultural resources or human remains are discovered during any ground disturbing activities, the USACE will be notified by either the project archaeologist or by LACFCD onsite personnel. All work in the vicinity of the discovery will cease until the USACE evaluates the nature and significance of the find, and determines the level of documentation necessary and potential consultation required with the NAHC, State Historic Preservation Officer (SHPO), Native American tribes, and any others. In the case of an inadvertent discovery of Human Remains, the proponent will immediately notify the responsible Federal official and County Coroner, and once determined to be of Native American origin by the coroner, the Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulations at 43 CFR 10 will be followed to manage and resolve the discovery and determine the final disposition of the remains.

8.0 CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this cultural resources report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

DATE: October 2017 SIGNED:

Patrick O. Maxon, RPA
Director, Cultural Services

9.0 REFERENCES

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1979 The Black, the Red, and the White: Duality and Unity in the Luiseño Cosmos. *The Journal of California and Great Basin Anthropology* 1(1):71-88.

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1970 *Early Uses of California Plants*. University of California Press, Berkeley.

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Mason, R.D., W.H. Bonner, S.J. Bouscaren, L. Carbone, R.O. Gibson, L.P. Klug, M.L. Peterson and V. Popper
1997 San Joaquin Hills Transportation Corridor Results of Data Recovery at CA-ORA-225, vol. 2. Chambers Group, Inc., Irvine, California. Submitted to Sverdrup Corporation, Irvine, California and Transportation Corridor Agencies, Santa Ana, California.

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APPENDIX A

CULTURAL RESOURCES RECORDS SEARCH (SCCIC)

SCCIC Bibliography: Big Tujunga Reservoir

LA-01477

Author(s): Singer, Clay A.
Year: 1985
Title: Cultural Resources Survey and Impact Assessment for the Proposed Maple Canyon Relief Drain, Near Big Tujunga Dam in the Angeles National Forest, Los Angeles County, Ca
Affliliation:
Resources:
Quads: CONDOR PEAK
Pages:
Notes:

LA-01529

Author(s): McIntyre, Michael J.
Year: 1985
Title: Archaeological Reconnaissance Report: Lower Big Tujunga Vegation Management Arr
Affliliation: U.S. Forest Service
Resources:
Quads: CONDOR PEAK
Pages:
Notes:

LA-03053

Author(s): Anonymous
Year: 1994
Title: Cultural Resources Assessment Angeles Forest Highway at Mile Marker 23.00 Angeles National Forest Los Angeles County, California
Affliliation: LSA Associates, Inc.
Resources:
Quads: CONDOR PEAK
Pages:
Notes:

LA-05454

Author(s): Romani, Gwendolyn R.
Year: 2000
Title: Negative Archaeological Survey Report Southern California Edison: Fall Creek 2
Affliliation: Compass Rose Archaeological, Inc.
Resources:
Quads: CONDOR PEAK
Pages:
Notes:

LA-05510

Author(s): Romani, Gwendolyn R.
Year: 1999
Title: Sce Road Repair, Angeles National Forest, Los Angeles County Archaeological Survey Report
Affliliation: Compass Rose Archaeological, Inc.
Resources:
Quads: MT WILSON
Pages:
Notes:

SCCIC Bibliography: Big Tujunga Reservoir

LA-06789

Author(s): Storey, Noelle
Year: 2002
Title: Tom Ross Honey Company Apiary Site (special Use Permit Issuance Lar 504603) Angeles National Forest, Los Angeles County, California
Affliliation: Angeles National Forest
Resources:
Quads: CONDOR PEAK
Pages:
Notes:

LA-07154

Author(s): Bartoy, Kevin M.
Year: 2003
Title: Clear Creek School Camp Water Acquisition, Conveyance and Storage System Angeles National Forest, Los Angeles County, California
Affliliation: Pacific Legacy, Inc.
Resources:
Quads: CONDOR PEAK
Pages:
Notes: ARR # 05-01-00-868

LA-07155

Author(s): Bartoy, Kevin M.
Year: 2003
Title: La County Flood Control Tanks Angeles National Forest, Los Angeles County, California
Affliliation: Pacific Legacy, Inc.
Resources:
Quads: CONDOR PEAK
Pages:
Notes: ARR # 05-01-00-841

LA-07283

Author(s): Brasket, Kelli S.
Year: 2004
Title: Wildwood, Tujunga and Fall Creek Plantations Project Angeles National Forest, Los Angeles County, Ca (arr#05-01-000935)
Affliliation: Angeles National Forest
Resources: 19-003386
Quads: CONDOR PEAK
Pages:
Notes:

LA-08184

Author(s): Bartoy, Kevin M.
Year: 2004
Title: Clear Creek Fuelbreak Improvement Project, Angeles National Forest, Los Angeles County, California
Affliliation: Pacific Legacy, Inc.
Resources:
Quads: CONDOR PEAK
Pages:
Notes:

SCCIC Bibliography: Big Tujunga Reservoir

LA-09733

Author(s): Romani, Gwen
Year: 2004
Title: ARR #05-01-00827: Phase I Cultural Resource Investigation: LARRD Hazard Reduction, Organized Camps hazardous Fuels Reduction Project, Angeles National Forest, Los Angeles County, California.
Affiliation: Compass Rose, Inc
Resources: 19-003471
Quads: CHILAO FLAT, CONDOR PEAK, WATERMAN MTN
Pages: 40
Notes:

LA-09744

Author(s): Romani, Gwendolyn R.
Year: 1999
Title: Results of Archaeological Survey: Big Tujunga Arundo Removal (ARR No. 05-01-00569)
Affiliation: Compass Rose Archaeological, Inc
Resources: 19-001153, 19-002051
Quads: CHILAO FLAT, CONDOR PEAK, SUNLAND
Pages: 22
Notes:

LA-09746

Author(s): Schmidt, James and Gwen Romani
Year: 2003
Title: Phase I Cultural Resource Investigation: Southern California Edison, Verdugo Distribution Line Circuit, Angeles National Forest, Los Angeles County (ARR No. 05-01-00825)
Affiliation: Compass Rose Archaeological, Inc.
Resources: 19-001153, 19-001980, 19-002051, 19-186860
Quads: CONDOR PEAK, SUNLAND
Pages: 20
Notes:

LA-10175

Author(s): Unknown
Year: 2009
Title: Confidential Cultural Resources Specialist Report for the Tehachapi Transmission Project
Affiliation: Applied Earthworks, Aspen Environmental Group
Resources: 19-000806, 19-001128, 19-001299, 19-001300, 19-001315, 19-001357, 19-001382, 19-001636, 19-001770, 19-001771, 19-001783, 19-001956, 19-001957, 19-002206, 19-002212, 19-002343, 19-002350, 19-002363, 19-002411, 19-002412, 19-003009, 19-003018, 19-003025, 19-003031, 19-003032, 19-003037, 19-003090, 19-003099, 19-003136, 19-003152, 19-003295, 19-003385, 19-003477, 19-003606, 19-003638, 19-003795, 19-003852, 19-003853, 19-003854, 19-100277, 19-100439, 19-100496, 19-100644, 19-120031, 19-120032, 19-120072, 19-120074, 19-180689, 19-186545, 19-186860, 19-186870, 19-186871, 19-186872, 19-186873, 19-186875, 19-186876, 19-186877, 19-186917, 19-186921, 19-186923, 19-186925, 19-187713
Quads: ACTON, AZUSA, BALDWIN PARK, CHILAO FLAT, CONDOR PEAK, DEL SUR, EL MONTE, FAIRMONT BUTTE, LA HABRA, LAKE HUGHES, LANCASTER WEST, LITTLE BUTTES, LOS ANGELES, MT WILSON, PACIFICO MOUNTAIN, PALMDALE, PASADENA, RITTER RIDGE, SLEEPY VALLEY, WATERMAN MTN, WHITTIER, YORBA LINDA
Pages: 234
Notes: Also OR 3777

SCCIC Bibliography: Big Tujunga Reservoir

LA-10470

Author(s): Schmidt, James

Year: 2010

Title: Archaeological Monitoring Report - Southern California Edison Station Fire Emergency Transmission Line Road Maintenance Project Project, Angeles National Forest, Los Angeles County, California ARR# 05-01-1154

Affliliation: Compass Rose Archaeological

Resources: 19-000241, 19-000902, 19-001128, 19-001359, 19-001382, 19-001572, 19-002350, 19-002359, 19-002361, 19-002363, 19-002411, 19-002412, 19-002987, 19-002989, 19-002991, 19-002994, 19-002995, 19-002996, 19-002997, 19-002998, 19-003000, 19-003004, 19-003005, 19-003008, 19-003009, 19-003018, 19-003025, 19-003037, 19-003136, 19-003141, 19-003152, 19-003295, 19-003562, 19-003606, 19-003722, 19-003730, 19-003731, 19-003732, 19-100438, 19-100496, 19-186545, 19-186876, 19-186877, 19-186901, 19-186923, 19-186925, 19-187713

Quads: ACTON, AZUSA, CHILAO FLAT, CONDOR PEAK, MT WILSON, PACIFICO MOUNTAIN

Pages: 31

Notes:

APPENDIX B

PALEONTOLOGICAL RESOURCES RECORDS SEARCH (LACM)

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

Vertebrate Paleontology
Telephone: (213) 763-3248
FAX: (213) 746-7431
e-mail: vrhue@nhm.org

OCT 2 8 2011

BY:

NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

27 October 2011

BonTerra Consulting
151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626-7969

Attn: Patrick O. Maxon, Director, Cultural Resources

re: Paleontological Resources for the proposed Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project, in Big Tujunga Canyon, Los Angeles County, project area

Dear Patrick:

I have conducted a thorough search of our Vertebrate Paleontology records for the proposed Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project, in Big Tujunga Canyon, Los Angeles County, project area as outlined on the portion of the Condor Peak USGS topographic quadrangle map that you sent to me via e-mail on 3 October 2011. We do not have any vertebrate fossil localities that lie within the proposed project boundaries, nor do we have any localities very nearby from sedimentary deposits that occur in the proposed project area.

Bedrock in most of the proposed project area is composed of plutonic igneous rocks that, of course, will be devoid of fossils. In the southwestern portion of the proposed project area there are surficial deposits of older Quaternary Alluvium, probably as a mixture of fan and fluvial deposits. Below the Big Tujunga Dam there are deposits of younger Quaternary Alluvium, albeit as coarse gravelly deposits. These latter types of sedimentary deposits typically do not contain vertebrate fossils, at least in the uppermost layers, and we do not have any vertebrate fossil localities very nearby from these deposits.

Excavations in the igneous bedrock occurring throughout most of the proposed project area will not encounter any fossils. Shallow excavations in the Quaternary deposits exposed in the southwestern portion of the proposed project area probably will not uncover significant

vertebrate fossils. Deeper excavation in the latter portion of the proposed project area, however, may encounter significant vertebrate fossils. Any substantial excavations in the sedimentary deposits exposed in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Any fossil materials uncovered during mitigation activities should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

Samuel A. McLeod

Samuel A. McLeod
Vertebrate Paleontology

enclosure: draft invoice

APPENDIX C

NATIVE AMERICAN CONSULTATION (NAHC)

BonTerra CONSULTING

TRANSMITTAL

DATE: September 22, 2011

TO:	Mr. Dave Singleton	**FAX NUMBER:**	(916) 657-5390
	Program Analyst	**TEL NUMBER:**	(916) 653-6251
	Native American Heritage Comm.	**PROJECT:**	**Big Tujunga Reservoir Sediment Removal**
	915 Capitol Mall, Rm. 364		
	Sacramento, CA 95814	**FROM:**	Patrick Maxon, RPA

☒ Fax / Pages_ ☒ E-Mail ☐ Fed Ex / Overnite Express ☐ Delivery / Courier

REGARDING: Sacred Lands File Search and Contact List Request

Dear Mr. Singleton:

BonTerra Consulting has been retained to complete a cultural resources study for three proposed **Big Tujunga Reservoir Sediment Removal Project** located in Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines).

At your earliest convenience, please conduct searches of the Sacred Lands File for the **Big Tujunga Reservoir Sediment Removal Project** and a one-mile radius. The project site is located on a portion of the USGS ***Condor Peak, CA*** 7.5 Minute Quadrangles in Township 2 and 3 North; Range 12 and 13 West (*S.B.B.M*).

The project entails the removal of alluvial sediment deposited into the Big Tujunga Reservoir. The project includes grading and widening of access roads to and from the reservoir.

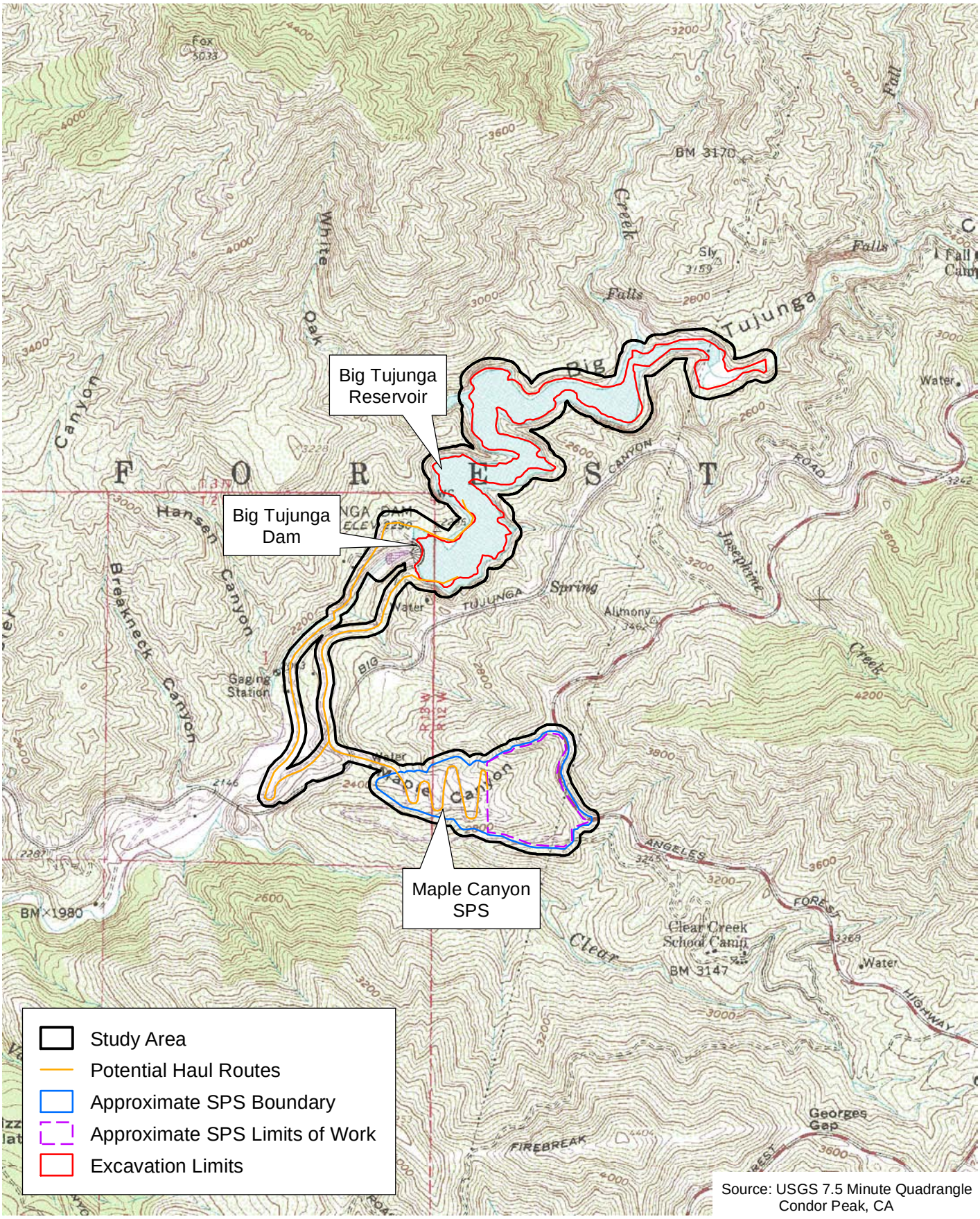
Please fax the results to me at (714) 444-9599, or e-mail to pmaxon@bonterraconsulting.com, referencing your letter to the "**Big Tujunga Reservoir Sediment Removal Project** ".

If you have any questions or require any additional information, please do not hesitate to contact me at (714) 444-9199 or via email.

Sincerely,

BONTERRA CONSULTING

Patrick Maxon, RPA
Director, Cultural Resources



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U.S. Geological Survey 7.5-Minute Quadrangle

Exhibit 2

Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project

N W E S

2,000 1,000 0 2,000 Feet

BonTerra CONSULTING

(Rev: 6-21-2011 CJS) R:\PAS\Projects\CoLADPW\J162\Graphics\Bio\Ex2_LV_quad.pdf

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

September 26, 2011

Mr. Patrick Maxon, RPA, Director, Cultural Resources
Bonterra Consulting
151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

Sent by FAX to: 714-444-9599
No. of Pages: 4

Re: Sacred Lands File Search and Native American Contacts list for the **"Big Tujunga Reservoir Sediment Removal Project;"** located in the Tujunga Canyon; Los Angeles County, California

Dear Mr. Maxon:

The Native American Heritage Commission (NAHC) conducted a Sacred Lands File search of the 'area of potential effect,' (APE) based on the USGS coordinates provided and **Native American cultural resources were not identified** in the USGS coordinates you specified. Also, please note; the NAHC Sacred Lands Inventory is not exhaustive and do not preclude the discovery of cultural resources during ground braking activity. There are Native American cultural resources in close proximity to the APE.

The California Environmental Quality Act (CEQA – CA Public Resources Code §§ 21000-21177, amendments effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. CA Government Code §65040.12(e) defines "environmental justice" provisions and is applicable to the environmental review processes.

Early consultation, even during Initial Study or First Phase surveys with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Local Native Americans may have knowledge of the religious and cultural significance of the historic properties of the proposed project for the area (e.g. APE). Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). We urge consultation with those tribes and interested Native Americans on the list of Native American Contacts we attach to this letter in order to see if your proposed project might impact Native American cultural resources. Lead agencies should consider avoidance as defined in §15370 of the CEQA Guidelines when significant cultural resources as defined by the CEQA Guidelines §15064.5 (b)(c)(f) may be

affected by a proposed project. If so, Section 15382 of the CEQA Guidelines defines a significant impact on the environment as "substantial," and Section 2183.2 which requires documentation, data recovery of cultural resources. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The aforementioned Secretary of the Interior's *Standards* include recommendations for all 'lead agencies' to consider the historic context of proposed projects and to "research" the cultural landscape that might include the 'area of potential effect.'

Partnering with local tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA (42 U.S.C 4321-43351) and Section 106 4(f), Section 110 (f)(k) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation.

Also, California Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery', another important reason to have Native American Monitors on board with the project.

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. An excellent way to reinforce the relationship between a project and local tribes is to employ Native American Monitors in all phases of proposed projects including the planning phases.

Confidentiality of "historic properties of religious and cultural significance" may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APE and possibility threatened by proposed project activity.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton

Attachment: Native American Contact List

Native American Contacts
Los Angeles County
September 26, 2011

Charles Cooke
32835 Santiago Road
Acton , CA 93510
suscol@intox.net

(661) 733-1812 - cell
suscol@intox.net

Chumash
Fernandeno
Tataviam
Kitanemuk

Beverly Salazar Folkes
1931 Shadybrook Drive
Thousand Oaks, CA 91362
folkes@msn.com
805 492-7255
(805) 558-1154 - cell
folkes9@msn.com

Chumash
Tataviam
Ferrnandeño

Fernandeno Tataviam Band of Mission Indians
Ronnie Salas, Cultural Preservation Department
601 South Brand Boulevard, Suite 102
San Fernando CA 91340
rsalas@tataviam-nsn.gov
(818) 837-0794 Office

(818) 837-0796 Fax

Fernandeno
Tataviam

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th St, Rm. 403
Los Angeles , CA 90020
randrade@css.lacounty.gov
(213) 351-5324
(213) 386-3995 FAX

Kitanemuk & Yowlumne Tejon Indians
Delia Dominguez, Chairperson
981 N. Virginia
Covina , CA 91722
deedominguez@juno.com
(626) 339-6785

Yowlumne
Kitanemuk

San Fernando Band of Mission Indians
John Valenzuela, Chairperson
P.O. Box 221838
Newhall , CA 91322
tsen2u@hotmail.com
(661) 753-9833 Office
(760) 885-0955 Cell
(760) 949-1604 Fax

Fernandeño
Tataviam
Serrano
Vanyume
Kitanemuk

Randy Guzman - Folkes
655 Los Angeles Avenue, Unit E
Moorpark , CA 93021
ndnRandy@yahoo.com
(805) 905-1675 - cell

Chumash
Fernandeño
Tataviam
Shoshone Paiute
Yaqui

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed "Big Tujunga Reservoir Sediment Removal Project;" located in the Angeles National Forest area; Los Angeles County, California for which a Sacred Lands File search and Native American Contacts list were requested.

BonTerra CONSULTING

PASADENA COSTA MESA

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www.BonTerraConsulting.com
151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

September 27, 2011

Mr. Ron Andrade
LA City/County Native American Indian Comm.
3175 W. 6th Street, Rm. 403
Los Angeles, California 90020

Subject: Big Tujunga Reservoir Sediment Removal Project

Dear Mr. Andrade:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed Big Tujunga Reservoir Sediment Removal Project located in Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

Location

The project site is located on a portion of the USGS Condor Peak, *CA* 7.5 Minute Quadrangles in Township 2 and 3 North; Range 12 and 13 West (*S.B.B.M*). See attached exhibit.

Project

The Project entails the removal of alluvial sediment deposited into the Big Tujunga Reservoir. The project includes grading and widening of access roads to and from the reservoir. BonTerra will produce a cultural resources report that will identify any significant issues related to any cultural resources on the property.

NAHC Notification

A Sacred Lands File Search conducted by the Native American Heritage Commission (NAHC) did not identify the presence of Native American cultural resources on the project site. The NAHC also provided BonTerra Consulting with a list of Native American individuals/organizations that may have knowledge of cultural resources in the project area. Your name and contact information was included on the list and serves as the basis for this letter.

Records Search/Survey

An archaeological/historic records search will be conducted at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton to evaluate the existing conditions of the project site. A survey of the project site will be completed after the records search to identify any exposed cultural resources.

Your participation in this local planning process is important. If you have any additional knowledge of Native American Sacred Lands or other cultural resources on or near the study area, or any comment on the project, please contact me at your earliest convenience at (714) 444-9199 or via email at pmaxon@bonterraconsulting.com, with a subject line referencing the "Big Tujunga Reservoir Sediment Removal Project".

Sincerely,

BONTERRA CONSULTING

Patrick O. Maxon, RPA
Director – Cultural Resources

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Costa Mesa, CA 92626

September 27, 2011

Mr. Charles Cooke
Tehachapi Indian Tribe
32835 Santiago Road
Acton, California 93510

Subject: Big Tujunga Reservoir Sediment Removal Project

Dear Mr. Cooke:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed Big Tujunga Reservoir Sediment Removal Project located in Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

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Sincerely,

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Patrick O. Maxon, RPA
Director – Cultural Resources

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151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

September 27, 2011

Ms. Delia Dominguez
Kitanemuk & Yowlumne Tejon Indians
981 N. Virginia
Covina, California 91722

Subject: Big Tujunga Reservoir Sediment Removal Project

Dear Ms. Dominguez:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed Big Tujunga Reservoir Sediment Removal Project located in Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

Location

The project site is located on a portion of the USGS Condor Peak, *CA* 7.5 Minute Quadrangles in Township 2 and 3 North; Range 12 and 13 West (*S.B.B.M*). See attached exhibit.

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Patrick O. Maxon, RPA
Director – Cultural Resources

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151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

September 27, 2011

Mr. Randy Guzman-Folkes
655 Los Angeles Avenue
Unit E
Moorpark, California 93021

Subject: Big Tujunga Reservoir Sediment Removal Project

Dear Mr. Guzman-Folkes:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed Big Tujunga Reservoir Sediment Removal Project located in Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

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Sincerely,

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Patrick O. Maxon, RPA
Director – Cultural Resources

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Costa Mesa, CA 92626

September 27, 2011

Mr. Ronnie Salas
Fernandeno Tataviam Band of Mission Indians
601 South Brand Blvd. Suite 102
San Fernando, California 91340

Subject: Big Tujunga Reservoir Sediment Removal Project

Dear Mr. Salas:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed Big Tujunga Reservoir Sediment Removal Project located in Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

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Director – Cultural Resources

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151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

September 27, 2011

Ms. Beverly Salazar Folkes
1931 Shadybrook Drive
Thousand Oaks, California 91362

Subject: Big Tujunga Reservoir Sediment Removal Project

Dear Ms. Salazar Folkes:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed Big Tujunga Reservoir Sediment Removal Project located in Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

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BONTERRA CONSULTING

Patrick O. Maxon, RPA
Director – Cultural Resources

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151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

September 27, 2011

Mr. John Valenzuela
San Fernando Band of Mission Indians
P.O. Box 221838
Newhall, California 91322

Subject: Big Tujunga Reservoir Sediment Removal Project

Dear Mr. Valenzuela:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed Big Tujunga Reservoir Sediment Removal Project located in Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

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Records Search/Survey

An archaeological/historic records search will be conducted at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton to evaluate the existing conditions of the project site. A survey of the project site will be completed after the records search to identify any exposed cultural resources.

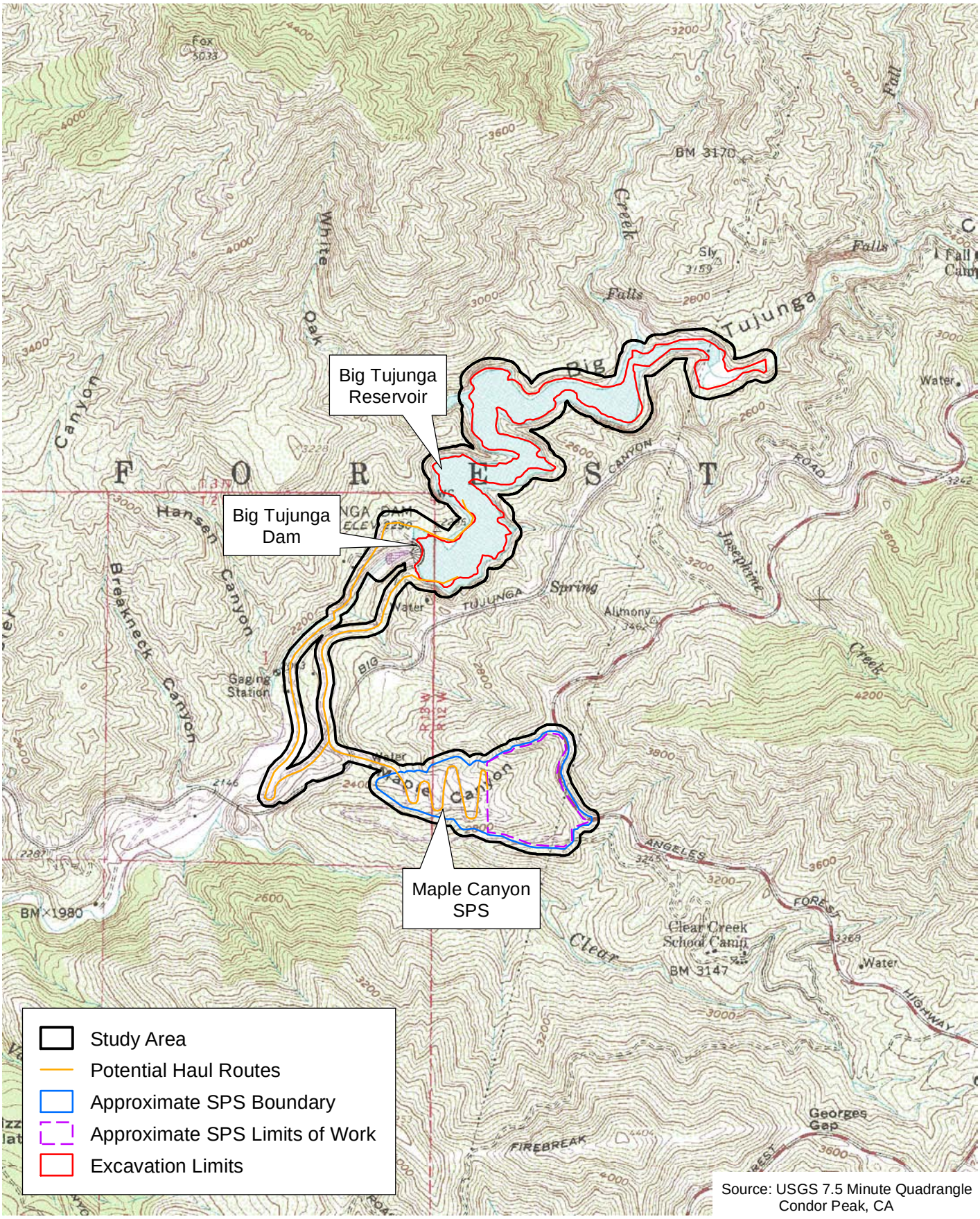
Your participation in this local planning process is important. If you have any additional knowledge of Native American Sacred Lands or other cultural resources on or near the study area, or any comment on the project, please contact me at your earliest convenience at (714) 444-9199 or via email at pmaxon@bonterraconsulting.com, with a subject line referencing the "Big Tujunga Reservoir Sediment Removal Project".

Sincerely,

BONTERRA CONSULTING

Patrick O. Maxon, RPA
Director – Cultural Resources

R:\Projects\CoLADPW-S\J167\Cultural\NA Scoping BigT-092711.docx



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U.S. Geological Survey 7.5-Minute Quadrangle

Exhibit 2

Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project

N W E S

2,000 1,000 0 2,000 Feet

BonTerra CONSULTING

(Rev: 6-21-2011 CJS) R:\PAS\Projects\CoLADPW\J162\Graphics\Bio\Ex2_LV_quad.pdf

APPENDIX D

FOREST SERVICE PERMIT

SEP 29 2011

Authorization ID: LAR9040CRI
Contact ID: BON TERRA
Expiration Date: 09/26/2012

FS-2700-32 (10/09)
OMB No. 0596-0082

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

PERMIT FOR ARCHAEOLOGICAL INVESTIGATIONS

Authority:
The Antiquities Act of 1906, 16 U.S.C. 431-433
The Organic Act of 1897, 16 U.S.C. 551

1. Holder **BON TERRA CONSULTING**	**2. Date of corresponding application** 9/13/2011
3. Address Attn: Patrick Maxon 151 Kalmus, E-200 Costa Mesa, CA 92626	**4. Telephone numbers** 714/444/9199(office) **5. Email addresses** pmaxon@bonterraconsulting.com
6. Name of authorized officer Michael J. McIntyre, District Ranger Telephone numbers 818/899/1900 x223 Email addresses	**7. Name of principal investigators** Patrick Maxon Telephone numbers 714/444/9199(office) Email addresses pmaxon@bonterraconsulting.com
8. Name of field directors authorized to carry out field projects Patrick Maxon and Albert Knight	**Telephone numbers** 714/444/9199(Maxon) 818/426/4730(Knight) **Email addresses** pmaxon@bonterraconsulting.com ahunknight@msn.com

9. Activities authorized

Consulting: Project-specific
Non-ground-disturbing activities (such as surveys)

10. Description of National Forest System lands authorized for use (hereinafter referred to as "the permit area")

Cultural resource study for the excavation of sediment within the Big Tujunga Reservoir and the deposition of the sediment in the Maple Canyon Sediment Placement Site within Big Tujunga Canyon.

11. Permit term
From September 26, 2011 To September 26, 2012
12. Name and address of the curatorial facility in which collections, records, data, photographs, and other documents resulting from activities conducted under this permit shall be deposited for permanent preservation on behalf of the United States Government. USDA Forest Service Attn: Darrell Vance 701 N. Santa Anita Ave. Arcadia, CA 91006

TERMS AND CONDITIONS

I. GENERAL TERMS

A. AUTHORITY. This permit is issued pursuant to The Organic Act of 1897, 16 U.S.C. 551, 36 CFR Part 251, Subpart B, 36 CFR Part 296, the Uniform Rules and Regulations of the Antiquities Act of 1906, 43 CFR Part 3, and applicable Forest Service policies and procedures and is subject to their provisions.

B. AUTHORIZED OFFICER. The authorized officer for this permit is the Forest Supervisor or a subordinate officer with delegated authority.

C. ANNUAL REVIEW. If this permit is issued for more than one year, it shall be reviewed annually by the authorized officer.

D. RENEWAL AND EXTENSION. This permit is not renewable. The holder may request an extension of this permit for a limited, specified period to complete activities authorized under this permit. Requests for an extension must be submitted in writing at least one month before expiration of this permit.

E. AMENDMENT. This permit may be amended in whole or in part by the Forest Service when, at the discretion of the authorized officer, such action is deemed necessary or desirable to incorporate new terms that may be required by law, regulation, the applicable land management plan, or projects and activities implementing a land management plan pursuant to 36 CFR Part 215. Any amendments to individuals named in or activities authorized by this permit that are needed by the holder must be approved by the authorized officer in writing.

F. COMPLIANCE WITH LAWS, REGULATIONS, AND OTHER LEGAL REQUIREMENTS. In exercising the privileges granted by this permit, the holder shall comply with all present and future federal laws and regulations and all present and future state, county, and municipal laws, regulations, and other legal requirements that apply to the permit area, to the extent they do not conflict with federal law, regulations, or policy. The Forest Service assumes no responsibility for enforcing laws, regulations, and other legal requirements that fall under the jurisdiction of other governmental entities.

G. NON-EXCLUSIVE USE. The use and occupancy authorized by this permit are not exclusive. The Forest Service reserves the right of access to the permit area, including a continuing right of physical entry to the permit area for inspection, monitoring, or any other purpose consistent with any right or obligation of the United States under any law or regulation. The holder shall allow the authorized officer or the authorized officer's representative full access to the permit area at any time the holder is in the field for purposes of examining the permit area and any recovered materials and related records. The Forest Service reserves the right to allow others to use the permit area in any way that is not inconsistent with the holder's rights and privileges under this permit, after consultation with all parties involved.

H. ASSIGNABILITY. This permit is not assignable or transferable.

II. OPERATIONS

A. OPERATING PLAN. The application corresponding to this permit is incorporated as the operating plan for this permit and is attached as Appendix A. The authorized officer may supplement the information contained in the application as appropriate or necessary.

B. REQUIRED PERMITS. The holder shall obtain all other permits required for conducting the activities authorized by this permit.

C. QUALIFIED INDIVIDUALS. Archaeological project design, literature review, development of regional historical contexts, site evaluation, conservation and protection measures, and recommendations for subsequent investigations shall be developed with direct involvement of an individual who meets the Secretary of the Interior's Standards for Archaeology and Historic Preservation. Fieldwork shall be overseen by an individual who meets the Secretary of the Interior's Standards for Archaeology and Historic Preservation.

D. CONDITION OF OPERATIONS. The holder shall maintain the authorized improvements and permit area to standards of repair, orderliness, neatness, sanitation, and safety acceptable to the authorized officer and consistent with other provisions of this permit. Standards are subject to periodic change by the authorized officer.

E. PROHIBITION ON USE OF MECHANIZED EQUIPMENT IN WILDERNESS AREAS. The holder shall not use mechanized equipment in wilderness areas and shall not use mechanized equipment in proposed or potential wilderness areas without prior written approval from the authorized officer.

F. PROHIBITION ON FLINT KNAPPING AND LITHIC REPLICATION EXPERIMENTS. The holder shall not conduct any flint knapping or lithic replication experiments at any archaeological site, aboriginal quarry source, or non-archaeological site that might be mistaken for an archaeological site as a result of such experiments.

G. PROHIBITION ON IMPEDING OR INTERFERING WITH OTHER USES. The holder shall perform the activities authorized by this permit so as not to impede or interfere with administrative or other authorized uses of National Forest System lands.

H. RESTRICTION ON MOTOR VEHICLE USE. The holder shall restrict motor vehicle use to designated roads, trails, and areas, unless specifically provided otherwise in the operating plan.

I. MINIMIZING GROUND DISTURBANCE. The holder shall keep ground disturbance to a minimum consistent with the nature and purpose of the authorized fieldwork.

J. RESOURCE PROTECTION. The holder shall conduct all activities so as to prevent or minimize scarring, erosion, littering, and pollution of National Forest System lands, water pollution, and damage to watersheds. In addition, the holder shall take precautions at all times to prevent wildfire. The holder may not burn debris without prior written approval from the authorized officer.

K. PREVENTION OF INJURY. The holder shall take precautions to protect livestock, wildlife, the public, and other users of National Forest System lands from accidental injury at any excavation site.

L. DESTRUCTION AND REMOVAL OF TREES. The holder shall not destroy or remove any trees on National Forest System lands without prior written approval from the authorized officer.

M. RESOURCE MANAGEMENT FACILITIES. The holder shall not disturb resource management facilities, such as fences, reservoirs, and other improvements, within the permit area without prior written approval from the authorized officer. Where disturbance of a resource management facility is necessary, the holder shall return it to its prior location and condition.

N. BACKFILLING. The holder shall backfill all subsurface test and excavation sites as soon as possible after recording the results and shall restore subsurface test and excavation sites as closely as possible to their original contour.

O. REMOVAL OF STAKES AND FLAGGING. The holder shall remove temporary stakes and flagging installed by the holder upon completion of fieldwork.

P. SITE RESTORATION. The holder shall restore all camp and work areas to their original condition before vacating the permit area. Refuse shall be carried out and deposited in disposal areas approved by the authorized officer.

Q. TITLE TO ARTIFACTS AND ASSOCIATED DOCUMENTATION. Archaeological and historical artifacts excavated or removed from National Forest System lands and any associated documentation shall remain the property of the United States.

R. NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION (NAGPRA). In accordance with 25 U.S.C. 3002 (d) and 43 CFR 10.4, if the holder inadvertently discovers human remains, funerary objects, sacred objects, or objects of cultural patrimony on National Forest System lands, the holder shall immediately cease work in the area of the discovery and shall make a reasonable effort to protect and secure the items. The holder shall immediately notify the authorized officer by telephone of the discovery and shall follow up with written confirmation of the discovery. The activity that

resulted in the inadvertent discovery may not resume until 30 days after the authorized officer certifies receipt of the written confirmation, if resumption of the activity is otherwise lawful, or at any time if a binding written agreement has been executed between the Forest Service and the affiliated Indian tribes that adopts a recovery plan for the human remains and objects.

S. ADDITIONAL REQUIREMENTS. Prior to beginning any fieldwork under the authority of this permit, the holder shall contact the authorized officer responsible for administering the lands involved to obtain further instructions regarding current land and resource conditions.

III. REPORTING REQUIREMENTS

A. PRELIMINARY REPORT. The holder shall submit a preliminary report to the authorized officer within 30 days of completion of the first stage of fieldwork. The preliminary report shall enumerate what was done during the first stage of fieldwork, how it was done, by whom, where, and with what results, including maps, global positioning satellite data, an approved site form for each newly recorded archaeological site, and the holder's professional recommendations regarding resource significance, as appropriate. Depending on the scope, duration, and nature of the work, the authorized officer may require progress reports periodically for the duration of the authorized activities.

B. DRAFT FINAL REPORT. Within 60 days of completion of fieldwork, the holder shall submit an edited draft final report to the authorized officer for review to ensure conformance with applicable laws, regulations, policies, and procedures and the terms and conditions of this permit.

C. FINAL REPORT. The holder shall submit the original final report and at least two copies to the authorized officer within 90 days after completion of fieldwork.

D. BLANKET SURVEY CONSULTING PERMIT. If this is a multi-year survey consulting permit, at the end of each calendar year, the holder shall submit to the authorized officer a report enumerating all activities conducted under this permit.

E. DEPOSIT OF MATERIALS AND DOCUMENTS WITH A CURATORIAL FACILITY. Within 90 days of the date the final report is submitted to the authorized officer, the holder shall deposit all artifacts, samples, and collections and original or clear copies of all records, data, photographs, and other documents resulting from activities authorized by this permit with the curatorial facility named in block 12.

F. CATALOGUE AND EVALUATION OF DEPOSITED MATERIALS. The holder shall provide the authorized officer with a catalogue and evaluation of all materials deposited with the curatorial facility named in block 12, including the facility's accession or catalogue numbers, and confirmation, signed by an authorized curatorial facility official, that artifacts, samples, and collections were deposited with the approved curatorial facility. The confirmation shall include the date the materials were deposited and the type, number, and condition of the deposited materials.

G. CONFIDENTIALITY OF SENSITIVE RESOURCES. The holder agrees to keep the specific location of sensitive resources confidential. Sensitive resources include but are not limited to threatened, endangered, and rare species; archaeological sites; caves; fossil sites; minerals; commercially valuable resources; and traditional cultural properties.

H. CONFIDENTIALITY OF INFORMATION IDENTIFYING ARCHAEOLOGICAL SITES. Without the authorized officer's prior written approval, the holder shall not publish any locational or other information identifying archaeological sites that could compromise their protection and management by the federal government.

I. IDENTIFICATION OF FOREST SERVICE PERMIT. Any published article, paper, or book containing results of work conducted under this permit shall specify that the work was performed in the Angeles National Forest under a Forest Service permit.

J. SUBMISSION OF WRITTEN MATERIALS. The holder shall submit a copy of any published or unpublished report, article, paper, or book resulting from the authorized activities (other than reports required by clauses III.A, B, and C) to the authorized officer and the appropriate official of the curatorial facility named in block 12. The holder shall submit tabular and spatial data to the authorized officer in the format specified in Appendix A.

IV. RIGHTS AND LIABILITIES

A. LEGAL EFFECT OF THE PERMIT. This permit, which is revocable and terminable, is not a contract or a lease, but rather a federal license. The benefits and requirements conferred by this authorization are reviewable solely under the

procedures set forth in 36 CFR Part 251, Subpart C, and 5 U.S.C. 704. This permit does not constitute a contract for purposes of the Contract Disputes Act, 41 U.S.C. 601. The permit is not real property, does not convey any interest in real property, and may not be used as collateral for a loan.

B. VALID OUTSTANDING RIGHTS. This permit is subject to all valid outstanding rights. Valid outstanding rights include those derived from mining and mineral leasing laws of the United States. The United States is not liable to the holder for the exercise of any such right.

C. ABSENCE OF THIRD-PARTY BENEFICIARY RIGHTS. The signatories of this permit do not intend to confer any rights on any third party as a beneficiary under this permit.

D. DAMAGE TO UNITED STATES PROPERTY. The holder has an affirmative duty to protect from damage the land, property, and other interests of the United States. Damage includes but is not limited to fire suppression costs, and all costs and damages associated with or resulting from the release or threatened release of a hazardous material occurring during or as a result of activities of the holder or the holder's heirs, assigns, agents, employees, contractors, or lessees on, or related to, the lands, property, and other interests covered by this permit. For purposes of clause IV.F, "hazardous material" shall mean any hazardous substance, pollutant, contaminant, hazardous waste, oil, and/or petroleum product, as those terms are defined under any federal, state, or local laws or regulations.

E. INDEMNIFICATION. The holder shall indemnify, defend, and hold harmless the United States for any costs, damages, claims, liabilities, and judgments arising from past, present, and future acts or omissions of the holder in connection with the use and occupancy authorized by this permit. This indemnification and hold harmless provision includes but is not limited to acts and omissions of the holder or the holder's family, guests, invitees, heirs, assignees, agents, employees, contractors, or lessees in connection with the use and occupancy authorized by this permit which result in (1) violations of any laws and regulations which are now or which may become applicable; (2) judgments, claims, demands, penalties, or fees assessed against the United States; (3) costs, expenses, and damages incurred by the United States; or (4) the release or threatened release of any solid waste, hazardous waste, hazardous materials, pollutant, contaminant, oil in any form, or petroleum product into the environment. The authorized officer may prescribe terms that allow the holder to replace, repair, restore, or otherwise undertake necessary curative actions to mitigate damages in addition to or as an alternative to monetary indemnification.

F. CONTINUATION OF LIABLITY BEYOND EXPIRATION. The holder shall not be released from requirements of this permit until all outstanding obligations have been satisfied, regardless of whether the permit has expired.

V. PERMIT FEES

A. LAND USE FEE. The holder shall pay an annual land use fee of $30.00 for the period from September 26, 2011 to September 26, 2012 and thereafter annually on N/A, in the amount of N/A.

B. MODIFICATION OF THE LAND USE FEE. The land use fee may be revised whenever necessary to reflect the market value of the authorized use or when the fee system used to calculate the land use fee is modified or replaced.

C. TERMINATION FOR NONPAYMENT. This permit shall terminate without the necessity of prior notice and opportunity to comply when any permit fee payment is 90 calendar days from the due date in arrears. The holder shall be responsible for the delinquent fees, as well as any other costs of restoring the site to its original condition, including hazardous waste cleanup.

VI. REVOCATION, SUSPENSION, AND TERMINATION

A. REVOCATION AND SUSPENSION. The authorized officer may revoke or suspend this permit in whole or in part:

1. For noncompliance with federal, state or local law.
2. For noncompliance with the terms and conditions of this permit.
3. For abandonment or other failure of the holder to exercise the privileges granted.
4. With the consent of the holder.
5. For specific and compelling reasons in the public interest.

Prior to revocation or suspension, other than immediate suspension under clause C, the authorized officer shall give the holder written notice of the grounds for revocation or suspension. In the case of revocation or suspension based on clause

VI.A.1, 2, or 3, the authorized officer shall give the holder a reasonable period, not to exceed 90 days, to cure any noncompliance.

B. RELINQUISHMENT OF ARTIFACTS AND DOCUMENTS. Within 30 days of revocation or suspension of this permit, the holder shall deliver to the Forest Service all artifacts and originals of all photographs, negatives, catalogues, field notes, analysis sheets, reports in any stage of preparation, computer files, and any other records resulting from any activity conducted under this permit.

C. IMMEDIATE SUSPENSION. The authorized officer may immediately suspend this permit in whole or in part when necessary to protect public health or safety or the environment. The suspension decision shall be in writing. The holder may request an on-site review with the authorized officer's supervisor of the adverse conditions prompting the suspension. The authorized officer's supervisor shall grant this request within 48 hours. Following the on-site review, the authorized officer's supervisor shall promptly affirm, modify, or cancel the suspension.

D. APPEALS AND REMEDIES. Written decisions made by the authorized officer relating to administration of this permit are subject to appeal pursuant to 36 CFR Part 251, Subpart C, as amended. Revocation or suspension of this permit shall not give rise to any claim for damages by the holder against the Forest Service.

E. TERMINATION. This permit shall terminate when by its terms a fixed or agreed upon condition, event, or time occurs without any action by the authorized officer. Examples include but are not limited to expiration of the permit by its terms on a specified date. Termination of this permit is not subject to administrative appeal and shall not give rise to any claim for damages by the holder against the Forest Service.

VII. MISCELLANEOUS PROVISIONS

A. MEMBERS OF CONGRESS. No member of or delegate to Congress or Resident Commissioner shall benefit from this permit either directly or indirectly, except to the extent the authorized use provides a general benefit to a corporation.

B. SUPERIOR CLAUSES. If there is any conflict between any of the preceding clauses and any subsequent clauses or appendices, the preceding clauses shall control.

THIS PERMIT IS ACCEPTED SUBJECT TO ALL ITS TERMS AND CONDITIONS.

BEFORE ANY PERMIT IS ISSUED TO AN ENTITY, DOCUMENTATION MUST BE PROVIDED TO THE AUTHORIZED OFFICER OF THE AUTHORITY OF THE SIGNATORY FOR THE ENTITY TO BIND IT TO THE TERMS AND CONDITIONS OF THE PERMIT.

ACCEPTED:

Patrick Maxon, Director - Cultural Resources Bon Terra Consulting	Patrick Maxon	9/22/11
HOLDER NAME, PRECEDED BY NAME AND TITLE OF PERSON SIGNING ON BEHALF OF HOLDER, IF HOLDER IS AN ENTITY	SIGNATURE	DATE

APPROVED:

Michael J. McIntyre District Ranger	Michael J. McIntyre	9/28/11
NAME AND TITLE OF AUTHORIZED OFFICER	SIGNATURE	DATE

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond, to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0082. The time required to complete this information collection is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and, where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call toll free (866) 632-9992 (voice). TDD users can contact USDA through local relay or the Federal relay at (800) 877-8339 (TDD) or (866) 377-8642 (relay voice). USDA is an equal opportunity provider and employer.

The Privacy Act of 1974 (5 U.S.C. 552a) and the Freedom of Information Act (5 U.S.C. 552) govern the confidentiality to be provided for information received by the Forest Service.

Appendix A

Use Code: 411
Authorization ID: LAN 9040 CAL
Contact ID: Bon Terra

FS-2700-30 (Rev 05/06)
OMB No. 0596-0082

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

APPLICATION FOR PERMIT FOR ARCHAEOLOGICAL INVESTIGATIONS

<USER NOTES FOR AUTHORITY>
<Select all authorities that apply. Delete any that do not apply.>

Authority:
Archaeological Resources Protection Act of 1979,
16 U.S.C. 470aa-mm

Antiquities Act of 1906,
16 U.S.C. 431-433

Organic Act of 1897
16 U.S.C. 551

Instructions: Complete and return two copies of this application form and required attachments to the appropriate Forest Service administrative unit. All information requested must be completed before the application will be considered. Use separate pages if more space is needed to complete a section.

1. Name of applicant (individual, institution, corporation, partnership, or other entity)
Patrick Maxon, RPA
BonTerra Consulting

2. Mailing address
151 Kalmus, E-200
Costa Mesa, Ca 92626

3. Telephone numbers
714-444-9199 (office)
949-677-2393 (mobile)

4. Email addresses
pmaxon@bonterraconsulting.com

5. Nature of archaeological work proposed

- ☒ Survey and recordation
- ☐ Limited testing (shovel tests, scrapes, probes)
- ☐ Formal testing and/or surface collection (project-specific)
- ☐ Excavation and/or removal (project-specific)
- ☐ Conservation and protection, e.g., ruin stabilization, restoration, rock art conservation, ARPA damage assessments (project-specific)

6. Location of proposed work (attach additional sheets)

Project is in Los Angeles County with the majority of the project site on Angeles National Forest lands.

Project area is shown on the USGS 7.5 minute Condor Peak, CA quadrangle (1995); Township 2 and 3 North, Range 12 and 13 West, portions of Section 1 and unsectioned. A copy of the attachaed map showing the specific project area depicts the proposed survey area. The green polygon shows the non-public lands within the project area.

The Forest Service administrative unit is the Angeles National Forest Los Angeles River Ranger District

7. Duration of proposed work

Duration of entire project: From September 12, 2011 To September 12, 2012

Duration of fieldwork: 1 day of field work From 9/12/11 To 9/12/12

8. Principal investigator

Patrick Maxon

Principal investigator contact information
949-677-2393 (mobile)
pmaxon@bonterraconsulting.com

9. Field directors	Field director contact information
Patrick Maxon Albert Knight	**Maxon:** 714-444-9199 (office) 949-677-2393 (mobile) pmaxon@bonterraconsulting.com **Knight** 818-426-4730 (mobile) ahunknight@msn.com
10. Permit holder Patrick Maxon, RPA Name of individual who will be responsible for fulfilling the terms and conditions of the permit or who has authority to bind the entity applying for the permit to its terms and conditions.	**Permit holder contact information** Telephone numbers: 714-444-9199 (office) 949-677-2393 (mobile) Email addresses: pmaxon@bonterraconsulting.com

11. The applicant must attach the following to the application form:

a. A description of the purpose, nature, and extent of the work proposed, including how and why it is proposed to be conducted (include research design, methods, and curation).

b. A summary of support capabilities, including the location and a description of necessary facilities and equipment, the personnel to be involved in the proposed work, and, in the case of an applicant that is an entity, its organizational structure and staffing.

c. A summary of the applicant's experience in completing the kind of work proposed, including similar projects and government contracts and federal permits that were previously held, that are currently in force, with their effective dates, and that are pending or planned, by agency and region or state, reports or publications resulting from similar work, and any other pertinent experience.

d. For each individual named in blocks 8 and 9, a resume including education, training, and experience in the kind of work proposed and in the role proposed.

e. A written certification, signed by an authorized official of the proposed curatorial facility, attesting to the facility's capability and willingness to accept any collections, records, data, photographs, and other documents generated during the proposed permit term and to assume permanent curatorial responsibility for those materials on behalf of the United States Government pursuant to 36 CFR Part 79. Archaeological and historical artifacts excavated or removed from National Forest System lands and their associated documentation shall remain the property of the United States. Custody of any Native American human remains or cultural items subject to the Native American Graves Protection and Repatriation Act (NAGPRA), 25 U.S.C. 3001-3013, that are removed from National Forest System lands shall be determined in accordance with NAGPRA and its implementing regulations at 43 CFR Part 10.

12. Proposed publications for results of work conducted under the permit

Section 106 compliant Cultural Resources Assessment report using Archaeological Resource Management Reports (ARMR) guidelines.

13. Signature of individual named in block 10	14. Date signed
Patrick Maxon	9/13/11

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0082. The time required to complete this information collection is estimated to average 4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (800) 975-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

The Privacy Act of 1974 (5 U.S.C. 552a) and the Freedom of Information Act (5 U.S.C. 552) govern the confidentiality to be provided for information received by the Forest Service.

ARPA Permit Attachment

a. The County of Los Angeles Department of Public Works proposes to conduct the Big Tujunga Dam and Reservoir Sediment Removal Project, which involves the excavation of sediment within the Big Tujunga Reservoir (BTR) and the deposition of the sediment in the Maple Canyon Sediment Placement Site (SPS), located in Big Tujunga Canyon, Angeles National Forest. Excavations of up to 4.4 million cubic yards (mcy) of sediment would be conducted over an area of approximately 83 acres within the BTR. Maple Canyon SPS currently holds less than 2.5 mcy of sediment over an area of approximately 28 acres. The additional 4.4 mcy of sediment from this Project would cover a total area of 32 acres, including 22 acres of previously undeveloped area within the SPS.

   The purpose of the cultural resources study is to ensure that the proposed project does not adversely impact significant cultural resources. The study will consist of (1) records searches at the South Central Coastal Information Center at the California State University, Fullerton and the Forest Service Los Angeles River Ranger District office; (2) NAHC and Native American scoping; (3) a one-day pedestrian survey of the Area of Potential Effects (APE) by Patrick Maxon and/or Albert Knight; and (4) completion of a technical cultural resources report (following Archaeological Resource Management Report [ARMR] guidelines) that summarizes the findings of the study and offers management recommendations.

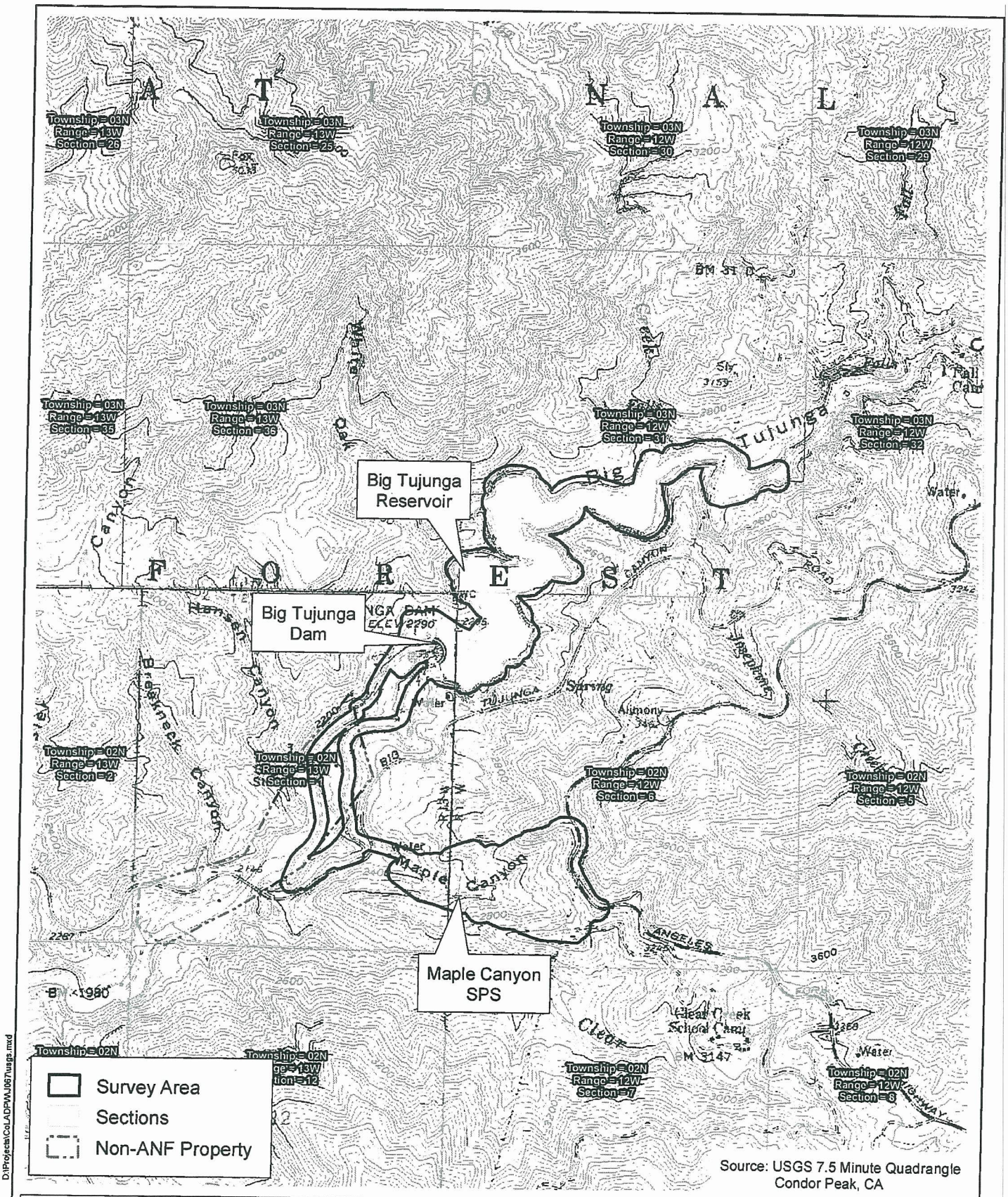
b. Patrick Maxon (Principal Investigator) and Albert Knight (Archaeology Field Director) will be involved in the study. They meet the Secretary of Interior's Professional Qualification Standards for Archaeology.

   BonTerra Consulting office support will consist of GIS capabilities to construct project maps, staff support, and computers for documentation purposes. No specialized equipment is necessary.

c. Mr. Maxon has completed scores of reconnaissance studies over the past 17 years. Mr. Maxon has held ARPA and other use Permits for the Forest Service, Bureau of Reclamation, and USACE; BLM use permits; and permits for the California Energy Commission. In 2010 a Forest Service archaeological investigation permit (LAR9036CRI) was issued to survey portions of Big Tujunga Canyon Road for the County of Los Angeles Department of Public Works (LADPW), and most recently in April 2011 a archaeological permit (LAR9039CRI) was acquired from the Forest Service for a sediment removal project by the LADPW at the Pacoima Reservoir.

d. Resumes for Patrick Maxon and Albert Knight are attached.

e. By agreement with the Angeles National Forest, no collections will be made. All items of historical or archaeological nature will be left in place within the Forest and remain property of the United States Government.



Source: USGS 7.5 Minute Quadrangle
Condor Peak, CA

U.S. Geological Survey 7.5-Minute Quadrangle

Big Tujunga Dam and Reservoir Post-Fire Sediment Removal Project

N
W E
S

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Feet

Bonterra CONSULTING

APPENDIX E

HISTORIC RESOURCES EVALUATION REPORT
Daly (2017)

HISTORIC RESOURCES EVALUATION REPORT

of

Big Tujunga Reservoir Sediment Removal Project, Los Angeles County, California

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October 2017

EXECUTIVE SUMMARY

This assessment report documents and evaluates the federal significance and eligibility of the Big Tujunga Reservoir Sediment Removal Project (Project) area-of-potential effect (APE). This document has been prepared to satisfy the requirements of the U.S. Army Corps of Engineers' (USACE's) compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.) and, due to the need for a Section 404 Clean Water Act Permit, Section 106 of the National Historic Preservation Act (NHPA) of 1966 (36 CFR 800) and USACE's implementing regulations at 33 CFR 325 Appendix C). The project is also required to be reviewed under the California Environmental Quality Act (CEQA).

The fieldwork for this historic resource assessment and evaluation of the Project APE was conducted by Pamela Daly, M.S.H.P., Principal Architectural Historian, on July 18, 2017. In order to identify and evaluate the subject features and site as potential historic resources, a multi-step methodology was utilized. The fieldwork consisted of inspecting previously identified individual components found therein, and evaluating them as individual resources. The fieldwork was combined with a review of local and regional historic archives regarding the history of the Project area, and an examination of historic maps was performed to document existing conditions and assist in evaluating the resources potential for significance.

A Phase I study of the Project APE was prepared by BonTerra Psomas in July 2012. The Phase 1 report identified three resources that either needed to be inspected and evaluated by a qualified architectural historian, or would benefit from the contribution of a qualified historian to provide historic context to a historical archaeology site. In assessing the historical significance of the subject resources, federal, state, and in the case of the Hansen Lodge site, County of Los Angeles, evaluation criteria were applied.

The previously recorded sites that were investigated within this Historic Resource Evaluation Report are:

1. Hansen Lodge site
2. Verdugo Circuit (P19-186860; USFS #05-01-51-138)
3. SCE Construction/Maintenance Road Alignment (P19-186877; USFS #05-01-55-187)

While the history of the San Gabriel Forest Timber Reserve and the development of the Los Angeles County Flood Control System was an integral part of the history of Southern California, there is no evidence that the resources within the Project APE are eligible for listing in the National Register or California under Criterion A/1.

Under the National Register or California Register criterion relating to the identified resources in the Project APE's direct association with persons of historic importance, none of the resources appear to qualify as significant resources. Research has not revealed any association between the identified resources within the Project APE and with persons

important during their time of significance, on either a regional or national level. There is no evidence that any of the identified resources is eligible for listing in the National Register or California Register under Criterion B/2.

Under National Register or California Register Criterion C/3, relating to the distinctive characteristics of a type, period, region, or method of construction, none of the resources appear to be significant. Not only were the built-environment resources found not to be significant historic sites, structures, or features, through evaluation, the resources also lacked the majority of their aspects of historic physical integrity.

The individual historic-period resources within the Project APE that are identified in this report do not appear to have the capacity to yield information important to the history of the Big Tujunga Canyon, Angeles National Forest, or Los Angeles County. The identified resources do not appear eligible for listing in the National Register or California Register under Criterion D/4.

As the Hansen Lodge site is situated on land owned by the County of Los Angeles, it was also evaluated for significance under the designation criteria for listing as a Historic Landmark in Los Angeles County. The Hansen Lodge site did not satisfy any of the relevant criteria (criterion 1, 2, 3, or 4) to be found eligible as a historic landmark.

In summation, there are no built-environment historic-period resources located within the Project APE, that appear to meet National Register and California Register criteria to be considered eligible for listing in the registries as significant historic resources.

Disposition of Data: Copies of this report will be filed with Psomas, and the South Central Coastal Information Center at California State University - Fullerton. Original documentation will remain on file at Daly & Associates, Riverside.

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I. INTRODUCTION

A. PROJECT DESCRIPTION

The Los Angeles County Department of Public Works (LACDPW) proposes to conduct the Big Tujunga Reservoir Sediment Removal Project (Project), which involves the excavation of sediment within Big Tujunga Reservoir (BTR) and the deposition of the sediment in the Maple Canyon Sediment Placement Site (SPS). (Figures 1 and2) The Project consists of various activities, per the *Big Tujunga Reservoir Sediment Removal Project Description*[1] as described below.

Excavations of up to 4.4 million cubic yards (mcy) of sediment would be conducted over an area of approximately 83 acres within the BTR. The actual amount of sediment removal would depend on the amount of rainfall and sediment deposition on coming years. If 4.4 mcy of sediment is required to be removed from BTR, the remaining capacity of the Maple Canyon SPS would be eliminated. As sediment is deposited into Maple Canyon SPS, drainage facilities would be extended into new fill areas of the SPS, which would ultimately be re-vegetated in compliance with the Maple Canyon Debris Disposal Site Re-vegetation Plan.

Prior to beginning any sediment removal, portions of the existing access roads would be re-established to accommodate the proposed truck traffic. Portions of the access roads would require improvements, with approximately two miles of unpaved sections and three miles of paved sections. The access roads may need to be improved periodically throughout the entire Project schedule due to erosion or damage that may occur from storms and/or the Project. Behind the dam structure, an access road will be graded to allow trucks to access the lower portions of the BTR as sediment is removed.

The project will consist of completely dewatering BTR through valve releases and mechanical pumping. The proposed cleanout will keep the reservoir in compliance with LACDPW's operational standards required for both flood protection and water conservation needs of the downstream communities. Water diversion structures will be constructed to allow natural flows from Big Tujunga Creek to bypass the reservoir.

The sediment will be transported to the Maple Canyon SPS by using low emission equipment. An estimated 20 trucks would cycle continuously between the reservoir and Maple Canyon SPS. During sediment removal operations this would total approximately 400 trucks trips per day. Prior to beginning any sediment removal, the existing reservoir access roads will be re-graded to allow truck traffic to enter the reservoir. Trucks would travel on the access roads to the nearby Maple Canyon SPS. Trucks will cross Big Tujunga Canyon Road for which normal traffic will be controlled.

[1] Los Angeles County Department of Public Works. "Big Tujunga Reservoir Sediment Removal Project Description". Accessed July 22, 2017 at: http://dpw.lacounty.gov/swd/Projects/bigtujunga/Expanded_Project_Description.pdf

Sediment will be removed from approximately 46 acres of the reservoir using heavy equipment such as excavators and bulldozers. In order to extend the useful life of the remaining capacity of the Maple Canyon SPS, a portion of the sediment with quality conducive to re- use for aggregate industry will be stockpiled to a staging area next to the Big Tujunga Dam (BTD) entrance gate and transported to offsite aggregate companies in Sun Valley after construction activities to reduce any air quality impacts.

Maple Canyon SPS

Maple Canyon SPS was established in 1981 for previous cleanouts of the reservoir with the current remaining capacity up to 4.4 mcy. It currently holds approximately 3 mcy of sediment and the existing fill covers an area of approximately 28 acres. Excavated material will be transported approximately 1.8 miles to the existing SPS. Bulldozers and other heavy equipment would be operated continuously at the Maple Canyon SPS in order to spread and compact the sediment. The addition of 4.4 mcy of sediment from this project will increase the SPS footprint by 29 acres. Areas within the increased fill footprint would be cleared and grubbed prior to the placing of sediment.

The Maple Canyon SPS design incorporates underground drainage pipes and surface drainage facilities such as gutters, inlets, and surface drains conveying surface runoff through the SPS. Debris basins were installed at the upstream end of each underground drainage pipe to catch eroded sediment from the natural drainages. These drainage facilities will be relocated to the top of the new Maple Canyon SPS.

Excavation will occur until the remaining ultimate capacity of the Maple Canyon SPS has been exhausted or until the reservoir cut template is achieved. Sediment removal and placement operations would mostly occur during the dry season between approximately April 16th and October 15th, during which time the reservoir would be dewatered. After October 15th, work will continue until the first storm is forecasted which will require the contractor to remove equipment from the reservoir until the end of the storm season. The reservoir will be operated according to standard flood control operating guidelines during the rainy season from October 15th through April 15th.

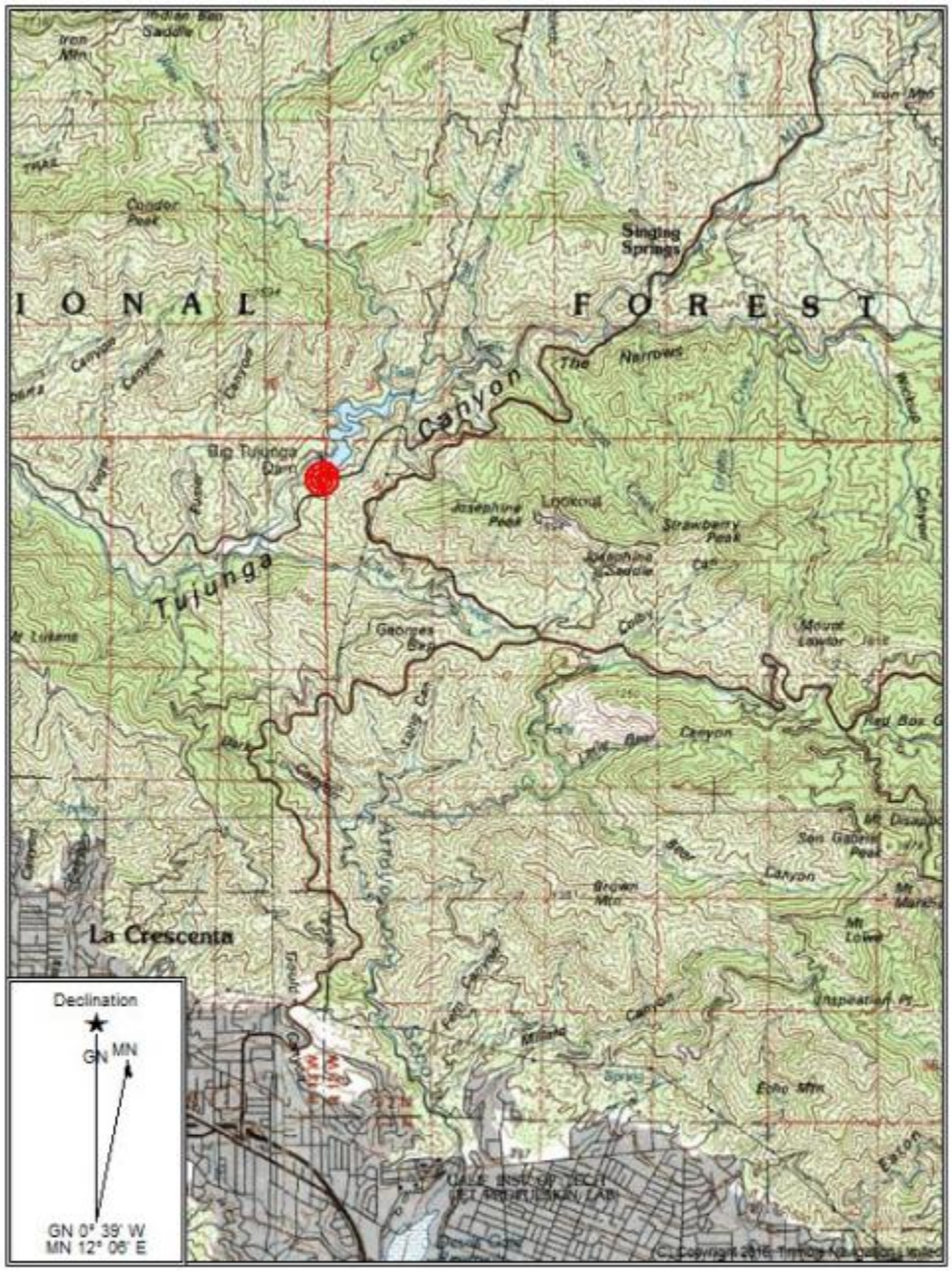

Figure 1: Project Vicinity
Big Tujunga Reservoir
Sediment Removal Project
Los Angeles County, CA

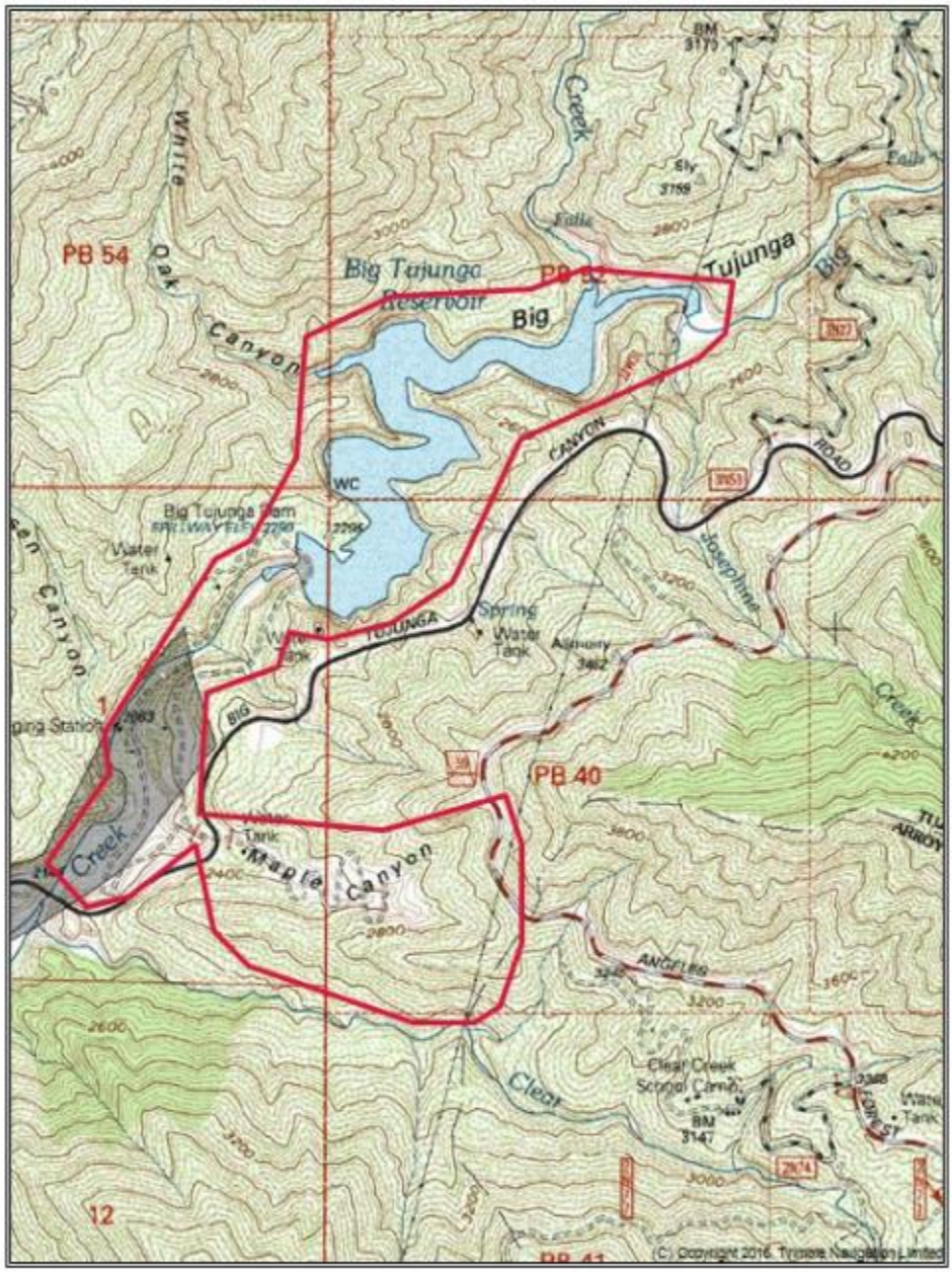

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Figure 2: Project Location
Big Tujunga Reservoir
Sediment Removal Project
Angeles National Forest, CA

B. SITE DESCRIPTION

The BTR is located in the San Gabriel Mountains within the Angeles National Forest (ANF), on land owned by the U.S. Government and managed by the U.S. Forest Service (USFS). The Project area-of-potential-effect (APE) also includes an "in-holding" of privately owned land. The "in-holding" is owned by the County of Los Angeles, and is comprised of the Homestead Entry for Homer A. Hansen granted in 1921. The Project APE is located along Big Tujunga Canyon Road, approximately 4.5 miles north of La Crescenta-Montrose and approximately 7 miles northeast of the community of Sunland.

Traveling from the intersection of the 210 Freeway (Foothill Freeway) and Sunland Boulevard, head east on Sunland Boulevard, Sunland Boulevard becomes Foothill Boulevard, make a left at Oro Vista Avenue, Oro Vista Avenue becomes Big Tujunga Canyon Road, and continue for 9.4 miles on Big Tujunga Canyon Road and turn left to the BTD entrance gate. The entrance to Maple Canyon SPS is located directly across Big Tujunga Canyon Road from the entrance gate to BTD.

C. BACKGROUND

The Station Fire started on August 26, 2009, in the Angeles National Forest near the USFS ranger station on the Angeles Crest Highway (State Highway 2) and burned over 160,000 acres before containment on October 16, 2009. Approximately 87 percent of the watershed tributary to BTR was affected. BTR is supplied with water from Big Tujunga Creek. On average, a watershed will take five years or more to recover from a forest fire burn. During this time, increased amounts of debris production are anticipated from the denuded ground surface. Base on the current survey, the total amount of accumulated sediment in the BTR is approximately 2 mcy. Additional sediment is expected to flow into the reservoir over the next few years from the recovering watershed.[2]

D. CULTURAL RESOURCES RECORDS SEARCH

Pre-field research included a cultural resources records search of the California Historical Resources Information System (CHRIS), performed by the South Central Coastal Information Center (SCCIC) on October 6, 2011.[3] The search included a review of previous survey reports, excavation reports, and site records for all sites documented within one mile of the APE. As part of this review, the SCCIC also examined databases for the California Points of Historical Interest (PHI), California Historical Landmarks (CHL), California Register of Historical Resources (CRHR), National Register of Historic Places (NRHP), and the CHRIS Historic Resources Inventory. No properties listed in the PHI, CHL, CRHR, or NRHP were identified by the search.

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[2] Los Angeles County Department of Public Works. "Big Tujunga Reservoir Sediment Removal Project Description". Accessed July 22, 2017 at: http://dpw.lacounty.gov/swd/Projects/bigtujunga/Expanded_Project_Description.pdf

[3] Drover, Christopher and Patrick Maxon. "Phase I Cultural Resources Assessment: Big Tujunga Reservoir Sediment Removal Project", July 2012; BonTerra Consulting, Pasadena, CA.

E. PREVIOUSLY RECORDED HISTORIC-PERIOD SITES

The CHRIS record search indicated that two previous cultural resources investigations have been conducted within one mile of the APE. The two previous studies resulted in the recording of built-environment resources.

Table 1: Previously Recorded Built-Environment Resources

Site Number	Recorder (Year)	Comment
P19-186860	Schmidt (2003)	Wood poles and associated features of Southern California Electric's (SCE) Verdugo Circuit.
P19-186860-update	Garcia and Norton (2009)	Large portions of the Verdugo Circuit no longer exist due to damage from the Station Fire in August 2009. (Note: the Big Tujunga Dam and Maple Canyon were within the burn area of the fire.)
P19-186877	Schmidt and Schmidt (2003)	26 miles of USFS and SCE service/maintenance road alignment using historic topographic maps and USFS historic maps to document the roads in the forest.

In addition to the documents and reports identified by the SCCIC, other previous work not yet on file with CHRIS also informed the current study. Outside of the CHRIS archives, two built-environment resources have been considered as cultural resources.

- **Big Tujunga Dam (1931)**. The BTD was surveyed in 1999 and included in a discontiguous district of dams and reservoirs constructed by the Los Angeles County Flood Control District as a result of the 1924 Bond Act for Flood Control. Communication between Federal Emergency Management Agency (FEMA) and State of California Office of Historic Preservation (SHPO) stated that SHPO considered the BTD "as eligible for listing in the National Register of Historic Places as a contributing resource to a thematic district of 1924 Los Angeles County dams. This district is composed of 10 dams and their related features funded in part of a 1924 Los Angeles County flood control bond issue."[4]

  The LACDPW applied for a FEMA grant to bring the BTD up to state seismic safety standards after the 1994 Northridge earthquake. The proposed Big Tujunga Dam Seismic Safety Modification Project would consist of thickening the existing dam approximately 97 feet, by constructing a buttress across the full downstream face of the dam, spillway modifications, a new pedestrian walkway, and installing reinforcing steel shear dowels in the upper half of the dam within the buttress.[5] It was determined by FEMA, and concurred by SHPO, that the

[4] Communication from David Fukutomi, Deputy Disaster Recovery Manager, to Daniel Abeyta, Acting State Historic Preservation Officer, regarding Seismic Safety Modification of Dams: Big Tujunga Dam, November 18, 1999.

[5] Communication from Maryann VanderVis on behalf of Harry W. Stone, County of Los Angeles Director of Public Works, to Andrew Petrow, Hazard Mitigation Program Manager, Governor's Office of Emergency Services, September 23, 1999.

proposed project activities would "not meet the Standards [*Secretary of the Interior's Standards for the Treatment of Historic Properties*] and meets two criterion as defined in 36 CFR §800.5(2) (ii and v) of an undertaking that will adversely affect the identified historic property."[6]

FEMA prepared a Historic American Engineering Record (HAER) document with photographs, and copies of original construction drawings of the BTD to mitigate the adverse effects to the historic property per a Standard Mitigation Measures Agreement executed between FEMA and SHPO in July 2000.[7] The HAER document was submitted to the Library of Congress in July 2000.[8]

- **Hansen's Lodge on Big Tujunga Creek (1926-1938)**. The site of the second Hansen's Lodge, built after the first lodge was irreparably damaged from flood waters in 1926, and has been considered a romanticized site of local interest for many years.

F. METHODOLOGY

The historic resource assessment and evaluation for this report was conducted by Pamela Daly, M.S.H.P., Principal Architectural Historian. In order to identify and evaluate the previously identified historic resources, a multi-step methodology was utilized. An inspection of the existing structure and associated features, combined with a review of accessible archival sources for these structures and features was performed to document existing conditions and assist in assessing and evaluating the built-environment resources for significance.

Archival resources used for this study included:

California Digital Newspaper Collection – University of California Riverside
GeneologyBank.com
Los Angeles Public Library Map Collection
Los Angeles Public Library Photograph Collection
Los Angeles Times Archives
NETR Historic Aerial Photographs
NewspaperArchive.com
Newspaper.com
United States Geological Survey (USGS) Historical Topographic Map Explorer

Historic maps referenced for this project included:

1876 U.S. Surveyor Generals Office; Township 2 North, Range 13 West, San Bernardino Base Meridian; Plat No. 2862151
1900 USGS Tujunga 1:62,500 scale map

[6] Communication from David Fukutomi, Deputy Disaster Recovery Manager, to Daniel Abeyta, Acting State Historic Preservation Officer, regarding Seismic Safety Modification of Dams: Big Tujunga Dam, November18, 1999.

[7] Communication between Stephen Mikesell, Deputy State Historic Preservation Officer to Allesandro Amagli, FEMA, November 30, 2005.

[8] Lee, Clint. Big Tujunga Dam HAER CA-287-17 (HAER CAL, 19-SUNL.V1-). Library of Congress: https://www.loc.gov/resource/hhh.ca2932.photos?st=gallery

1910 U.S. Surveyor Generals Office; Homestead Survey Number 84, Homer A. Hansen Entryman; Plat 2801781
1911 U.S. Surveyor Generals Office; Township 2 North, Range 13 West, San Bernardino Base Meridian; Plat No. 2862131
1934 USGS Mt. Lowe 1:24,000 scale map
1939 USGS Mt. Lowe 1:24,000 scale map
1940 USGS Acton 1:62,500 scale map
1959 USGS Acton 1:62,500 scale map
1959 USGS La Cresenta 1:24,000 scale map
1959 USGS Condor Peak 1:24,000 scale map
1988 USGS Condor Peak 1:24,000 scale map
1995 USGS Condor Peak 1:24,000 scale map

In addition to evaluating the significance of the resources within the APE under National Register and California Register criteria, a portion of the APE (APN 5869-001-902; Hansen's Homestead Patent) is located within the legal boundary of the County of Los Angeles. The County of Los Angeles has a Historic Preservation Ordinance to recognize the importance of preserving the County's distinctive architectural and cultural history.

The following tasks were performed for the study:

- The National Register and the California Historical Resources inventories were searched.
- Site-specific research was conducted on the subject property utilizing maps, city directories, newspaper articles, historical photographs, and other published sources.
- Background research was performed at local historic archives and through internet resources.
- Ordinances, statutes, regulations, bulletins, and technical materials relating to federal, state, and local historic preservation, designation assessment processes, and related programs were reviewed and analyzed.

II. REGULATORY FRAMEWORK

Historic resources fall within the jurisdiction of several levels of government. Federal laws provide the framework for the identification, and in certain instances, protection of historic resources. Additionally, states and local jurisdictions play active roles in the identification, documentation, and protection of such resources within their communities. The National Historic Preservation Act (NHPA) of 1966, as amended, particularly Section 106 of the NHPA, and the California Environment Quality Act (CEQA) are the primary laws and regulations governing the evaluation and significance of historic resources of national, state, regional, and local importance. A description of these relevant laws and regulations is presented below.

In analyzing the historic significance of the subject property, criteria for designation under federal, state, and local landmark programs were considered. Additionally, the California Office of Historic Preservation (OHP) survey methodology was used to survey and rate the relative significance of the built-environment and historic-era deposits found within the APE.

A. FEDERAL LEVEL

1. National Register of Historic Places

First authorized by the Historic Sites Act of 1935, the National Register was established by the NHPA as "an authoritative guide to be used by Federal, State, and local governments, private groups and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment."[9] The National Register recognizes properties that are significant at the national, state and local levels.

To be eligible for listing in the National Register, the quality of significance in American history, architecture, archaeology, engineering, or culture must be in a district, site, building, structure, or object that possesses integrity of location, design, setting, materials, workmanship, feeling and association, and:[10]

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

B. is associated with the lives of persons significant in our past; or

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

D. yields, or may be likely to yield, information important to prehistory or history.

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[9] Code of Federal Regulations (CFR), 36 § 60.2.

[10] *Guidelines for Completing National Register Forms, National Register Bulletin 16,* U.S. Department of the Interior, National Park Service, September 30, 1986. This bulletin contains technical information on comprehensive planning, survey of cultural resources, and registration in the National Register of Historic Places.

A property eligible for listing in the National Register must meet one or more of the four criteria (A-D) defined above. In addition, unless the property possesses exceptional significance, it must be at least 50 years old to be eligible for National Register listing.

In addition to meeting the criteria of significance, a property must have integrity. "Integrity is the ability of a property to convey its significance."[11] According to *National Register Bulletin 15*, within the concept of integrity, the National Register criteria recognize seven aspects or qualities that, in various combinations, define integrity. To retain historic integrity a property will always possess several, and usually most, of these seven aspects. The retention of specific aspects of integrity is paramount for a property to convey its significance.[12] The seven factors that define integrity are location, design, setting, materials, workmanship, feeling, and association. The following is excerpted from *National Register Bulletin 15,* which provides guidance on the interpretation and application of these factors.

- Location is the place where the historic property was constructed or the place where the historic event occurred.[13]
- Design is the combination of elements that create the form, plan, space, structure, and style of the property.[14]
- Setting is the physical environment of a historic property.[15]
- Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.[16]
- Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.[17]
- Feeling is property's expression of the aesthetic or historic sense of a particular period of time.[18]
- Association is the direct link between an important historic event or person and a historic property.[19]

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[11] *National Register Bulletin 15*, page 44.

[12] Ibid.

[13] "The relationship between the property and its location is often important to understanding why the property was created or why something happened. The actual location of historic property, complemented by its setting is particularly important in recapturing the sense of historic events and persons. Except in rare cases, the relationship between a property and its historic associations is destroyed if the property is moved." Ibid.

[14] "A property's design reflects historic functions and technologies as well as aesthetics. It includes such considerations as the structural system; massing; arrangement of spaces; pattern of fenestration; textures and colors of surface materials; type, amount, and style of ornamental detailing; and arrangement and type of plantings in a designed landscape." Ibid.

[15] *National Register Bulletin 15*, page 45.

[16] "The choice and combination of materials reveals the preferences of those who created the property and indicated the availability of particular types of materials and technologies. Indigenous materials are often the focus of regional building traditions and thereby help define an area's sense of time and place." Ibid.

[17] "Workmanship can apply to the property as a whole or to its individual components. It can be expressed in vernacular methods of construction and plain finishes or in highly sophisticated configurations and ornamental detailing. In can be based on common traditions or innovative period techniques." Ibid.

[18] "It results from the presence of physical features that, taken together, convey the property's historic character." Ibid.

In assessing a property's integrity, the National Register criteria recognize that properties change over time; therefore, it is not necessary for a property to retain all its historic physical features or characteristics. The property must, however, retain the essential physical features that enable it to convey its historic identity.[20]

For properties that are considered significant under National Register criterion A and B, *National Register Bulletin 15* states that a property that is significant for its historic association is eligible if it retains the essential physical features that made up its character or appearance during the period of its association with the important event, historical pattern, or person(s).[21]

In assessing the integrity of properties that are considered significant under National Register criterion C, National Register Bulletin 15 provides that a property important for illustrating a particular architectural style or construction technique must retain most of the physical features that constitute that style or technique.[22]

The primary effects of listing in the National Register on private property owners of historic buildings is the availability of financial and tax incentives.[23] In addition, for projects that receive federal funding, the NHPA Section 106 clearance process must be completed (published at 36 CFR Part 800). State and local laws and regulations may apply to properties listed in the National Register. For example, demolition or inappropriate alteration of National Register eligible or listed properties may be subject to the CEQA.

B. STATE LEVEL

The California Office of Historic Preservation (OHP), as an office of the California Department of Parks and Recreation, implements the policies of the NHPA on a statewide level. The OHP also carries out the duties as set forth in the Public Resources Code (PRC) and maintains the California Historical Resources Inventory. The State Historic Preservation Officer (SHPO) is an appointed official who implements historic preservation programs within the state's jurisdictions.

1. California Register of Historical Resources

Created by Assembly Bill 2881, which was signed into law on September 27, 1992, the California Register is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to

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19 "A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey that relationship to the observer. Like feeling, associations require the presence of physical features that convey a property's historic character…Because feeling and association depend on individual perceptions, their retention alone is never sufficient to support eligibility of a property for the National Register." Ibid.

20 *National Register Bulletin 15*, page 46.

21 Ibid.

22 "A property that has lost some historic materials or details can be eligible if it retains the majority of the features that illustrate its style in terms of the massing, spatial relationships, proportion, patter of windows and doors, texture of materials, and ornamentation. The property is not eligible, however, if it retains some basic features conveying massing but has lost the majority of features that once characterized its style." Ibid.

23 See 36 CFR 60.2(b) (c).

indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change."[24] The criteria for eligibility for the California Register are based upon National Register criteria.[25] Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register.[26]

The California Register consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The California Register automatically includes the following:

- California properties listed in the National Register of Historic Places and those formally Determined Eligible for the National Register of Historic Places;
- California Registered Historical Landmarks from No. 770 onward;
- Those California Points of Historical Interest that have been evaluated by the OHP and have been recommended to the State Historical Resources Commission for inclusion in the California Register.[27]

Other resources which may be nominated to the California Register include:

- Individual historical resources;
- Historical resources contributing to historic districts;
- Historical resources identified as significant in historical resources surveys with significance ratings of Category 1 through 5;
- Historical resources designated or listed as local landmarks, or designated under any local ordinance, such as a historic preservation overlay zone.[28]

To be eligible for listing in the California Register, a historic resource must be significant at the local, state, or national level under one or more of the following four criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

Additionally, a historic resource eligible for listing in the California Register must meet one or more of the criteria of significance described above and retain enough of its historic character or

[24] California Public Resources Code § 5024.1(a).
[25] California Public Resources Code § 5024.1(b).
[26] California Public Resources Code § 5024.1(d).
[27] California Public Resources Code § 5024.1(d).
[28] California Public Resources Code § 5024.1(e).

appearance to be recognizable as a historic resource and to convey the reasons for its significance. Historical resources that have been rehabilitated or restored may be evaluated for listing.[29]

Integrity under the California Register is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association. The resource must also be judged with reference to the particular criteria under which it is proposed for eligibility. It is possible that a historic resource may not retain sufficient integrity to meet criteria for listing in the National Register, but it may still be eligible for listing in the California Register.[30]

2. California Office of Historical Preservation Survey Methodology

The evaluation instructions and classification system prescribed by the California Office of Historic Preservation in its Instructions for Recording Historical Resources provide a three-digit evaluation rating code for use in classifying potential historic resources. The first digit indicates one of the following general evaluation categories for use in conducting cultural resources surveys:

1. Listed in the National Register or the California Register;
2. Determined eligible for listing in the National Register or the California Register;
3. Appears eligible for listing in the National Register or the California Register through survey evaluation;
4. Appears eligible for listing in the National Register or the California Register through other evaluation;
5. Recognized as Historically Significant by Local Government;
6. Not eligible for any Listing or Designation; and
7. Not evaluated for the National Register or California Register or needs re-evaluation.

The second digit of the evaluation status code is a letter code indicating whether the resource is separately eligible (S), eligible as part of a district (D), or both (B). The third digit is a number that is used to further specify significance and refine the relationship of the property to the National Register and/or California Register. Under this evaluation system, categories 1 through 4 pertain to various levels of National Register eligibility. The California Register, however, may include surveyed resources with evaluation rating codes through level 5. In addition, properties found ineligible for listing in the National Register, California Register, or for designation under a local ordinance are given an evaluation status code of 6.

C. LOCAL LEVEL

1. County of Los Angeles

On September 1, 2015, the Board of Supervisors recognized the importance of preserving the County's distinctive architectural and cultural history by adopting the Historic Preservation Ordinance ("HPO") that:

[29] California Code of Regulations, California Register of Historical Resources (Title 14, Chapter11.5), Section 4852(c).

[30] Ibid.

- Specifies criteria and procedures for the designation of landmarks and historic districts;
- Prohibits work, including demolition, on property nominated but not yet designated as a landmark or historic district;
- Encourages adaptive reuse of landmarks and historic district contributors by providing relief from parking requirements;
- Provides for the enhancement of historic districts by the establishment of development guidelines and standards, and by allowing streetscape improvements that are compatible with the areas historic character;
- Specifies criteria and procedures for reviewing proposed work on designated landmarks or on property within historic districts;
- Requires maintenance of landmarks and historic district contributors to prevent deterioration; and
- Establishes penalties for unauthorized work, including demolition, on landmarks or historic district contributors.[31]

22.52.3060 Criteria for Designation of Landmarks and Historic Districts.[32]

A. A structure, site, object, tree, landscape, or natural land feature may be designated as a landmark if it is 50 years of age or older and satisfies one or more of the following criteria:

1. It is associated with events that have made a significant contribution to the broad patterns of the history of the nation, State, County, or community in which it is located;

2. It is associated with the lives of persons who are significant in the history of the nation, State, County, or community in which it is located;

3. It embodies the distinctive characteristics of a type, architectural style, period, or method of construction, or represents the work of an architect, designer, engineer, or builder whose work is of significance to the nation, State, County, or community in which it is located; or possesses artistic values of significance to the nation, State, County, or community in which it is located;

4. It has yielded, or may be likely to yield, significant and important information regarding the prehistory or history of the nation, State, County, or community in which it is located;

5. It is listed, or has been formally determined eligible by the United States National Park Service for listing, in the National Register of Historic Places, or is listed, or has been formally determined eligible by the State Historical Resources Commission for listing, on the California Register of Historical Resources;

6. If it is a tree, it is one of the largest or oldest trees of the species located in the County; or

[31] County of Los Angeles. "Historic Preservation Ordinance." http://planning.lacounty.gov/preservation/ordinance

[32] County of Los Angeles – Code of Ordinances; Title 22: Planning and Zoning; Division1: Planning and Zoning; General Regulations 22.52; Part 28: Historic Preservation Ordinance (Ord. 2015-0033 § 3, 2015).

7. If it is a tree, landscape, or other natural land feature, it has historical significance due to an association with an historic event, person, site, street, or structure, or because it is a defining or significant outstanding feature of a neighborhood.

B. Property less than 50 years of age may be designated as a landmark if it meets one or more of the criteria set forth in subsection A of this Section, and exhibits exceptional importance.

C. The interior space of a property, or other space held open to the general public, including but not limited to a lobby, may be designated as a landmark or included in the landmark designation of a property if the space qualifies for designation as a landmark under subsections A or B of this Section.

D. Historic districts. A geographic area, including a noncontiguous grouping of related properties, may be designated as an historic district if all of the following requirements are met:

1. More than 50 percent of owners in the proposed district consent to the designation;

2. The proposed district satisfies one or more of the criteria set forth in subsections A.1 through A.5, inclusive, of this Section; and

3. The proposed district exhibits either a concentration of historic, scenic, or sites containing common character-defining features, which contribute to each other and are unified aesthetically by plan, physical development, or architectural quality; or significant geographical patterns, associated with different eras of settlement and growth, particular transportation modes, or distinctive examples of parks or community planning.

22.52.3120 - Designation of County-Owned Property as a Landmark.

A. The Board of Supervisors may designate any County-owned property as a landmark, if the Board of Supervisors determines that the property satisfies the applicable criteria set forth in Section 22.52.3060.

B. The designation of a County-owned property as a landmark may be made by written resolution which shall:

1. Contain a detailed description of the property subject to the landmark designation, including the character-defining features that justify the designation and should be preserved;

2. Delineate the location and boundaries of the landmark; and

3. Discuss the criteria for the designation of landmarks set forth in Section 22.52.3060 as applied to the landmark.

The resolution may also establish guidelines and standards for future proposed changes to the landmark, and may impose any other restrictions or regulations on future work on or use of the landmark.

C. Effective Date of Designation. A landmark designation of a County-owned property shall be effective as of the date the resolution approving the designation is adopted by the Board of Supervisors.

D. Upon the effective date of the designation of the County-owned property as a landmark, the Landmarks Commission shall promptly enter the property into the County Register as a "Los Angeles County Landmark," and shall specify the effective date of the landmark designation.

E. Recordation. The Director shall cause a document titled "Notice of Landmark Designation" to be promptly recorded with the County Registrar-Recorder /County Clerk upon the effective date of the designation of a County-owned property as a landmark. The Notice of Landmark Designation shall include:

1. A legal description of the property designated as the landmark;

2. The effective date of the landmark designation; and

3. A certified copy of the resolution adopted by the Board of Supervisors designating the landmark.

F. A County-owned property designated by the Board of Supervisors as a landmark shall be subject only to the guidelines, standards, restrictions, or regulations set forth in the designating resolution, or in any subsequent resolution adopted by the Board of Supervisors regarding the landmark designation, and shall not otherwise be subject to the provisions of this part. The Director shall assist County departments or commissions to determine whether proposed work on or use of a County-owned landmark is consistent with its landmark designation, at the request of such departments or commissions.

III. EVALUATION

A. HISTORIC CONTEXT

1. Spanish/Mexican Period (1689-1848)

Spanish presence in the region of Los Angeles County began with Gaspar de Portola's expedition through the Los Angeles Basin in 1769. The founding of the San Gabriel Mission in 1771 marked the end of the land patterns used by the local Gabrielino peoples. The Gabrielinos were encouraged to move to the Missions where they were taught how to plant seasonal crops and raise cattle. This attempt to assimilate the native culture into the Catholic Church was accelerated with the founding of El Pueblo de Nuestra Señora la Reina de los Angeles (the Town of Our Lady Queen of the Angels) in 1781. El Pueblo de los Angeles would become the city of Los Angeles in the 1830s. Finding the ways of the western Europeans incompatible with their way of life, the Gabrielinos moved away from the new settlements.

The land where the community of Sunland is situated was associated with the Rancho Tujunga. It was granted in 1840 by Mexican governor Juan Alvarado to Francisco Lopez and Pedro Lopez. In 1845, the Lopez brothers traded the 6,661-acre Rancho Tujunga to Miguel Triunfo, an Indian who had been a trusted worker at the San Fernando Mission. Triunfo sold a half-interest in Rancho Tujunga back to Francisco Lopez in 1850, and then sold the other half-interest to Los Angeles merchants David W. Alexander and Francis Mellus. In 1851, Francisco Lopez sold his half-interest to Agustin Olvera.

2. American Transition Period (1848-ca. 1880)

After the Mexican-American War, the 1848 Treaty of Guadalupe Hidalgo provided that the land grants would be honored. As required by the Land Act of 1851, Alexander, Mellus and Olvera filed a claim for Rancho Tujunga in 1852, and the grant was patented to in 1874. Alexander and Mellus sold their half-interest to Olvera in 1856. In 1875, Olvera sold the entire Rancho Tujunga to Andrew Glassell. Boundary disputes continued into 1888.

3. The American Period (1880s to Present)

In 1858, Henry Hancock, a surveyor with the United States Land Commission, submitted the land survey map for the area in California that included Rancho Tujunga, Rancho La Canãda, Rancho San Rafael, in what is now known as the San Fernando Valley.[33] The U.S. Surveyor General's Office would send out W. H. Norway in 1875, to survey the land to the north and west of the old ranchos recorded by Hancock, and the foothills of the "unsurveyable mountains" that would become the San Gabriel Forest Reserve (San Gabriel Timber Land Reserve) in 1892.[34/35] San Gabriel Timber Land

[33] U.S. Department of the Interior, Bureau of Land Management. "Survey Map for Township 2 North, Range 13W" submitted by W.H. Norway; 1875. DM #286216.

[34] Ibid.

Reserve was the first federal forest in California formed under the Forest Reserve Act of 1891, and it extended from Pacoima to the Cajon Pass. The San Gabriel Timber Land Reserve was coalesced with other federal forest lands to create the Angeles National Forest in 1908.

In the 1880s, just to the east and south of Big Tujunga Canyon, and north of La Canãda, the U.S. Government had opened up a limited amount of land in Sections 31 and 32 of Township 2 North, Range 12 West of the San Gabriel Mountain foothills for private ownership. John Hartwell, Eugene and Clara Giddings, Jason and Owen Brown all received patents accessed by the Arroyo Seco for acreage in Section 32 wherein lay Fern Canyon, El Prieto Canyon, and Millard Canyon, from 1883 to 1891, more than 20 years before Homer A. Hansen filed for his patent on Big Tujunga Creek.[36] Owen and Jason Brown, descendants of the Kansas abolitionist John Brown, constructed their homestead in a San Gabriel Mountain canyon that would be named after them, in 1886.

Farther north in the Arroyo Seco canyon, C. Perry Switzer established one of the most ambitious mountain resorts of the San Gabriel Mountains. The "Commodore" as he was known, built a tourist-resort camp far into the mountains in 1884 that was accessible from a trail that followed the Arroyo Seco Creek deep into the mountains.[37] Switzer's resort was located, by today's roads, just seven-and-a-half miles to the east from where Homer A. Hansen's would file for patent lands along the Tujunga Creek.

Two of the first known residents of Big Tujunga Canyon were Pedro Ybarra who built his home in the canyon in 1880, and Silas Hoyt who built his cabin about 1890.[38] By the time the U.S.G.S. *Tujunga* Quadrangle map was issued in 1900 (upon a survey in 1897), there were numerous permanent buildings, ranches, and cabins, noted along the path of the Big Tujunga Creek in Township 2 North/Range 13 West of the San Bernardino Base Meridian. [39] "Hoyts Ranch being noted on the map a short distance to the south from where Hansen would file for a Homestead Land Act patent in 1910.

In 1898, the City of Los Angeles reviewed a proposal by the Los Angeles Mountain Water Company to direct water to the City from the Big Tujunga Canyon's 134 square miles of watershed area.[40] The proposal by the Los Angeles Mountain Water Company was to build three dams along Big Tujunga Creek, and then send the water southward in a steady discharge to a reservoir at Griffith Park. The estimate to buy the water rights and construct the water delivery system to the Griffith Park reservoir was $1,561,540.[41]

Charles M. Hansen, older brother of Homer A. Hansen, would become the attorney for one of the officers of the Los Angeles Mountain Water Company in 1901, and be involved in the dissolution of that water company soon after his client won his claiming mismanagement of the

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[35] Davis, Richard C. "The National Forests of the United States" with appendix, September 29, 2005. http://www.foresthistory.org/ASPNET/places/National%20Forests%20of%20the%20U.S.pdf

[36] General Land Office records. www.glorecords.blm.gov

[37] Ibid, page 371.

[38] *Trails Magazine*. "Cabins of the Big Tujunga", Winter 1936, Volume 3, Number 1, page 14.

[39] U.S.G.S. *Tujunga* Quadrangle, 1900.

[40] *Los Angeles Times*. "Mountain Water Supply", March 1, 1898.

[41] Ibid.

company. Charles Hanson's involvement with the Los Angeles Mountain Water Company would lead to Homer Hansen's eventual purchase of land in the Big Tujunga Canyon, and for the building of Hansen's Lodge

Homer Alfred Hansen was born in Logan, Ohio, in 1872, the fourth of six children born to John Hansen, a bank clerk, and Mary M. Hanson.[42] He attended Rush Medical College in Chicago, and eventually graduated from Toledo Medical School in 1895.[43] Homer married Maud S. Dack/Dock in 1896, and was living in Shell Creek, Platte, Nebraska, with his wife and in-laws, and working as a physician in 1900.[44]

While Homer was still in medical school, his older brother Charles M. Hansen had left Ohio after first studying to become a Presbyterian minister, a physician, and eventually the law.[45] Charles married Lou J. Miller in Ohio, in 1891, and then became involved with various land deals and building projects in Salt Lake City, Omaha, and in Ohio. Charles continued westward and was living in San Diego in 1896.[46] He was admitted to practice law in California in October of 1897 and had an office in San Diego where he specialized in commercial real estate. [47]/[48]

In California, one of Charles' clients, a Mr. N.B. Everett, had hired him in 1901 to sue the Los Angeles Mountain Water Company for mis-management of the company of which Everett was a partner.[49] The Los Angeles Mountain Water Company was located in the Big Tujunga Canyon, and was in the planning stages of building a reservoir to capture winter storm runoff.[50] Charles won the case for his client, which led to the dissolution of the company. In its stead, Charles, his brother Homer, and Homer's father-in-law Thomas M. Dack, worked to reorganize the company with other investors, and created the Big Tujunga Water Company.[51] Charles and his wife had divorced in 1902, and he moved to Los Angeles where he lived until his death in 1904 at only 36 years of age. [52]/[53]

It appears that Homer Hansen may have headed west from Nebraska to Nevada with his wife and in-laws in 1903, when through Charles' connections, and Homer's business skills, the Hansen brothers worked with a consortium of investors to create the Searchlight Railroad and the Searchlight Bank. An article in the *San Bernardino Sun* about the Searchlight Railroad deal called "Dr. Homer A. Hansen, a capitalist of this [Los Angeles] city".[54] (Figure 3)

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[42] U.S. Census Bureau. *Tenth Census of the United States, 1880*. Accessed at Ancestry.com.
[43] *Mojave Desert News*. "Dr. Homer Hansen Taken in Death", December 1, 1960.
[44] U.S. Census Bureau. *Twelfth Census of the United States, 1900*. Accessed at Ancestry.com.
[45] *Los Angeles Times.* "C.M. Hansen Funeral", March 21, 1904.
[46] California State Library, California History Section; Great Registers, 1866-1898; Collection Number: 4 - 2A; CSL Roll Number: 40; FHL Roll Number: 977095
[47] *Los Angeles Times*, October 12, 1897.
[48] *San Diego Evening Tribune*. Advertisement for "C.M. Hansen, Attorney-at-Law", October 15, 1898.
[49] *San Diego Evening Tribune*. "That Water Scrap", August 4, 1901.
[50] *Los Angeles Times*. "Mountain Water Supply", March 1, 1898.
[51] Ibid.
[52] *Los Angeles Herald*. "Legal News", August 9, 1902.
[53] *Los Angeles City Directory 1903*. "Charles M Hansen, attorney", page 555.
[54] *San Bernardino Sun*. December 3, 1905.



Searchlight Nevada

To Whom it May Concern:—

To certify that we the undersigned, doing business in the Original Townsite of Searchlight, Nev., hereby go on record to refute any statements made to the effect that we intend moving our present place of business to the Addition platted recently, adjoining the depot of the Santa Fe railroad. The present townsite is the logical and best fitted location for the town, being located on a nearly level plateau above the depot site some one hundred feet.

The following are a list of some of the improvements made in our city at a cost of thousands of dollars: A water system costing $25,000, and water mains now being laid; an electric light plant established and equipped at a cost of $20,000; Mr. Wallbrecht, president of the Searchlight Development Co., has also lately installed an ice and cold storage plant of the capacity of 15 tons per day; the Searchlight Bank and Trust Co., established some two years ago, with a capital of $50,000; the Searchlight hotel, built at a cost of $10,000; the Kennedy House, built at a cost of $5000, and some fifty places of business built at a cost of $75,000.

The property values along Hobson street have reached the value of $100 00 per front foot; and over three blocks nearly solidly built up on Hobson street alone, while on Main street and Broadway and Surprise street there are many more places of business, such as blacksmith shops, bakery, newspaper office, school and other small places of business.

We may add that in such mining towns as Butte, Mont., the depot is about one and one-third miles from the center of town; Goldfield, Nev., two miles; Rossland, B. C., three-quarters of a mile; Grandforks, B. C., one mile; Bingham, Utah, two and one-half miles; Tonopah, Nev., nearly one mile, and for that matter scores of other cities have their depot sites generally located from a half mile to two and one-half miles from town.

There will in all probability be clustered around the present depot site in Searchlight, such places of business as a lumber yard, coal yards and oil tanks, but that any of the undersigned intend removing to such a location is a wilfully absurd statement.

In conclusion, it has taken six years and over three-quarters of a million dollars to build the present town of Searchlight, and so sure are the merchants that the present town is the proper location for the city that nearly every one of them are adding additions on to their present business buildings, while Carl Leonardt of Los Angeles has extended his electric light poles through the place, and the Water Works Company are laying their mains thereon.

THOMAS GAHAGAN,
Large Mine Owner.

A. B. DAY,
Locator Searchlight Mining and Milling Co.; Owner Nevada Searchlight Mine.

W. F. WALLBRECHT,
Owner Ice Plant and Water Works.

HOMER A. HANSEN,
Pres. Searchlight Bank and Trust Co.

W. USREY,
Large Mine Owner.

THOMAS DACK,
Owner of Searchlight Hotel.

L. NEEDHAM,
Wealthy Property Owner.

G. H. M'CLINTOCK,
Cashier Searchlight Bank.

JOSEPH M'ARTHUR,
Pres. Stanley Forbes M. & M. Co.

And 100 business men and property owners of Searchlight.

Figure 3: Advertisement noting Homer A. Hansen as President of Searchlight Bank and Trust Company, 1905.

Meanwhile, the *Los Angeles Herald* noted in an article on November 26, 1905, about the Searchlight Railroad, that "Dr. Hansen's profits for two years' work are said to exceed $200,000." (The sum of $200,000 would be worth approximately $4.9 million in 2017).

Once he left Nevada to permanently settle in Los Angeles, Homer Hansen was installed as president and manager of the Big Tujunga Water Company in 1910. During that same year, the Tujunga Water & Power Company tried to sell water supply from Tujunga Creek to the City of Pasadena. Pasadena did not accept the proposal because the Tujunga Water & Power Company "in

no case would the company agree to sell its title and interest in the Tejunga [sic] basin".[55] The *Los Angeles Times* article went on to state that "the Tejunga [sic] Company does not lay claim to the normal flow of the Tejunga [sic] River, or the underground waters, but only the flood waters it proposes to impound and sell. It alleges it has a patent to the land and a decision from the courts giving it the flood waters."[56] (Figure 4)

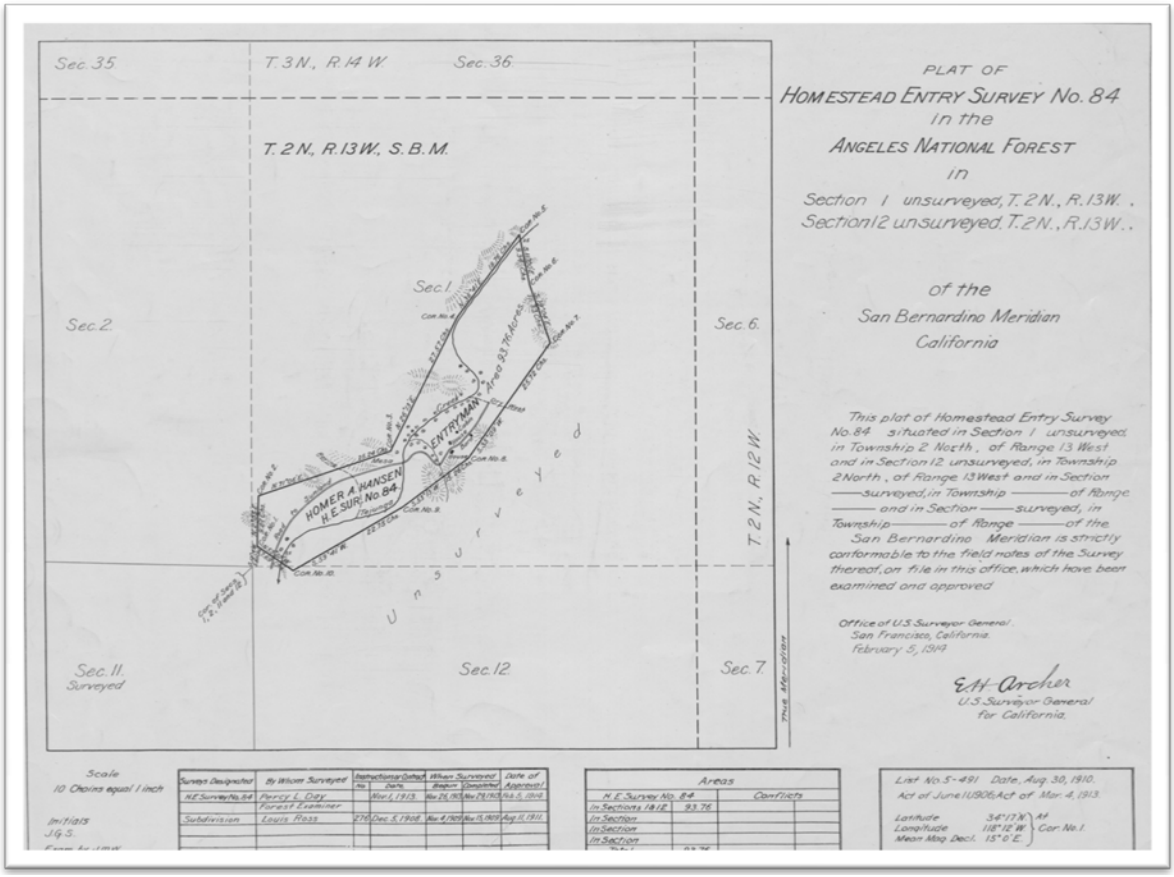

Figure 4: Survey plat map for Hansen's patent entry, 1910.

In 1910, Homer and Maud were living with her parents at 729 South Bonnie Brae Street in the city of Los Angeles, and continued to do so for the next few years. Homer kept an office in the Bradbury Building at 304 South Broadway in downtown Los Angeles, for his real estate and water management activities.[57] (Figure 5)

With the passing of the 1924 Flood Relief Bond Act in Los Angeles County, the County Flood Control District (LACFCD) was going to finally follow-up on the plans that the Los Angeles Mountain Water Company had proposed to both the Cities of Los Angeles and Pasadena for the control of flood waters in the Big Tujunga Creek watershed.[58] Unlike the prior plans though, LACFCD would

[55] *Los Angeles Times*. "Offer Water Ask Million", November 4, 1910.
[56] Ibid.
[57] *Los Angeles City Directory 1908*. "Homer A. Hansen", page 570.
[58] *Los Angeles Times*. "Los Angeles County Voters Authorize Huge Project", January 1, 1925.

only be constructing dams on Big Tujunga Creek for flood control and as a reservoir for water supply.

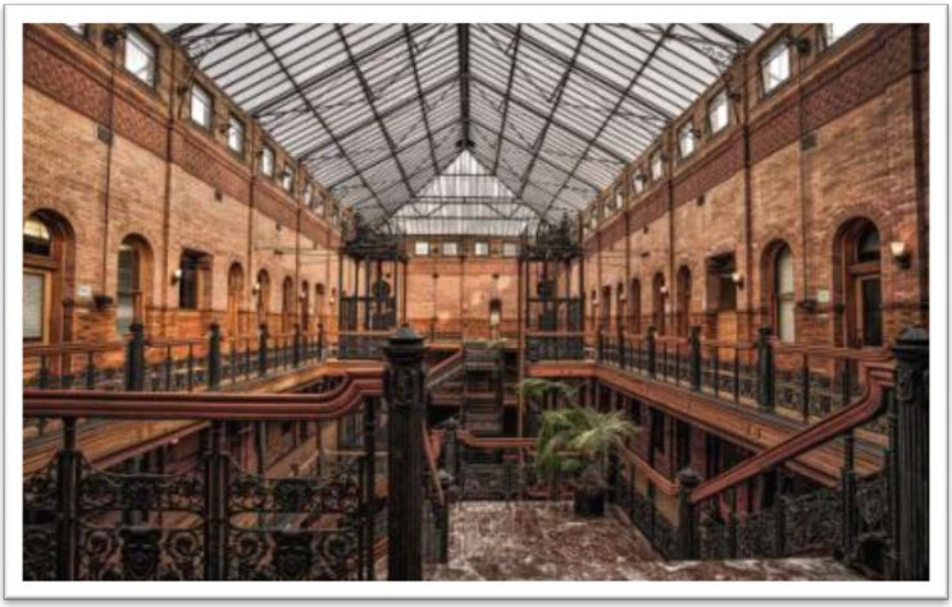

Figure 5: Interior view of the Bradbury Building that still stands on South Broadway in downtown Los Angeles.

There were plans for the construction of a total of four dams on the creek, with the "Upper Hansen" Dam located at its current location and next dam down the creek to be located at the approximate of Hoyts Ranch.[59] The proposed dam at Hoyts Ranch would lead to all of Hansen's land in Big Tujunga Canyon to be underwater.[60]

Trails Magazine described Hansen's property in their 1936 Winter issue as such:

> *Just below the Big Tujunga Flood Control Dam, under a fine oak tree, on a little flat near the road [old Tujunga Creek Road], stands a little log cabin, with a big stone chimney. Though it looks ancient in it more modern surroundings it is not so old as it seems, and was built by Dr. Homer A. Hansen, who filed a homestead on this property in 1910. Later, Dr. Hansen built a large and very beautiful log home which was destroyed in the flood of April 7, 1926, and in that same year the big, two-story Lodge which now stands on the property, was completed. Constructed of big spruce logs and great boulders, this big rustic building is an object of interest and wonder to many who drive to the end of the Big Tujunga Road.* [61]

Hansen sells the land, his road right-of-way, Hansen's Lodge, and other buildings along the Big Tujunga Creek to the County of Los Angeles in 1930 for $85,000 ($45,000 for the land, and $40,000 for the lodge and other improvements).[62]/[63] The County paid to Hansen a profit of $39,859

[59] *Los Angeles Times*. "Dam Land Deal Ordered", January 14, 1930.
[60] *Los Angeles Times*. "Dam Land Deal Ordered", January 14, 1930.
[61] *Trails Magazine*. "The Big Tujunga: Hansen's Lodge", Volume 3, Number 1, 1936; page 14.
[62] *Los Angeles Times*. "Dam Land Deal Ordered", January 14, 1930.

for his payment of $141 for the 94 acres of Government patent lands. At the start of the Great Depression, Hansen makes a profit of approximately 28,270%. Meanwhile, Hansen and his second wife Marie and their children, have been living in a custom designed house that he built in 1918 on the ranch land that would become the site of the U.S. Army Corps of Engineer's Hansen Dam in 1940.

During the construction of Big Tujunga Dam in 1930-1931, the old road up the canyon was widened so that men and materials could have easy access to the dam site.[64] "At Hansen Lodge near the dam site, numbers of tents have been placed to house engineers, inspectors and others who are at work on the big job."[65] The County had no intention of operating the Lodge, and at the time of purchase was intending to build a dam below the Lodge, in the approximate area of Hoyts Ranch, which would submerge Hansen's Lodge.[66] Even though LACFCD owned the old lodge, they did not use it to house the workers and managers of the project. LACFCD had Hansen's Lodge inspected for termite damage In April of 1931, but the lodge was still vacant and no decision had been made for its future.[67]

In March 1938, the runoff from winter rains crested the spillway of Big Tujunga Dam, and a five-foot wall of water charged down Big Tujunga Creek, demolishing Hansen's Lodge leaving only the stone chimney standing.[68]

Hansen and his family had moved to South Pasadena in 1940, and for the next twenty years he managed large land development projects and personal land holdings in Riverside, San Bernardino, Kern, and San Diego Counties. [69] His development in the Jawbone Canyon, Mojave, and Tehachapi Mountain areas, located northeast of Tehachapi Pass along Cache Creek, was comprised of 35,000 acres of land.[70] Homer A. Hansen passed away November 25, 1960 at 88 years of age.[71]

In 1966, the BTD operator, Bill Croke and his family lived in a wood cabin that was situated on the north side of the Big Tujunga Creek, built at the same time as the dam.[72] The assistant dam operator lived in a river rock and timber house on the south side of the stream.[73] The *Los Angeles Times* wrote that Croke had grown up in the area and knew that the "rock house (on the south side of the stream) used to be the private home of a man named Dr. Homer Hansen. Just a few yards downstream, he had a larger rock building which was a kind of nightclub and lodge where they had dancing and entertainment. They used to serve bootleg whiskey there [Hansen's Lodge]. When it came time to drive home, a lot of the customers were a little unsteady."[74]

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[63] Los Angeles County Assessor's Office property data for APN 5869-001-902
[64] *Los Angeles Times*. "Three Shifts Used at Big Tujunga Dam", May 11, 1930.
[65] Ibid.
[66] Ibid.
[67] *Los Angeles Times*. "Comment and Opinion", April 19, 1931.
[68] *Los Angeles Times*. "Big T – A Rugged Canyon Full of Desert Wonder", February 20, 1966.
[69] *Mojave Desert News*. "Dr. Homer Hansen Taken in Death", December 1, 1960.
[70] *Los Angeles Times*. "Funeral Services Set Tuesday for Dr. Hansen, 88", December 2, 1960.
[71] *Mojave Desert News*. "Dr. Homer Hansen Taken in Death", December 1, 1960.
[72] *Los Angeles Times*. "Dam Caretakers to Switch Houses", July 17, 1966.
[73] Ibid.
[74] Ibid.

BTD was designed to be a "big gulp" reservoir.[75] The reservoir behind the dam is intentionally kept at a low level so that it can capture a large amount of runoff from seasonal storms. Then, the dam keepers can slowly release the water to spreading grounds and percolation fields downstream to restore the underground water table. The BTD was seismic retrofitted in 2011 to meet state safety standards by thickening the dam wall, replacing the dam crest, stabilizing he canyon walls, and installing new dam controls.[76]

B. HISTORIC RESOURCES IDENTIFIED IN THE APE

A site visit and pedestrian-level inspection of the historic-era resources within the project area was performed by Pamela Daly, M.S.H.P., on July 18, 2017. Photographs were obtained during the pedestrian survey of the sites and structures previously identified as being located within the APE.

1. Hansen Lodge and Cabins site (USFS #05-01-55-00017)

Homer A. Hansen filed for a Homestead Land Patent Entry for approximately 94 acres primarily located in Township 2 North; Range 13 West; of Section 1; San Bernardino Base Meridian in 1910.[77] Contrary to local lore, it appears that he purchased the U.S. Government land for access to the water rights from Big Tujunga Creek, and a site for a future dam and reservoir. Hansen was aware of the value of this land and location from his professional association with the Tujunga Water and Power Company. The Homestead Entry patent was granted to Hansen in 1921. In 1924, a bond act was passed in Los Angeles County to finance a major flood control project to build a network of dams, reservoirs, and other structures.

Hansen sold his land and buildings to LACFCD in 1930. The two-story lodge that was in the parcel was destroyed in 1938, and massive grading and hillside contouring have significantly altered the land surrounding where the lodge once stood. There is a pile of stones that are supposed to have come from the chimney that remained after the Lodge building had been demolished when the dam was crested in March of 1938 by excessive rains. The area measures approximately 298 feet long by 107 feet wide, approximately .732 acre, and there are large, mature oak trees in this location. There are no standing structures, or foundations in this site. Topographic maps and aerial photographs also provide information that the discharge from BTD has changed the path of Big Tujunga Creek through the canyon, and the site where the Lodge was situated.

2. SCE Transmission Line Road Alignment in the USFS (P19-186877; USFS #05-01-55-187)

Within the current project APE is a segment of the SCE transmission line/maintenance road. In 2003, Schmidt and Schmidt recorded that the resource was a 26-mile-long alignment that includes parts of five Forest- and/or SCE-maintained roads. The road is depicted on the 1934 USGS Mt Lowe 1:24,000 quadrangle map, and the 1939 Mt. Lowe 1:24,000 quadrangle map.

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[75] *Los Angeles Times*. "Big Tujunga Dam in the Angeles National Forest Ready for 'Big Gulp'", February 3, 2014.
[76] Ibid.
[77] Bureau of Land Management, General Land Office Records; Homer A. Hansen patent: BLM Serial No. CALA 0011812/Accession Number 829972.

The SCE Verdugo Circuit (P19-186860) is directly associated with the SCE transmission line/maintenance road in the current project APE. The service roads were used to construct the power network through the Angeles National Forest, and have continued to be used to maintain the system. The utility poles and associated service road are considered ordinary and ubiquitous structures, as these rural power systems are found throughout California.

3. Verdugo Circuit (P19-186860; USFS #05-01-51-138)

The SCE Verdugo Circuit (P19-186860) is directly associated with the SCE transmission line/maintenance road in the current project APE. Our inspection revealed that the SCE Verdugo Circuit power lines no longer run from the base of Maple Canyon (near Big Tujunga Road), to the west towards Angeles Forest Highway, to where the maintenance road goes under the Vincent Circuit lines. The poles are still in place (without power lines) on the maintenance road between where the transmission road runs along the south wall of Maple Canyon SPS.

4. Big Tujunga Dam (USFS#05-01-55-221)

The Big Tujunga Dam is a variable-radius arch concrete dam. It was constructed 1930-1931 as a result of a Los Angeles County bond act passed in 1924 to finance a major flood control project to build a network of dams, reservoirs, and other structures. (Figures 6 and 7) Section 1, E., of this report summarizes the affects to the BTD as a result of seismic upgrades in 2011.

There will be no adverse effects to the dam due to the proposed Project. It should be noted that the dam is not recorded on DPR 523 Site Recording forms and the SCCIC does not maintain the USFS site record in its files.



Figure 6: Big Tujunga Dam, image date January 2008



Figure 7: Big Tujunga Dam, image date April 2015

C. SIGNIFICANCE

The APE of the Project contains a variety of identified historic-period resources. The site that has been identified as being the location of Hansen's Lodge, is situated on Los Angeles County land. The three other resources, the SCE Verdugo Power lines, SCE service road, and BTD, are all located on federal forest land. The built-environment resources, and the vacant site, have been evaluated under criterion for listing in the National Register and California Register. The Hansen Lodge site has also been evaluated for significance under the relevant County of Los Angeles Historic Preservation Ordinance.

1. Resource on County of Los Angeles land

a. Hansen's Lodge site

The site was investigated for any physical remains of the Hansen Lodge building. Other than three piles of river rocks that are supposed to have been from the stone chimney of the lodge, there are no physical attributes of a building that was located here. The site does not possess any physical aspects of integrity such as design, setting, materials, workmanship, feeling, and association, which could convey the history of Hansen's Lodge along Big Tujunga Creek and his patent homestead. The site does not appear eligible for listing in the National Register or California Register under criteria A/1 or B/2 for association with important events or persons, or as a County of Los Angeles Historic Landmark under criteria 1 and 2.

There are no remaining physical aspects of the Lodge that can be evaluated as a type or period of architecture, or a method of construction. The site does not appear eligible for listing in the National Register or California Register under criterion C/3, or as a County of Los Angeles Historic Landmark under criterion 3.

Our investigation did not find any evidence that the site has the potential to yield information about the history of the local area. We found evidence of at least 12 instances between 1938 and 2016, when the average annual rainfall was exceeded by almost double the amount of rain, and this would have led to substantial and sustained runoff over and around the site where the Lodge building once stood. The site does not appear eligible for listing in the National Register or California Register under criterion D/4, or as a County of Los Angeles Historic Landmark under criterion 4.

2. Resources on Federal land

a. Verdugo Circuit P19-186860; USFS #05-01-51-138

Unlike the electric transmission lines and supporting structures of systems such as the San Bernardino Line that provided electric to the Boulder Dam/Hoover Dam project, local circuits and associated utility poles, and construction/maintenance roads, are found in rural/forested areas throughout California. While the survey for the current project did not allow for the evaluation of the SCE road and Verdugo circuit outside of the APE, it appears that the utility poles and power lines should not be considered more than ordinary and ubiquitous structures.

The few utility poles and power lines that remain of the Verdugo Circuit in the APE do not appear eligible for listing in the National Register or California Register under criteria A/1 or B/2 for association with important historic events or persons.

The remaining utility poles and power lines of the Verdugo Circuit in the APE do not possess important engineering values, or add to the history of the use of electricity in Southern California. The segment of the Verdugo Circuit does not appear eligible for listing in the National Register or California Register under criterion C/3.

The short segment of the Verdugo Circuit in the APE does not appear to have the capacity to provide information important to the history of the local area, and be considered a significant historic resource under criterion D/4.

As the Verdugo Circuit transmission line no longer forms a continuing circuit through the APE, even though some utility poles are still evident along the construction/maintenance road at the west end of Maple Canyon, the Verdugo Circuit has lost the aspects of design, setting, materials, workmanship, and feeling, from regular maintenance to the line and the decision not to restore part of the line after the Station Fire.

b. SCE Transmission Line Road Alignment in the USFS P19-186877; USFS #05-01-55-187

Construction/maintenance roads such as the road that runs under the Verdugo Circuit in the APE are found in rural/forested areas throughout California. While the survey for the current project did not allow for the evaluation of the SCE road and Verdugo circuit outside of the APE, it appears that the utility poles and power lines should not be considered more than ordinary and ubiquitous structures. The construction/maintenance road does not appear to have the potential to be considered a historic resource.

The construction/maintenance road in the APE does not appear eligible for listing in the National Register or California Register under criteria A/1 or B/2 for association with important historic events or persons.

The construction/maintenance road in the APE has not been found to possess important engineering values, or add to the history of the building of electrical systems in Southern California. The segment of the SCE maintenance road does not appear eligible for listing in the National Register or California Register under criterion C/3.

The segment of the construction/maintenance road in the APE does not appear to have the capacity to provide information important to the history of the local area, and be considered a significant historic resource under criterion D/4.

Even though the Verdugo Circuit system does not appear to be carried along the original path through the APE, some utility poles are still evident along the construction/maintenance road, and the construction/maintenance road appears to have kept some aspects of integrity where the road has not been removed by alterations to the landscape.

Summary

Three resources were evaluated within the APE; a segment of the Verdugo Circuit, a segment of the SCE construction/maintenance road, and the vacant site where Hansen's Lodge was located until 1938. The resources evaluated within the BTR Sediment Removal Project APE do not appear eligible for listing in the National Register or the California Register as significant historic resources, as they do not meet any of the criteria necessary for listing in the registries. The Hansen Lodge site was also found not to meet the criteria necessary for being determined a County of Los Angeles Historic Landmark.

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APPENDIX A: Preparers Qualifications



Pamela Daly, M.S.H.P., Principal Architectural Historian
Daly & Associates, 2242 El Capitan Drive, Riverside, CA 92506
(951) 369-1366 daly.rvrsde@sbcglobal.net

Ms. Daly is a 36 CFR 61 Qualified Architectural Historian with more than 20 years experience in historic resource management and consulting in California, Vermont, New York, and Nevada. She earned a Bachelor of Science degree in Business Management from Elmira College in Elmira, New York, and a Master of Science degree in Historic Preservation at University of Vermont. Ms. Daly's coursework in Historic Preservation included the study of American Architecture, Historic Landscapes, and Building Conservation Techniques.

Ms. Daly has experience with federal agencies including U.S. Air Force, U.S. Navy, U.S. Army Reserve, U.S. Army Corps of Engineers, Bureau of Land Management, the U.S. Forest Service, the National Park Service, and U.S. Fish & Wildlife. She is accepted as a principal investigator for both Architectural History and History by the California State Office of Historic Preservation, and holds the qualifications to work throughout the United States. Ms. Daly belongs to the National Trust for Historic Preservation, Vernacular Architecture Forum, Society of Industrial Archaeology, and Association of Preservation Technology.

Ms. Daly has expertise not only in assessing and evaluating classic residential architectural styles of the United States dating from the eighteenth to the twenty-first century, but she has a wide range of experience in the survey and evaluation of military sites and structures in both the western and eastern United States. She has performed studies on airplane hangars, military housing, helicopter hangers, ammunition bunkers, flight simulators, and Cold War radar arrays. Industrial archaeological sites include automobile and railroad bridges, irrigation canals and ditches, gravity-fed water supply systems, sewer treatments systems, gold mines, water-pumping systems, privately-owned reservoirs, electric transmission line towers, roads, historic signage, airplane hangars, steam-powered belt and pulley systems, and a historic zanja.

Studies of built-environment resources include archival research, field investigation, significance criteria and determinations, assessment of impacts/effects, management plans, and mitigation implementation. Mitigation measures include preparation of Historic American Building Survey (HABS) documentation, Historic American Engineering Record (HAER) documentation, Historic American Landscape (HALS) documentation, interpretive signage, layout and production of brochures, websites, and video displays. Ms. Daly has also worked with clients with historically significant buildings to restore or rehabilitate them in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.

APPENDIX B: APE Map with location of resources

APPENDIX C: DPR Series 523 Site Forms

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # 19-186860 Update
HRI #
Trinomial
NRHP Status Code: 6Z

Other Listings
Review Code | Reviewer | Date

*Resource Name: Segment of "SCE Verdugo Circuit, Forest Service site #05-01-51-138"

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted *a. County: Los Angeles

and

*b. USGS 7.5' Quad: Condor Peak Date: 1995 T 2N;R 13W; Section 1, and T2N; R12W; Section 6; S.B.B.M.

c. Address: near entrance to Big Tujunga Dam, 809 Big Tujunga Canyon Road City: Sunland Zip:

d. UTM: Segment from Zone:11; 390332mE/3794975mN, to Zone 11; 0391397mE/3794036mN (G.P.S.)

e. Other Locational Data: The segment runs from inside the private property of the Big Tujunga Dam complex, to the south and east, along the north slope of the south canyon wall in Maple Canyon towards the Angeles Highway. Elevation: 2,248 feet a.s.l. to 3,061 a.s.l.

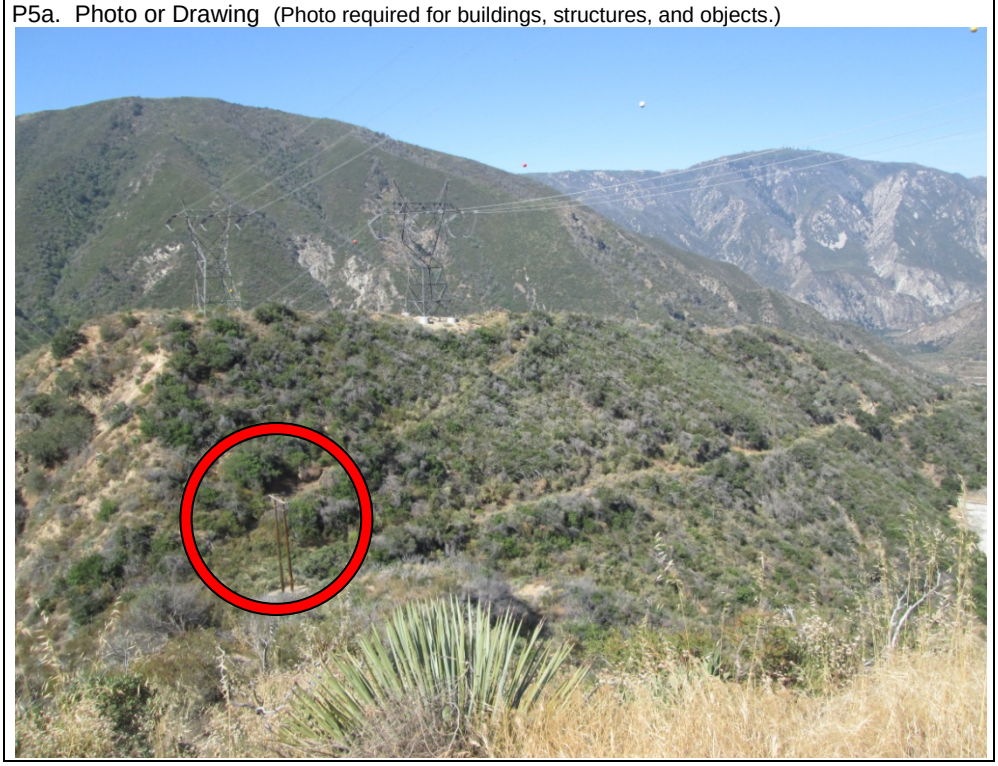
*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The SCE Verdugo Circuit (P19-186860) is directly associated with the SCE transmission line/maintenance road in the current project area-of-potential effects (APE). Our inspection revealed that the SCE Verdugo Circuit power lines no longer run from the base of Maple Canyon (near Big Tujunga Road), to the west towards Angeles Forest Highway, to where the maintenance road goes under the Vincent Circuit lines. The poles are still in place (without power lines) on the maintenance road between where the transmission road runs along the south wall of Maple Canyon.

*P3b. Resource Attributes: HP39 (Other: Power line).

*P4. Resources Present: ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo: View looking southwest from a pullout on the Angeles Forest Highway towards the south canyon wall of Maple Canyon. Utilty pole does not carry lines that run from the west where the Verdugo Circuit terminates near Big Tujunga Creek. July 18, 2017.

*P6. Date Constructed/Age and Sources: ☒Historic ☐Prehistoric ☐Both

The Verdugo Circuit dates from circa 1925, but the poles and lines have been replaced. *P7. Owner and Address:

Southern California Edison on Angeles National Forest land.

*P8. Recorded by:

Pamela Daly, M.S.H.P.
Daly & Associates
2242 El Capitan Drive
Riverside, CA 92506

*P9. Date Recorded: August 3, 2017

*P10. Survey Type: Intensive pedestrian.

*P11. Report Citation: Daly, Pamela. "Historic Resources Evaluation Report of Big Tujunga Reservoir Sediment Removal Project, Los Angeles County, CA.", Daly & Associates, August 2017.

*Attachments: ☐NONE ☒Location Map ☐Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

 ***NRHP Status Code**: 6Z

***Resource Name:** Segment of "SCE Verdugo Circuit, Forest Service #05-01-51-138"

B1. Historic Name: Verdugo Circuit line.
B2. Common Name:
B3. Original Use: Electric transmission line and utility poles. B4. Present Use: Same.
***B5. Architectural Style:** N/A.
***B6. Construction History:** The installation of utility poles to run the electric system along Big Tujunga Creek, and into the Big Tujunga Canyon, circa 1925, would have been constructed contemporaneously with the SCE construction/maintenance service road.

***B7. Moved?** ■No ☐Yes ☐Unknown **Date:** **Original Location:**
***B8. Related Features:**
Southern California Edison's Transmission Line Road, P19-186877.

B9a. Architect: Unknown b. Builder: Southern California Electric
***B10. Significance:** None **Theme:** Electric supply circuits **Area:** Los Angeles County
Period of Significance: None **Property Type:** utility poles and power lines **Applicable Criteria:** None

Unlike the electric transmission lines and supporting structures of systems such as the San Bernardino Line that provided electric to the Boulder Dam/Hoover Dam project, local circuits and associated utility poles, and construction/maintenance roads, are found in rural/forested areas throughout California. While the survey for the current project did not allow for the evaluation of the SCE road and Verdugo circuit outside of the APE, it appears that the utility poles and power lines should not be considered more than ordinary and ubiquitous structures.

The few utility poles and power lines of the Verdugo Circuit in the APE have not been found to be associated with important historic events or persons, nor do they possess important engineering values, or add to the history of the use of electricity in Southern California. The short segment of the Verdugo Circuit in the APE does not appear to have the capacity to provide information important to the history of the local area.

As the Verdugo Circuit transmission line no longer forms a continuing circuit through the APE, even though some utility poles are still evident along the construction/maintenance road at the west end of Maple Canyon, the Verdugo Circuit has lost the aspects of design, setting, materials, workmanship, and feeling, from regular maintenance to the line and the decision not to restore part of the line after the Station Fire.

B11. Additional Resource Attributes:

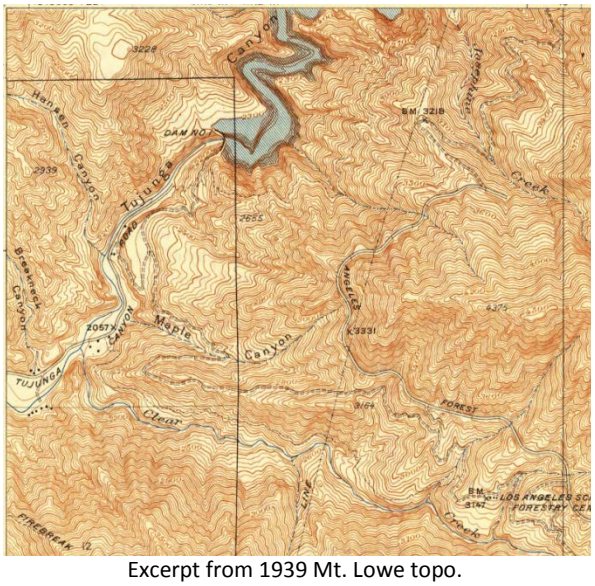
***B12. References:**

B13. Remarks:

***B14. Evaluator:** Pamela Daly, M.S.H.P.

***Date of Evaluation:** August 3, 2017

(This space reserved for official comments.)



Excerpt from 1939 Mt. Lowe topo.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

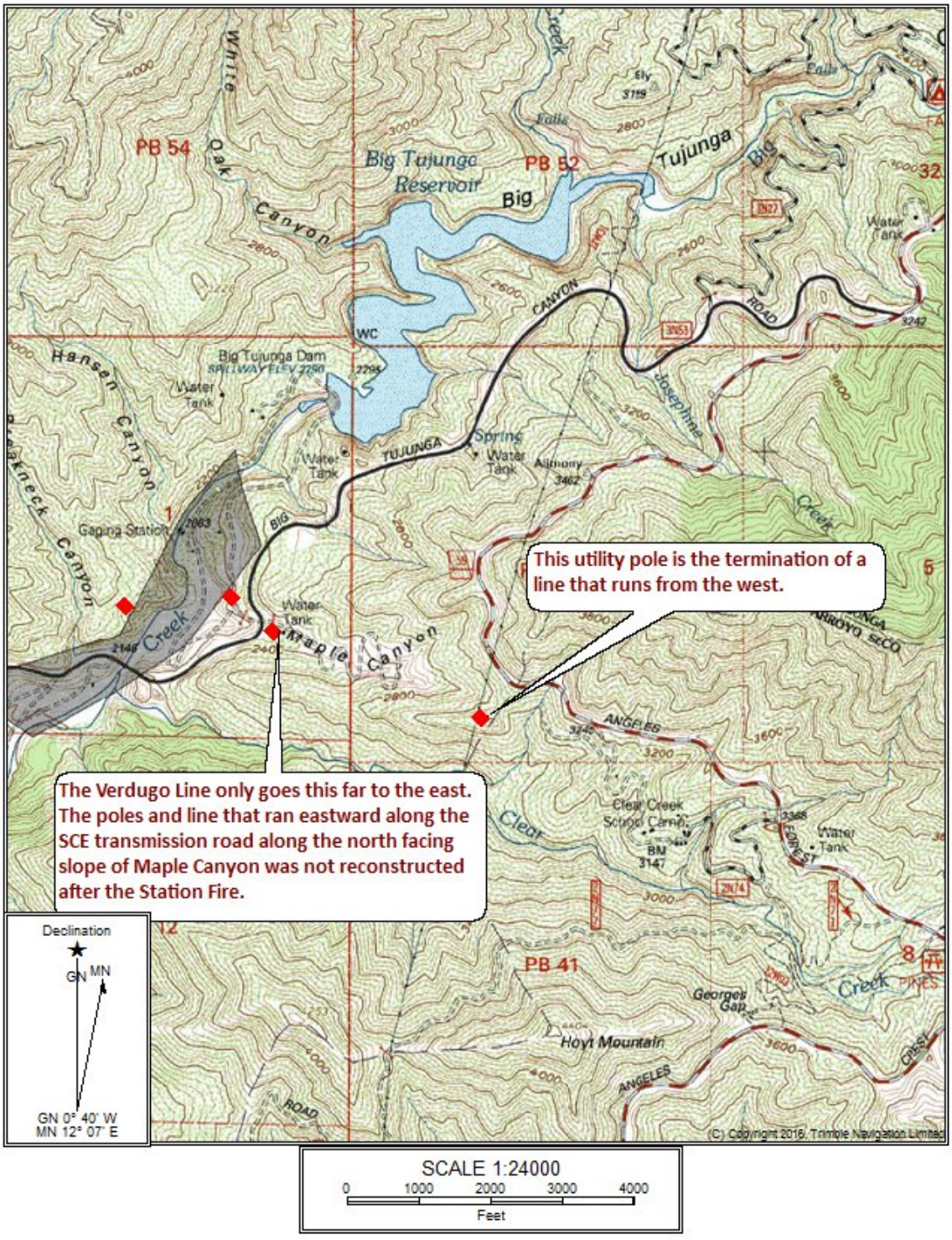
Primary # 19-186860 Update
HRI#
Trinomial

Page 3 of 3

***Resource Name:** Segment of "SCE Verdugo Circuit, Forest Service #05-01-51-138"

***Map Name:** Condor Peak

***Scale:** 1:24,000 ***Date of Map:** 1995



*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # 19-186877 Update
HRI #
Trinomial
NRHP Status Code: 6Z

Other Listings Review Code	Reviewer	Date

***Resource Name:** Segment of "SCE Transmission Line Road: SCE ANF Roads P3 #2, Forest Service site #05-01-55-187"

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Los Angeles

and

***b. USGS 7.5' Quad:** Condor Peak **Date:** 1995 T 2N;R 13W; Section 1, and T2N; R12W; Section 6**;** S.B.B.M.

c. Address: near entrance to Big Tujunga Dam, 809 Big Tujunga Canyon Road City: Sunland Zip:

d. UTM: Segment from Zone:11; 390332mE/3794975mN, to Zone 11; 0391397mE/3794036mN (G.P.S.)

e. Other Locational Data: The segment runs from inside the private property of the Big Tujunga Dam complex, to the south and east, along the north slope of the south canyon wall in Maple Canyon towards the Angeles Highway. Elevation: 2,248 feet a.s.l. to 3,061 a.s.l.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Within the current project APE is a segment of the SCE transmission line/maintenance road. In 2003, Schmidt and Schmidt recorded that the resource was a 26-mile-long alignment that includes parts of five Forest- and/or SCE-maintained roads (Schmidt and Schmidt 2003). The road is depicted on the 1934 USGS Mt Lowe 1:24,000 quadrangle map, and the 1939 Mt. Lowe 1:24,000 quadrangle map.

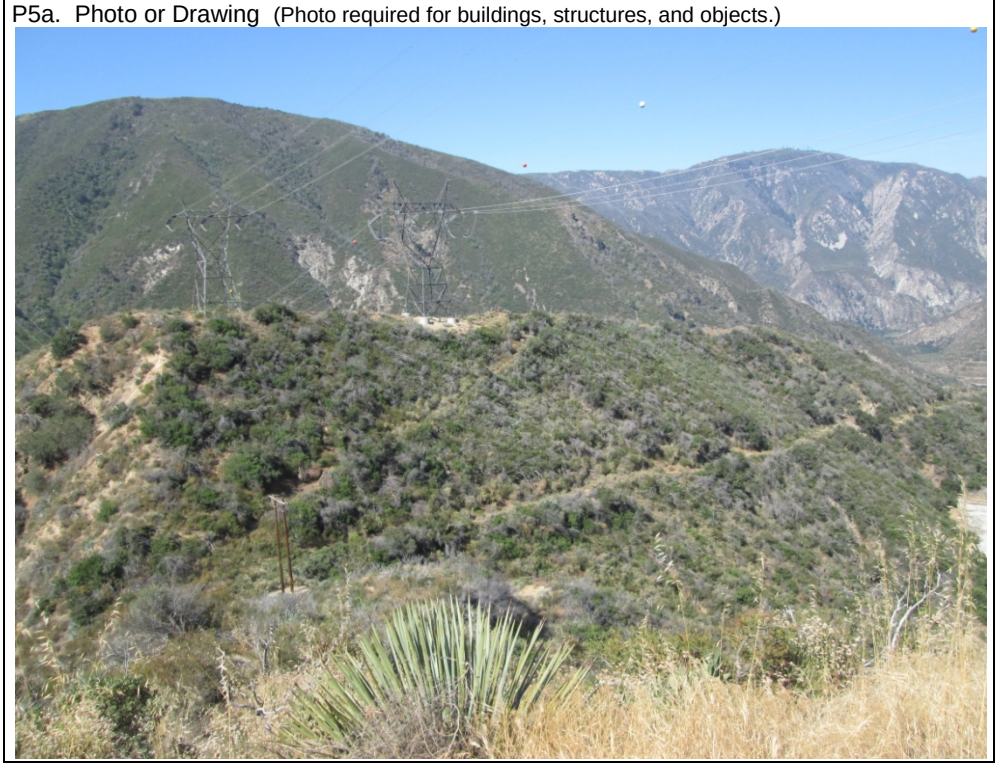
The SCE Verdugo Circuit (P19-186860) is directly associated with the SCE transmission line/maintenance road in the current project area-of-potential effects (APE). The service roads were used to construct the power network through the Angeles National Forest, and have continued to be used to maintain the system.

The utility poles and associated service road are considered ordinary and ubiquitous structures, as these rural power systems are found throughout California.

***P3b. Resource Attributes:** HP39 (Other: Power line maintenance road).

***P4. Resources Present:** ☐Building ☐Structure ☐Object ☒Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo: View looking southwest from a pullout on the Angeles Forest Highway towards the south canyon wall of Maple Canyon. The old SCE maintenance road is visible as the "Z" path on the face of the hill that continues to the west. The sediment spreading grounds of Maple Canyon is just visible along the bottom half of the right edge of the photograph. July 18, 2017.

***P6. Date Constructed/Age and Sources:** ☒Historic ☐Prehistoric ☐Both
1930-1931 for the construction of Big Tujunga Dam, and surrounding homesteads.

***P7. Owner and Address:**
Southern California Edison on Angeles National Forest land.

***P8. Recorded by:**
Pamela Daly, M.S.H.P.
Daly & Associates
2242 El Capitan Drive
Riverside, CA 92506

***P9. Date Recorded:** August 3, 2017

***P10. Survey Type:** Intensive pedestrian.

***P11. Report Citation:** Daly, Pamela. "Historic Resources Evaluation Report of Big Tujunga Reservoir Sediment Removal Project, Los Angeles County, CA.", Daly & Associates, August 2017.

***Attachments:** ☐NONE ☒Location Map ☐Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

 ***NRHP Status Code**: 6Z

***Resource Name:** Segment of "SC Edison Transmission Line Road: SCE ANF Roads P3 #2, Forest Service #05-01-55-187"

B1. Historic Name: Maintenance road for the Verdugo Circuit line.
B2. Common Name:
B3. Original Use: Construction road for installing utility poles. B4. Present Use: For maintenance of lines and utility poles.
***B5. Architectural Style:** N/A.
***B6. Construction History:** The road would have been constructed contemporaneously with the installation of utility poles to run the electric system along Big Tujunga Creek, and into the Big Tujunga Canyon, circa 1925.

***B7. Moved?** ■No ☐Yes ☐Unknown **Date:** **Original Location:**
***B8. Related Features:**
Southern California Edison's Verdugo Circuit, P19-186860.

B9a. Architect: Unknown b. Builder: Southern California Electric
***B10. Significance:** None **Theme:** Electric supply circuits **Area:** Los Angeles County
Period of Significance: None **Property Type:** unpaved dirt path **Applicable Criteria:** None

Unlike the electric transmission lines and supporting structures of systems such as the San Bernardino Line that provided electric to the Boulder Dam/Hoover Dam project, local circuits and associated utility poles, and construction/maintenance roads, such as the road under the Verdugo Circuit are found in rural/forested areas throughout California. While the survey for the current project did not allow for the evaluation of the SCE road and Verdugo circuit outside of the APE, it appears that the utility poles and power lines should not be considered more than ordinary and ubiquitous structures. The construction/maintenance road does not appear to have the potential to be considered a historic resource.

The construction/maintenance road in the APE has not been found to be associated with important historic events or persons, nor does it possess important engineering values, or add to the history of the use of electricity in Southern California. The segment of the construction/maintenance road does not appear to have the capacity to provide information important to the history of the local area.

As the transmission lines no longer form a continuing circuit through the APE, even though some utility poles are still evident along the construction/maintenance road, the construction/maintenance road appears to have kept some aspects of integrity where the road has not been removed by alterations to the landscape.

B11. Additional Resource Attributes:

***B12. References:**

B13. Remarks:

See Continuation Sheet for view of road in APE.

***B14. Evaluator:** Pamela Daly, M.S.H.P.

***Date of Evaluation:** August 3, 2017

(This space reserved for official comments.)

***Resource Name:** Segment of "SCE Edison Transmission Line Road: SCE ANF Roads P3 #2, Forest Service #05-01-55-187"

***Recorded by:** Pamela Daly, M.S.H.P. ***Date:** August 3, 2017 ☒Continuation ☒Update

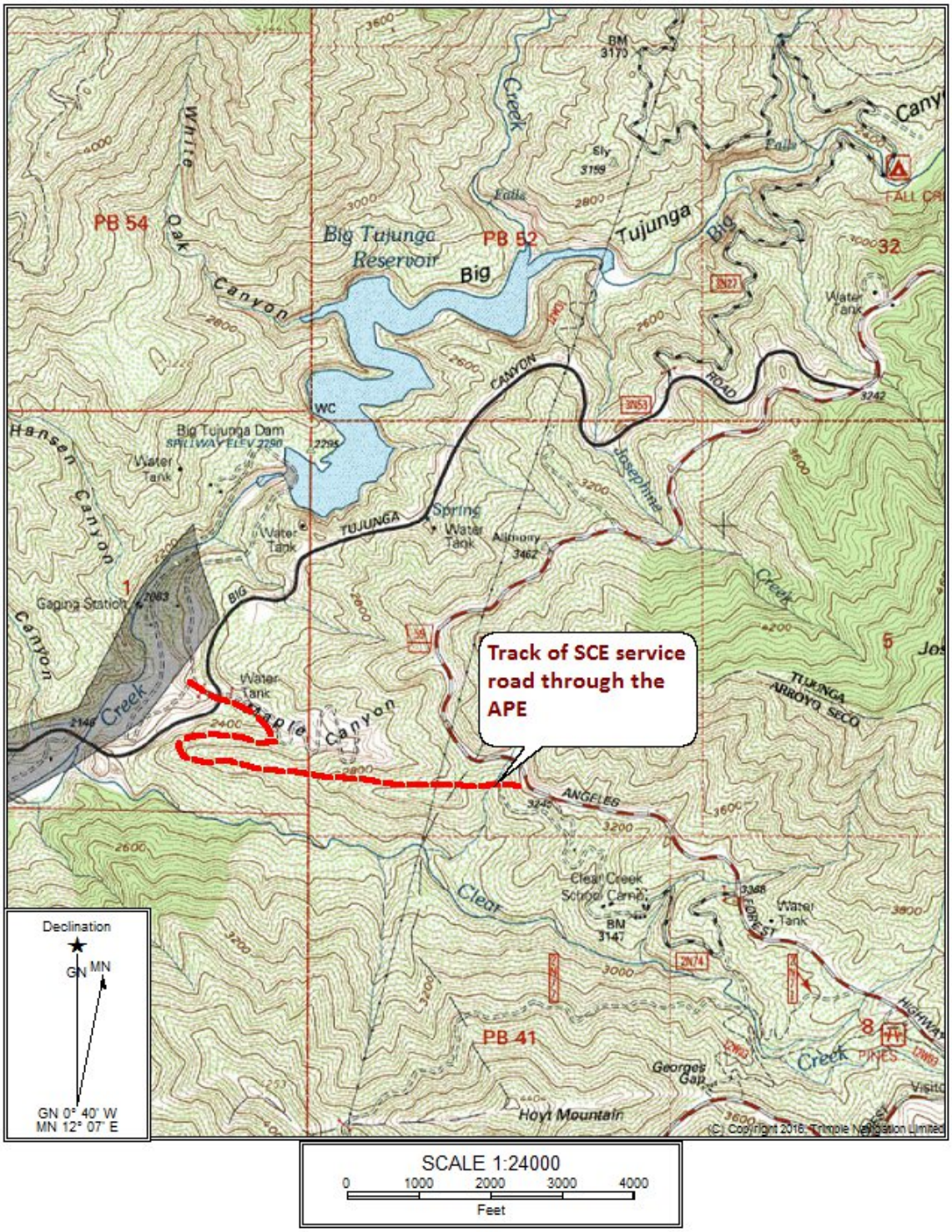


Using an aerial image from Google Earth, (imagery date April 2017) we have laid over the current roads and paths the paths as shown on the Mt. Lowe 1939 topo map for the SCE power line, utility poles, and associated maintenance road. (View looking north.)

The path shown in the DPR for P19-186877, written by Compass Rose Archaeological, Inc., dated November 28, 2003, mistakenly plotted the SCE lines and maintenance road (in this specific segment) on the modern roads, and not off of the original Tujunga Canyon Road that was located almost along the bank of Tujunga Creek.

***Resource Name:** Segment of "SCE Edison Transmission Line Road: SCE ANF Roads P3 #2, Forest Service #05-01-55-187"

***Map Name:** Condor Peak ***Scale:** 1:24,000 ***Date of Map:** 1995



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code: 6Z

Other Listings
Review Code | Reviewer | Date

*Resource Name: Hansen's Lodge site

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted *a. County: Los Angeles

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

*b. USGS 7.5' Quad: Condor Peak Date: 1995 T2N; R13W; 93.76 acres of Section 1; S.B.B.M.

c. Address: 809 Big Tujunga Canyon Road City: Sunland Zip:

d. UTM: see coordinates on Location Map page

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation:

The homestead parcel of Homer A. Hansen was given the APN of 5869-001-902 when it was purchased by Los Angeles County Flood Control District. Los Angeles County Department of Public Works now owns the site.

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

This area was pointed out by the Big Tujunga Dam keeper as the site where Hansen's Lodge had been located. There is a pile of stone that are supposed to have been from the chimney that remained after the Lodge building had been demolished from when the dam was crested in March of 1938 from excessive rains. The area measures approximately 298 feet long by 107 feet wide, approximately .732 acre, and there are large, mature oak trees in this location.

There are no standing structures, or foundations in this site. The area surrounding the site has been heavily disturbed over the years by grading activities. Topographic maps and aerial photographs also provide information that the discharge from Big Tujunga Dam has changed the path of Big Tujunga Creek through the canyon, and the site where the Lodge was situated.

The old "Road to Sunland" appears to have run to the immediate east of this lot, along the base of the hillside.

*P3b. Resource Attributes: AH7 (road segment).

*P4. Resources Present: ☐Building ☐Structure ☐Object ☒Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing



P5b. Description of Photo:
View looking north at site where Hansen Lodge was located. Big Tujunga Creek runs along the west side of the site.

*P6. Date Constructed/Age and Sources: ☒Historic
☐Prehistoric ☐Both
Lodge was built in 1926, destroyed by flood in 1938.

*P7. Owner and Address:
Los Angeles County Department of Public Works
900 South Fremont Avenue
Alhambra, CA 91803

*P8. Recorded by:
Pamela Daly, M.S.H.P.
Daly & Associates
2242 El Capitan Drive
Riverside, CA 92506

*P9. Date Recorded: August 5, 2017

*P10. Survey Type: Section 106

*P11. Report Citation: Daly, Pamela. "Historic Resources Evaluation Report of Big Tujunga Reservoir Sediment Removal Project, Los Angeles County, CA", Daly & Associates, August 2017.

*Attachments: ☐NONE ☒Location Map ☐Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code**: 6Z

***Resource Name: Hansen's Lodge site**

B1. Historic Name: Hansen Lodge site
B2. Common Name:
B3. Original Use: site of Hansen's Lodge
B4. Present Use: None

***B5. Architectural Style:** N/A

***B6. Construction History:** (Construction date, alterations, and date of alterations)

The lodge was built in 1926 after flood waters had demolished Hansen's prior mountain cabin resort. Hansen's Lodge was bought by the Los Angeles Flood Control District in 1930 as part of the Big Tujunga Dam project. The dam was crested in 1938 and flood waters demolished the abandoned lodge building. According to local sources, only the stone chimney and fireplace remained after the flood waters. The stone chimney was destroyed by the LADPW in the early 2000s because it was attracting hikers into the private property.

***B7. Moved?** ■**No** ☐**Yes** ☐**Unknown** **Date:** **Original Location:**

***B8. Related Features:**

Remain of the old Big Tujunga Creek Road that ran alongside Hansen's cabin and lodge site.

B9a. Architect: N/A
b. Builder: N/A

***B10. Significance:** None **Theme:** early 20th century mountain lodge **Area:** Los Angeles County
Period of Significance: None **Property Type:** None **Applicable Criteria:** None

The site was investigated for any physical remains of the Hansen Lodge building. Other than three piles of river rocks that are supposed to have been from the stone chimney of the lodge, there are no physical attributes of a building that was located here. The site does not possess any physical aspects of integrity such as design, setting, materials, workmanship, feeling, and association, which could convey the history of Hansen's Lodge along Big Tujunga Creek and his patent homestead. The property does not appear eligible for listing in the National Register, California Register, or as a County of Los Angeles historical resource under criterion for association with important events or persons. There are no remaining physical aspects of the Lodge that can be evaluated as a type, period, or method of construction.

Our investigation of the site did not find any evidence that the site has the potential to yield information about the history of the local area. We found at least evidence of at least 12 instances when the average rainfall was exceeded by almost double the annual average, which would have led to substantial and sustained flooding over and around the site.

B11. Additional Resource Attributes: None.

***B12. References:**

B13. Remarks:

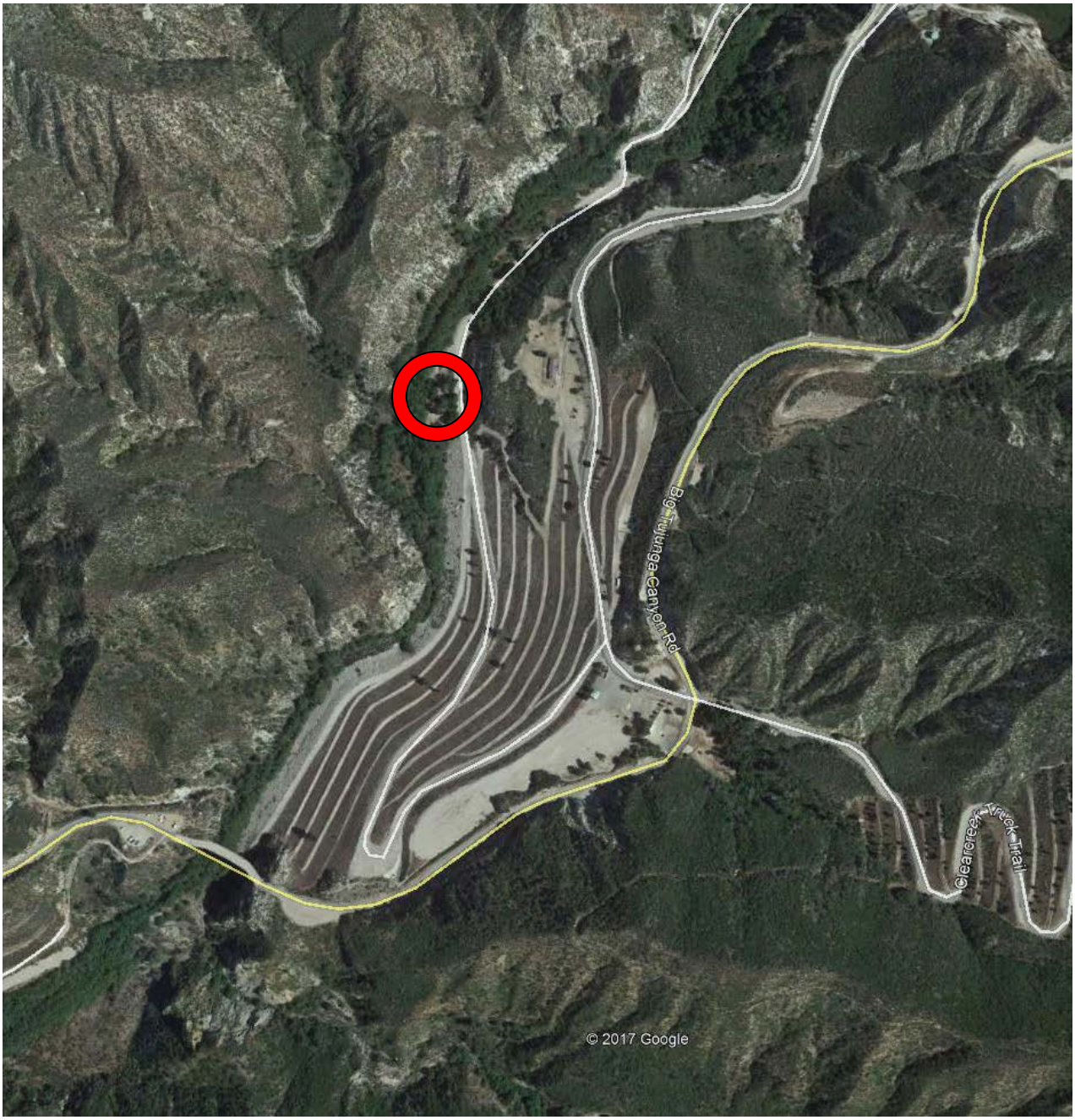
See aerial map on Continuation Sheet.

***B14. Evaluator:** Pamela Daly, M.S.H.P.

***Date of Evaluation:** August 5, 2017

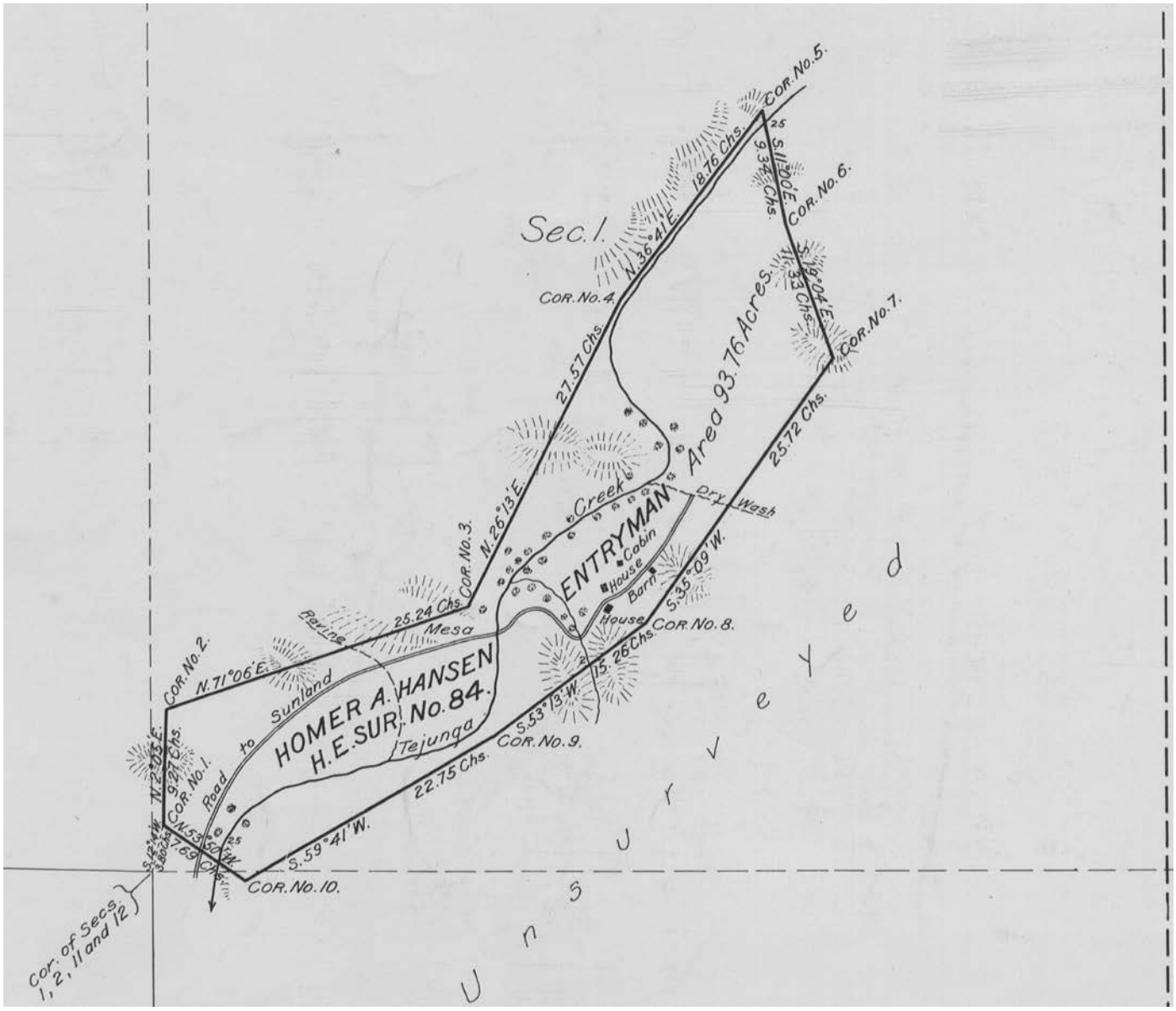
(This space reserved for official comments.)

***Recorded by:** Pamela Daly, M.S.H.P. ***Date:** August 5, 2017 ☒Continuation ☐ Update



The location of the site where Hansen's Lodge (1926-1938) was located. The site is within the private property of LA County Department of Public Works.

***Recorded by:** Pamela Daly, M.S.H.P. ***Date:** August 5, 2017 ☒Continuation ☐ Update



Close-up of excerpt from the Plat of Homestead Entry Survey No. 84 in the Angeles National Forest in Section 1, T2N, R13 W and Section 12 T2N; R13W, S.B.B.M., August 30, 1910.

The buildings and structures noted on the map may have been constructed by prior settlers on the land, or by Homer A. Hansen when he filed for the patent in 1910. All the buildings and structures of the homestead parcel were destroyed by the flood waters of 1926. When Hansen rebuilt, he constructed a lodge just a bit farther north up Tujunga Creek, approximately where the final "n" of the word "Entryman" is on the map. The "Road to Sunland" is the original Big Tujunga Creek Road. It only went as far as the base of Big Tujunga Dam when it was constructed in 1930-1931. According to Mt. Lowe Quad Map of 1939, the present day road, Big Tujunga Canyon Road, was built after 1939



Pile of the riverrock chimney stones along the creek side of the site. View looking west.



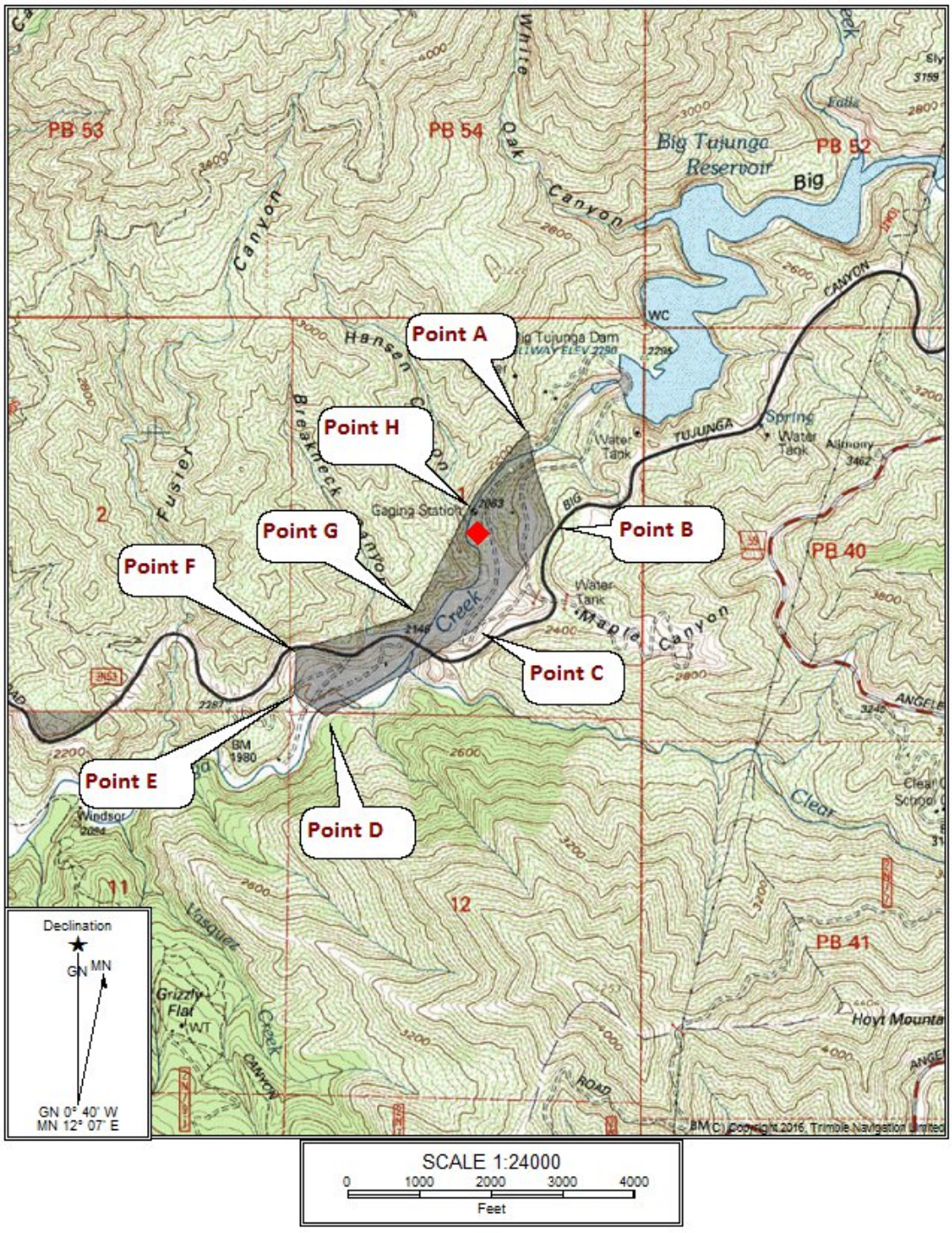
Segments of poured concrete and stone-and-concrete walls that supported the original canyon road. View looking north.

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **LOCATION MAP**	Primary # HRI# Trinomial

***Resource Name:** Hansen's Lodge

***Map Name:** Condor Peak

***Scale:** 1:24,000 ***Date of Map:** 1995



Point A: Zone 11; 0386821m/E; 3797027m/N
Point B: Zone 11; 0390427m/E; 3794727m/N
Point C: Zone 11; 0390091m/E; 3794302m/N
Point D: Zone 11; 0389451m/E; 3793933m/N
Point E: Zone 11; 0389305m/E; 3794034m/N
Point F: Zone 11; 0389313m/E; 3794217m/N
Point G: Zone 11; 0389819m/E; 3794373m/N
Point H: Zone 11; 0390076m/E; 3794825m/N

APPENDIX F

PERSONNEL QUALIFICATIONS

PATRICK MAXON, M.A., RPA

Director | Cultural Resources

VCS Environmental
EXPERT SOLUTIONS | CEQA-NEPA . Biology . Regulatory



EDUCATION

1994/MA/Anthropology/California State University, Fullerton
1987/BA/Psychology/Sociology/Towson State University, Towson, MD

VCS TEAM MEMBER SINCE 2017

CERTIFICATIONS/TRAINING

Riverside County Transportation and Land Management Agency Certified Archaeologist/Riverside County

California Energy Commission Cultural Resources Specialist/

Registered Professional Archaeologist (National)/No. 11468/Register of Professional Archaeologists

Orange County Certified Archaeologist/Orange County

National Historic Preservation Act Section 106 Compliance Advanced Certification, 2002/

Principal Investigator, Southern California/Bureau of Land Management

Qualified Archaeologist-Secretary of Interior Standards and Guidelines of Professional Qualification & Standards for Archeology, as per Title 36, Code of Federal Regulations, Part 61/

ABOUT

Patrick Maxon M.A., RPA is a Registered Professional Archaeologist who meets the Secretary of Interior's standards for historic preservation programs for archaeology and who has a permit to perform work on Bureau of Land Management land. Patrick has 23 years of experience in all aspects of cultural resources management, including prehistoric and historic archaeology, paleontology, ethnography, and tribal consultation. He has expertise in compliance with NEPA, CEQA, the National Historic Preservation Act (NHPA), the Archaeological Resources Protection Act, and the Clean Water Act, among others. Patrick has completed hundreds of cultural resources projects that have involved (1) agency, client, Native American, and subcontractor coordination; (2) treatment plans and research design development; (3) archival research; (4) field reconnaissance; (5) site testing; (6) data recovery excavation; (7) construction monitoring; (8) site recordation; (9) site protection/preservation; (10) mapping/cartography; (11) laboratory analysis; and (12) report production. He has managed a number of projects within the jurisdiction of the USACE, the Bureau of Land Management, the Bureau of Reclamation, and other federal agencies that require compliance with Section 106 of the NHPA. He has also completed projects throughout Southern California under CEQA for State and local governments and municipalities, including Caltrans, the Department of General Services (DGS), the California Energy Commission, the California Department of Water Resources, the Los Angeles County Department of Public Works (LACDPW), the Los Angeles Department of Water and Power, the Los Angeles Unified School District, and others.

SELECT EXPERIENCE/PROJECTS

Tujunga Spreading Grounds Enhancement Project Cultural Resources Study, Los Angeles, CA: Cultural Resources Manager for the proposed project which consists, in part, of an alteration to the current intake facility; creation of a low-flow treatment area; installation of two new intake facilities; and reactivation, deepening, and/or combining of existing water basins to alleviate the migration of methane gas from the landfill to local residences (due to the presence of the Sheldon-Arleta landfill). Pat conducted a cultural resources study, which consisted of (1) a records search undertaken at the South Central Coastal Information Center (SCCIC) located at the California State University, Fullerton; (2) consultation with the Native American Heritage Commission (NAHC); (3) a paleontological records search at the Natural History Museum of Los Angeles County; and (4) an assessment of the project's potential to adversely impact cultural resources, including recommendations for mitigating any adverse impacts to a less than significant level. The existing facility buildings and structures on the site will not be removed, and they do not appear to be of sufficient age to be considered historic; therefore, there would be no significant impacts to historic resources. Monitoring was recommended during excavations for new intake facilities and during expansion and deepening of the basins due to the potential to impact cultural resources.

Santa Anita Stormwater Flood Management and Seismic Strengthening Project Initial Study/Mitigated Negative Declaration, Los Angeles County, CA: Cultural Resources Manager for the preparation of an IS/MND pursuant to CEQA for the modification of three existing flood management and water conservation facilities along the Santa Anita Canyon Watershed, including the Santa Anita Dam (Dam), the Santa Anita Headworks (Headworks) and culvert crossing, and the Santa Anita Debris Dam (Debris Dam). The project improves these County of Los Angeles Flood Control District (LACFCD) facilities

PROFESSIONAL AFFILIATIONS

Pacific Coast Archaeological Society

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to better manage storm water runoff and to improve public safety by addressing seismic safety and other structural issues, as well as to increase water conservation and prevent flood damage to downstream communities. The Dam would be structurally altered to accommodate a new spillway with sufficient capacity to pass the probable maximum flood in order to reduce the risk of Dam failure from uncontrolled overtopping during major storm events. The Headworks would reconstruct the levee to ensure it can withstand flows and replace the existing tainter gate with a new diversion structure. The existing culvert bridge providing access to the City of Arcadia's Wilderness Park would be removed and replaced with a single-span bridge. Lastly, the remediation of the seismic deficiencies at the Debris Dam would involve a reconfiguring of the intake tower and reinforcing the embankment with structural buttressing. Key environmental issues include biological resources (e.g. bats, woodland plant communities), tree removal, construction noise adjacent to residential, and the temporary closure of park facilities. Patrick managed a Phase I study, which included records searches, a pedestrian survey, Native American scoping, and a technical report. Consultation with the U.S. Forest Service's (USFS') Cultural Resources Manager and research in the Forest Service archives was also undertaken. A historic evaluation of the Dam and associated built environment resulted in a finding of no historic properties affected.

Ortega Highway Reservoir Project Cultural Resources Monitoring, Orange County, CA: Project Manager for the Santa Margarita Water District's excavation of test pits and auger borings for its Planning Area 4 Reservoir on Ortega Highway. Archaeologists and Paleontologists monitored all substantial excavations into the subsurface at this location. The Cretaceous Period (circa 140 to 65 million years ago) geologic formation known as the Williams Formation is present throughout the subsurface of the project area. Monitors recovered several fossils during the study including plant and leaf impressions, a small crab, and several fragments of bone that could be dinosaur. Further study is necessary to identify and evaluate the discoveries and curate them in an appropriate museum facility.

Orange County Water District On-Call Environmental Analyses Services, Orange County, CA: Cultural Resources Manager for the On-Call Contract. Mr. Maxon has provided environmental analyses services on an as-needed basis as part of on-call contracts with the Orange County Water District since 2010. Representative cultural resources task orders completed as part of the on-call contracts, include the following:

- La Palma Recharge Basin, Anaheim, CA
- Prado Basin Mitigation Sites, Orange County, CA
- Fletcher Basin Improvement Project Cultural and Paleontological Resources Mitigation Monitoring Plan, City of Orange, CA
- Centennial Park Injection Well Project, Santa Ana, CA
- EW-1 Groundwater Containment and Treatment Project, City of Fullerton, CA.
- Santiago Recharge Basin Project, Orange, CA

Edinger Avenue Bridge Replacement Environmental Documents and Regulatory Services, Huntington Beach and Seal Beach, CA: Cultural Resources Manager for this project. The County of Orange, in cooperation with Caltrans and the FHWA, proposed to demolish the existing 15-span timber bridge over the Bolsa Chica Channel that provides access to Sunset Aquatic Regional Park. A 4-span precise concrete bridge would be constructed in its place. An IS/MND and supporting documentation were prepared in accordance with Caltrans standards. Pat conducted a Phase I cultural resources study to

Caltrans standards and completed a Historic Property Survey Report (HPSR) documenting the findings of the study. The Phase I study included development of a project Area of Potential Effects (APE); Native American scoping with local Gabrielino and Juaneño tribes and individuals; a pedestrian survey of the bridge and approaches on either side; and preparation of the HPSR. No archaeological resources were recorded within the APE and none were discovered as a result of this study. The bridge itself is listed as Category 5 (Not Eligible for NRHP) in the Caltrans Historic Highway Bridge Inventory.

Whittier Narrows Dam Basin Recreation Area Master Development Plan Input Program, El Monte, CA: Cultural Resources Manager for the preparation of a Program EIR for the Master Development Plan Input (MDPI) document to the 1996 Whittier Narrows Dam Recreation Area (WNRA) Master Plan. The project provides the USACE (which owns the WNRA) with a vision for the future of the WNRA that has evolved from the coordination and collaboration of interested stakeholders. The MDPI conceptually organizes the approximate 1,400-acre WNRA into 6 Planning Zones and one Conservation/Restoration Zone to define the types and intensity of recreational activities that are compatible with each other and with the underlying natural resource values of the site. Key environmental issues include impacts to biological resources, traffic/circulation, hydrology/drainage, and recreation. Pat reviewed existing literature and completed the Cultural Resources Section for the project's EIR.

Joshua Basin Water District Groundwater Recharge Basin and Pipeline Project, Joshua Tree, CA: Cultural Resources Manager for the Joshua Basin Water District Groundwater Recharge Basin and Pipeline Project. This project included the construction of approximately 24,000 linear feet of 16-inch diameter pipe, as an extension to the existing Mojave Water Agency pipeline, and the construction of an approximate 32.5-acre water recharge facility. Patrick prepared an educational awareness program on the historic and prehistoric cultural resources in the area; the potential of construction activities to disturb known or unknown cultural resources and human remains; and the actions to be taken in the event of accidental discovery. A qualified Archaeologist monitored ground-disturbing activities related to the pipeline construction; completed a pedestrian survey of the planned recharge basin; and monitored grading for construction of the basin itself.

East Garden Grove-Wintersburg Channel Widening Project Phase I Cultural Resources Study, Huntington Beach, CA: Cultural Resources Manager for this project, which will widen and stabilize approximately 1.8 miles of channel by installing sheet piling on both sides of the channel and subsequently removing rock and soil on the channel side of the piling. Residential uses are immediately adjacent to both sides of the eastern reach of the channel; the western reach traverses the Bolsa Chica wetlands. Pat conducted a Phase I cultural resources study to determine if the proposed channel widening would have the potential to impact cultural resources. The study included a literature review at the South Central Coastal Information Center (SCCIC) located at the California State University, Fullerton; a paleontological literature review at the Natural History Museum of Los Angeles County; a pedestrian survey of the Area of Potential Effects (APE); and completion of the CEQA IS/MND section describing the study results. Pat also consulted with USACE regulators, Native American tribes and individuals, and a local Archaeologist who has extensive experience working in and around Bolsa Chica. Elements of the defunct Bolsa Chica Gun Club were identified in the wetlands, but it was determined that the channel work would have no impact on them. Channel recordation and construction monitoring were recommended.

Serrano Water District Walter E. Howiler, Jr. Water Filtration Plant and Wells No. 3 and No. 5 Modifications Project Initial Study/Mitigated Negative Declaration, Orange and Villa Park, CA: Cultural Resources Manager for this project involving water quality improvements at both the Howiler Water Filtration Plant located in the City of Orange and at the Serrano Water District's groundwater Well Nos. 3 and 5 located in the City of Villa Park. The project was to convert the primary disinfectant used at the Howiler Water Filtration Plant from free chlorine to ozone, and the residual (secondary) disinfectant at both the Howiler Water Filtration Plant and at Well Nos. 3 and 5 from free chlorine to chloramines. Pat completed a cultural resources literature review of the project site at the South Central Coastal Information Center (SCCIC) located at the California State University, Fullerton, and contacted the California Native American Heritage Commission (NAHC) for a review of its Sacred Lands File and to obtain a list of Native American contacts for the project area. Additionally, he prepared and sent informational letters to all the NAHC-listed contacts in order to ensure a good-faith effort of participation and contacted the Natural History Museum of Los Angeles County to conduct a paleontological resources literature review for the project.

La Rivera Drainage Project Cultural Resources Services, Riverside, CA: Cultural Resources Manager for this project which proposed to improve existing drainage conditions within the La Rivera residential development. Psomas prepared an IS/MND for its implementation. The Phase I cultural resources study included (1) a cultural resources literature review of the project site at the Eastern Information Center (EIC) at the University of California, Riverside; (2) contact with the Native American Heritage Commission (NAHC) for a review of its Sacred Lands File and to obtain a list of Native American contacts for the project area; (3) preparation of informational letters to all the NAHC listed contacts in order to ensure a good-faith effort of participation and (4) conducted a paleontological resources literature review for the project at the Natural History Museum of Los Angeles County (NHMLA). No cultural resources were discovered and no impacts are anticipated.

Sunset Upper Debris Basin Dam Modification Project Cultural Resources Services, Los Angeles County, CA: Cultural Resources Manager for this project which proposes construction of a five-foot-high parapet wall on top of the existing dam to increase the storage capacity of the Sunset Upper Debris Basin. The project includes raising the dam abutments, modifying the dam access road, and installing a Geobrugg net debris barrier. Pat completed a cultural resources literature review of the project site at the South Central Coastal Information Center (SCCIC) at the California State University, Fullerton, and contacted the Native American Heritage Commission (NAHC) for a review of its Scared Lands File and to obtain a list of Native American contacts for the project area. Additionally, he prepared and sent informational letters to all the NAHC-listed contacts in order to ensure a good-faith effort of participation. An examination was also made of the Historic Resource Inventory (HRI) maintained by the California Register of Historic Preservation. Psomas prepared an Initial Study/Mitigated Negative Declaration (IS/MND) for the proposed project, which proposed the construction of a 3.2-foot extension to the existing parapet wall on top of the existing dam structure in order to increase the capacity of the debris basin from 15,900 cubic yards to 23,900 cubic yards. This project also involved reconstruction of the existing concrete dam's spillway elevation by 5 feet. The parapet wall and spillway improvements would increase the height of the dam structure, thereby increasing the "footprint" of the basin's 100 percent contour by approximately 1.3 acres.

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APPENDIX D

ENERGY DATA

Fuel Use

PhaseName	OffRoadEquipmentType	OffRoadE	UsageHours	HorsePower	Horsepower Category	Load Factor	Num Days	Year	Fuel Consumption Rate (gal/hour)	Total Fuel Consumption (gal/construction period)
SPS Site Preparation	Concrete/Industrial Saws	0	8	81	100	0.73	27	2020	4.7	0
SPS Site Preparation	Excavators	1	8	158	175	0.38	27	2020	2.9	237
SPS Site Preparation	Rubber Tired Dozers	1	8	247	300	0.4	27	2020	4.5	386
SPS Site Preparation	Tractors/Loaders/Backhoes	4	8	97	100	0.37	27	2020	1.6	508
BTR Site Preparation	Rubber Tired Dozers	0	8	247	300	0.4	11	2020	4.5	0
BTR Site Preparation	Tractors/Loaders/Backhoes	1	8	97	100	0.37	11	2020	1.6	52
BTR Access Road Grading	Air Compressors	0	6	78	100	0.48	25	2020	1.3	0
BTR Access Road Grading	Excavators	4	8	158	175	0.38	25	2020	2.9	877
BTR Access Road Grading	Graders	0	8	187	175	0.41	25	2020	3.1	0
BTR Access Road Grading	Rubber Tired Dozers	4	8	247	300	0.4	25	2020	4.5	1,429
BTR Access Road Grading	Scrapers	0	8	367	300	0.48	25	2020	5.6	0
BTR Access Road Grading	Tractors/Loaders/Backhoes	4	8	97	100	0.37	25	2020	1.6	470
Dewatering Activities	Cranes	0	7	231	300	0.29	52	2020	3.3	0
Dewatering Activities	Forklifts	0	8	89	100	0.2	52	2020	2.0	0
Dewatering Activities	Generator Sets	0	8	84	100	0.74	52	2020	5.2	0
Dewatering Activities	Pumps	4	24	84	100	0.74	52	2020	1.3	4,953
Dewatering Activities	Tractors/Loaders/Backhoes	0	7	97	100	0.37	52	2020	1.6	0
Dewatering Activities	Welders	0	8	46	50	0.45	52	2020	2.4	0
Paving Haul Roads	Excavators	0	8	158	175	0.38	25	2020	2.9	0
Paving Haul Roads	Graders	0	8	187	175	0.41	25	2020	3.1	0
Paving Haul Roads	Pavers	1	8	130	100	0.42	25	2020	1.7	146
Paving Haul Roads	Paving Equipment	1	8	132	100	0.36	25	2020	1.6	118
Paving Haul Roads	Rollers	1	8	80	100	0.38	25	2020	1.7	129
Paving Haul Roads	Rubber Tired Dozers	0	8	247	300	0.4	25	2020	4.5	0
Paving Haul Roads	Scrapers	0	8	367	300	0.48	25	2020	5.6	0
Paving Haul Roads	Tractors/Loaders/Backhoes	0	8	97	100	0.37	25	2020	1.6	0
Culvert Crossing Repair	Cement and Mortar Mixers	1	8	9	25	0.56	25	2020	0.4	43
Culvert Crossing Repair	Pavers	0	8	130	100	0.42	25	2020	1.7	0
Culvert Crossing Repair	Paving Equipment	0	8	132	100	0.36	25	2020	1.6	0
Culvert Crossing Repair	Rollers	0	8	80	100	0.38	25	2020	1.7	0
BTR Grading and Hauling	Excavators	4	8	158	175	0.38	132	2020	2.9	4,632
BTR Grading and Hauling	Graders	0	8	187	175	0.41	132	2020	3.1	0
BTR Grading and Hauling	Rubber Tired Dozers	4	8	247	300	0.4	132	2020	4.5	7,544
BTR Grading and Hauling	Scrapers	0	8	367	300	0.48	132	2020	5.6	0
BTR Grading and Hauling	Tractors/Loaders/Backhoes	4	8	97	100	0.37	132	2020	1.6	2,482
SPS Grading	Excavators	0	8	158	175	0.38	132	2020	2.9	0
SPS Grading	Graders	0	8	187	175	0.41	132	2020	3.1	0
SPS Grading	Rubber Tired Dozers	4	8	247	300	0.4	132	2020	4.5	7,544
SPS Grading	Scrapers	0	8	367	300	0.48	132	2020	5.6	0
SPS Grading	Tractors/Loaders/Backhoes	4	8	97	100	0.37	132	2020	1.6	2,482
SPS Construction	Cranes	0	7	231	300	0.29	79	2020	3.3	0
SPS Construction	Forklifts	0	8	89	100	0.2	79	2020	2.0	0
SPS Construction	Generator Sets	0	8	84	100	0.74	79	2020	5.2	0
SPS Construction	Rubber Tired Dozers	4	8	247	300	0.4	79	2020	4.5	4,515
SPS Construction	Tractors/Loaders/Backhoes	4	7	97	100	0.37	79	2020	1.6	1,300
SPS Construction	Welders	0	8	46	50	0.45	79	2020	2.4	0
Seasonal Stockpile/Crushing	Crushing/Proc. Equipment	1	8	85	100	0.78	52	2020	7.6	2,478
Seasonal Stockpile/Crushing	Generator Sets	1	8	84	100	0.74	52	2020	5.2	1,604
Seasonal Stockpile/Crushing	Tractors/Loaders/Backhoes	2	8	97	100	0.37	52	2020	1.6	489
SPS Paving	Pavers	1	8	130	100	0.42	52	2020	1.7	303
SPS Paving	Paving Equipment	1	8	132	100	0.36	52	2020	1.6	245
SPS Paving	Rollers	1	8	80	100	0.38	52	2020	1.7	268
Slope Protection Activity	Excavators	0	8	158	175	0.38	26	2020	2.9	0
Slope Protection Activity	Graders	0	8	187	175	0.41	26	2020	3.1	0
Slope Protection Activity	Rubber Tired Dozers	0	8	247	300	0.4	26	2020	4.5	0
Slope Protection Activity	Scrapers	0	8	367	300	0.48	26	2020	5.6	0
Slope Protection Activity	Tractors/Loaders/Backhoes	1	8	97	100	0.37	26	2020	1.6	122
Hydroblasting for Cement Slurry	Generator Sets	1	8	84	100	0.74	26	2020	5.2	802
Site Preparation	Rubber Tired Dozers	1	8	247	300	0.4	80	2025	4.5	1,144
Site Preparation	Tractors/Loaders/Backhoes	0	8	97	100	0.37	80	2025	1.6	0
Planting	Rubber Tired Dozers	1	6	247	300	0.4	53	2025	4.5	568
									Total	**47,868**

Input							**Gasoline Consumption**			**Diesel Consumption**		
Phase Name	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker	Vendor	Haul	Worker	Vendor	Haul
SPS Site Preparation	30	10	0	19.8	10	20						
BTR Site Preparation	20	10	0	19.8	10	20						
BTR Access Road Grading	40	10	0	19.8	10	20						
Dewatering Activities	30	0	0	19.8	7.9	20						
Paving Haul Roads	6	0	0	19.8	7.9	20						
Culvert Crossing Repair	16	0	0	19.8	7.9	20						
BTR Grading and Hauling	96	10	0	19.8	10	20						
SPS Grading	50	0	0	19.8	7.9	20						
SPS Construction	0	10	0	19.8	7.9	20						
Seasonal Stockpile/Crushing	16	0	0	19.8	7.9	20						
SPS Paving	10	0	0	19.8	7.9	20						
Slope Protection Activity	0	0	0	19.8	7.9	20						
Hydroblasting for Cement Sl	6	0	0	19.8	7.9	20						
Sluicegate Repair	16	0	0	19.8	7.9	20						
Site Preparation	10	10	0	19.8	10	20						
Planting	10	20	0	19.8	10	20						
Site Preparation	10	10	0	19.8	10	20						
Planting	10	20	0	19.8	10	20						
Truck Travel	0	0	400	19.8	10	5						
Adjusted												
SPS Site Preparation	810	270	0	19.8	10	20	773	174	0	1	2	0
BTR Site Preparation	220	110	0	19.8	10	20	210	71	0	0	1	0
BTR Access Road Grading	1000	250	0	19.8	10	20	955	161	0	1	2	0
Dewatering Activities	1560	0	0	19.8	7.9	20	1,490	0	0	2	0	0
Paving Haul Roads	150	0	0	19.8	7.9	20	143	0	0	0	0	0
Culvert Crossing Repair	400	0	0	19.8	7.9	20	382	0	0	0	0	0
BTR Grading and Hauling	12672	1320	0	19.8	10	20	12,100	848	0	15	9	0
SPS Grading	6600	0	0	19.8	7.9	20	6,302	0	0	8	0	0
SPS Construction	0	790	0	19.8	7.9	20	0	401	0	0	4	0
Seasonal Stockpile/Crushing	832	0	0	19.8	7.9	20	794	0	0	1	0	0
SPS Paving	520	0	0	19.8	7.9	20	497	0	0	1	0	0
Slope Protection Activity	0	0	0	19.8	7.9	20	0	0	0	0	0	0
Hydroblasting for Cement Sl	156	0	0	19.8	7.9	20	149	0	0	0	0	0
Sluicegate Repair	416	0	0	19.8	7.9	20	397	0	0	0	0	0
Site Preparation	800	800	0	19.8	10	20	764	514	0	1	6	0
Planting	530	1060	0	19.8	10	20	506	681	0	1	7	0
Site Preparation	800	800	0	19.8	10	20	764	514	0	1	6	0
Planting	530	1060	0	19.8	10	20	506	681	0	1	7	0
Truck Travel	0	0	48000	19.8	10	5	0	0	461	0	0	41,142
Total							**26,732**	**4,045**	**461**	**33**	**44**	**41,142**

APPENDIX E

SEDIMENT CHARACTERIZATION STUDY
BIG TUJUNGA DAM AND RESERVOIR SEDIMENT REMOVAL PROJECT

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
GEOTECHNCIAL AND MATERIALS ENGINEERING DIVISION

February 4, 2013

TO: Christopher Stone
Water Resources Division

Attention Kavita Mahulikar

FROM: Greg Kelley NGD for GK
Geotechnical and Materials Engineering Division

SEDIMENT CHARACTERIZATION STUDY
BIG TUJUNGA DAM AND RESERVOIR SEDIMENT REMOVAL PROJECT
PROJECT ID WRDD000028 (PCA HF00710003)

In response to your August 18, 2011, and August 27, 2012, requests, we conducted a sediment characterization for the subject project. Our findings and conclusions are included in the attached report.

If you have any questions regarding this matter, please contact Olga Cruz or Geir Mathisen at Extension 4923.

OC:kw
P:\gmepub\Secretarial\soilsrvw\REPORTS\Reservoir Sediment Characterization Study Report_011513.docx

Attach.

SEDIMENT CHARACTERIZATION STUDY

BIG TUJUNGA DAM AND RESERVOIR SEDIMENT REMOVAL PROJECT

ANGELES NATIONAL FOREST
UNINCORPORATED LOS ANGELES COUNTY

Prepared for

County of Los Angeles
Department of Public Works
Water Resources Division

Prepared by

County of Los Angeles
Department of Public Works
Geotechnical and Materials Engineering Division

January 15, 2013

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Figure 1 – Site Location Map
Figure 2 – Underwater Sample and Test Pit Location Map

TABLES

Table 1 – Summary of Sediment Characterization Test Results

PLATE

Plate 1 – Underwater Sample and Test Pit Station Map

APPENDICES

Appendix A – Geotechnical Laboratory Data
Appendix B – Environmental Analytical Results
Appendix C – Vulcan Developed Soil Concentration Levels and California Human Health Screening Levels

INTRODUCTION

As requested by Water Resources Division (WRD), Geotechnical and Materials Engineering Division conducted a characterization study of the sediment materials in Big Tujunga Reservoir. The work was completed as part of the sediment removal program to clean out the reservoir. The project area is located in the Angeles National Forest, unincorporated Los Angeles County (see Figure 1). This report presents our findings and conclusions from this study.

SUBSURFACE EXPLORATION

Our investigation was divided into two categories: 1) underwater sampling within submerged portions of the reservoir, and 2) sampling within the dry portions of the reservoir. Logistical constraints around Big Tujunga Reservoir prevented the use of conventional subsurface investigation methods. There were no feasible access points into the reservoir for heavy equipment such as excavators and the foot path behind the reservoir was considered hazardous and unsafe. We determined that the only way to travel to different areas within the reservoir was by boat. The dam operator volunteered the use of his small motor-operated boat to transport our team; however, the weight limit of the small boat would only allow light-weight equipment that can be carried and operated by hand.

For underwater sampling within submerged portions of the reservoir, two options were discussed with WRD. The first option was to sample the reservoir bottom using a mud rotary drill rig from a barge. This option has the advantage of deep, continuous sampling that provides a comprehensive subsurface profile of the reservoir bottom. The second option was to use a 12-inch by 6-inch ponar grab sampler dropped by hand from a boat. The ponar sampling would be less expensive than barge drilling because it can be conducted using the dam operator's small boat; however, this would only provide sampling of approximately 6 inches of the reservoir bottom. At WRD's request, only ponar sampling was conducted within the submerged areas. Sampling locations (see Figure 2) were selected based on water levels at the time of investigation, directions from WRD, and the dam operator’s availability.

Initially, multiple sampling locations were selected within the dry areas around the reservoir. However, rainfall and fluctuations in the reservoir's water level made many of these locations either inaccessible by boat or unsafe for landing. The scope of our sampling program within dry areas was reduced to one test pit, denoted as B-10 on Figure 2. This test pit was excavated by hand using picks and shovels down to a depth

of approximately 9 feet. Geotechnical testing was performed at a mobile laboratory set up adjacent to the location of the test pit, immediately upstream of water level at the time of exploration.

DATA AND TEST RESULTS

Sediment Characterization Test Results

Sieve analyses and organic content tests were performed on samples collected. The test results are provided in Appendix B and are summarized in the following Table 1.

Table 1

Summary of Sediment Characterization Test Results

Approximate Station	Sampling Location/ Test Pit Location (*)	% Gravel	% Sand	% Fines (Silts and Clays)	% Organic Content
3+00	B-9	0	2.1	97.9	6.65
8+00	B-8	0	2	98.0	6.74
11+00	B-7	3.2	3.2	93.6	7.07
14+50	B-6	0	5.2	94.8	6.24
17+50	B-5	0	5.8	94.2	5.86
20+50	B-4	0	4.5	95.5	6.78
24+00	B-3	0.8	6.3	92.9	6.24
31+00	B-2	3.1	54.4	42.5	3.01
37+00	B-1	1.3	93.9	4.8	.77
44+50	B-16	0.3	75.3	24.4	6.5
53+00	B-15	0.2	7.2	92.6	10.2
60+50	B-14	13	72.2	14.8	5.6
67+00	B-13	1.1	27.2	71.7	1.2
72+50	B-12	3.3	58.2	38.5	6.7
77+00	B-11	2.4	44.8	52.8	2.9
95+00	B-10*	60.6	36.7	2.7	0.46

With the exception of a test pit (*) all samples were collected underwater to a depth of approximately 6 inches.

Environmental Test Results

Sixteen locations were sampled and submitted for testing. Locations were chosen to closely represent the conditions throughout the reservoir. Due to access constraints the samples were primarily collected in underwater conditions using a ponar sampler. Locations where samples were collected are shown on sampling location map (see Figure 2) and reservoir plan on Plate 1.

The following analytical tests were performed: California Code of Regulations (CCR) Title 22 Metals including mercury, volatile organic compounds including fuel oxygenates, semivolatile organic compounds, organochlorine pesticides, chlorinated herbicides, polynuclear aromatic hydrocarbons, polychlorinated biphenyls, and 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). The analytical test results are provided in Appendix C and are summarized in Table 2.

DISCUSSION AND CONCLUSIONS

1. Sediments in the reservoir range from silt and clay (fine soils) size particles up to cobble sizes.

2. Underwater sampling showed that areas from approximately Station 0+00 to 30+00 appear to have the greatest silt and clay content. This may correspond to a topographic drop in the natural ground as observed in the profile plans. One test pit excavated in the upper area of the reservoir at approximately Stations 95+00 showed significant gravel content.

3. In the wet areas of the reservoir, organic material was observed on the water surface. Sediments generally appeared to contain negligible organic materials in dry areas; except for localized deposits found along the stream banks of what appears to be forest fire-derived debris. Due to fluctuating water levels, forest-fire-derived debris deposits may be expected to be washed down into the lower reservoir.

4. Based on the analytical results listed in Table 2, semivolatile organic compounds, organochlorine pesticides, chlorinated herbicides, polynuclear aromatic hydrocarbons, polychlorinated biphenyls, carbofurans, 1,4 Dioxane and 2,3,7,8-TCDD were not detected in any of the samples analyzed.

5. Based on the analytical results listed in Table 2, the concentrations of detected metals and volatile organic compounds do not indicate significant contamination or hazardous conditions and are below the applicable Vulcan Developed Soil Concentration Levels and the California Human Health Screening Levels listed in Appendix D. The low levels of volatile organic compounds in the soils samples are most likely cross-contamination from the boat engine.

6. Special provisions for health and safety and for the handling or disposal of excavated soils in Big Tujunga Reservoir are not required.

7. Sediments may be processed for use as aggregates or placed at a Sediment Placement Site as follows:

   (a) If crushed to suitable sizes, gravels and cobbles from the middle and upper reservoir areas and part of the lower reservoir area may be used as aggregates.

   (b) Most of the sediments from the lower reservoir area and part of the middle reservoir will not likely be suitable for use as aggregate.

   (c) Sediments with high organic contents should be blended with other sediments so that organic content does not exceed 3 percent prior to placement at a Sediment Placement Site and/or stockpiled for landscaping purposes.

   (d) Sediments with high moisture contents should be dried out or blended with other sediments so that moisture content is low prior to transportation.

LIMITATIONS

This report has been prepared for the exclusive use of Public Works for the specific site discussed herein and should not be considered transferable to other sites or projects. This study was conducted according to generally accepted geotechnical engineering practice for projects of this magnitude. Our findings and conclusions are based on the data and equipment available and our interpretation of the data based on our experience and background. The findings and conclusions found in this report are professional opinions and are not meant to be a control of nature; therefore, no warranty is herein expressed or implied.

The environmental testing component of this study is representative of a small portion of the site and does not preclude the occurrence of hazardous materials or conditions at other portions of the site. Although hazardous materials or conditions have not been identified during this assessment, the absence of such conditions at the site should not be assumed.

If you have any questions regarding the content of this report, please contact Olga Cruz or Geir Mathisen at (626) 458-4925.

Prepared by:

Olga Cruz
Principal Civil Engineering Assistant

Geir Mathisen
Engineering Geologist

Reviewed by:



William Man
Associate Civil Engineer

Charles Nestle
Supervising Engineering Geologist II

REFERENCES

1. California Code of Regulations, Title 22, Division 4.5, Chapter 11, Article 3 (Characteristics of Hazardous Waste), §66261.24 (Characteristic of Toxicity), September 2009.

2. U.S. Environmental Protection Agency, Region 9, "Regional Screening Levels for Chemical Contaminants at Superfund Sites," on-line reference: http://www.epa.gov/region09/superfund/prg/, April 2009.

3. Request for Services for Big Tujunga Reservoir Sediment Characterization Program, prepared by County of Los Angeles Department of Public Works, Water Resources Division, August 18, 2011.

4. California Test Method 202, California Department of Transportation, Division of Engineering Services, Materials Engineering and Testing Services, June 2008.

5. Soil and Rock Logging, Classification, and Presentation Manual, California Department of Transportation, Division of Engineering Services, Geotechnical Services, June 2007.

6. California Environmental Protection Agency, Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties, January 2005.

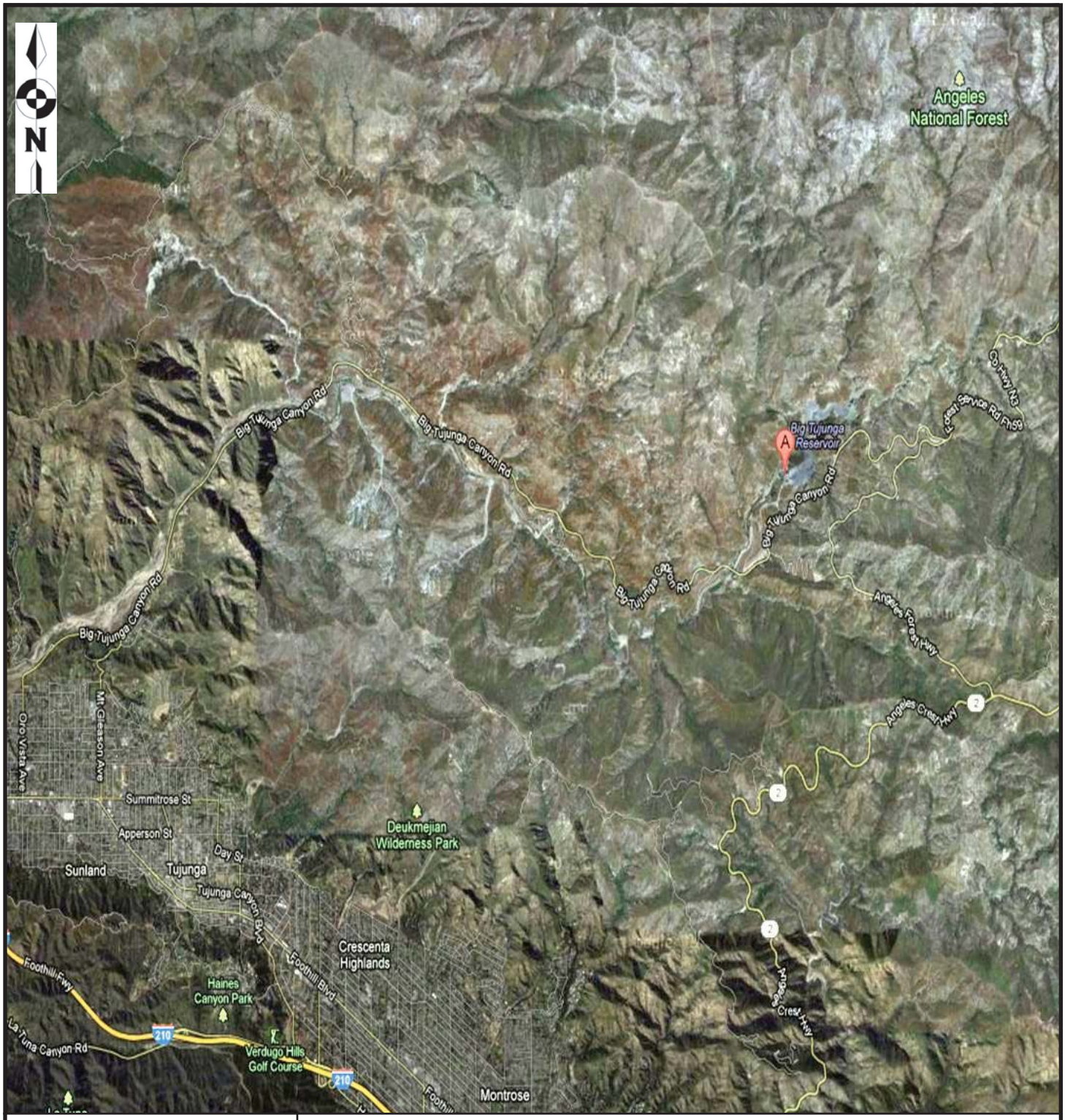
7. Draft Cooperative Agreement between the Los Angeles County Flood Control District and Vulcan Materials Company, regarding exchange of excavated material for sediment placement rights, undated.

8. Design Plans dated March 21, 1994. Big Tujunga Dam and Reservoir Maple Canyon Sediment Placement Site, County of Los Angeles Department of Public Works.

9. As-built Plans dated August 12, 1991. Big Tujunga Dam and Reservoir Maple Canyon Sediment Placement Site, County of Los Angeles Department of Public Works.

10. Draft Concept Design Plans, undated. Big Tujunga Dam and Reservoir Postfire Sediment Removal. County of Los Angeles Department of Public Works.

11. Big Tujunga Reservoir Cleanout Work Plan Map Dated April 07, 2011. Water Resources Division.



GEOLOGY INVESTIGATIONS

GEOLOGY INVESTIGATIONS

GEOLOGY INVESTIGATIONS

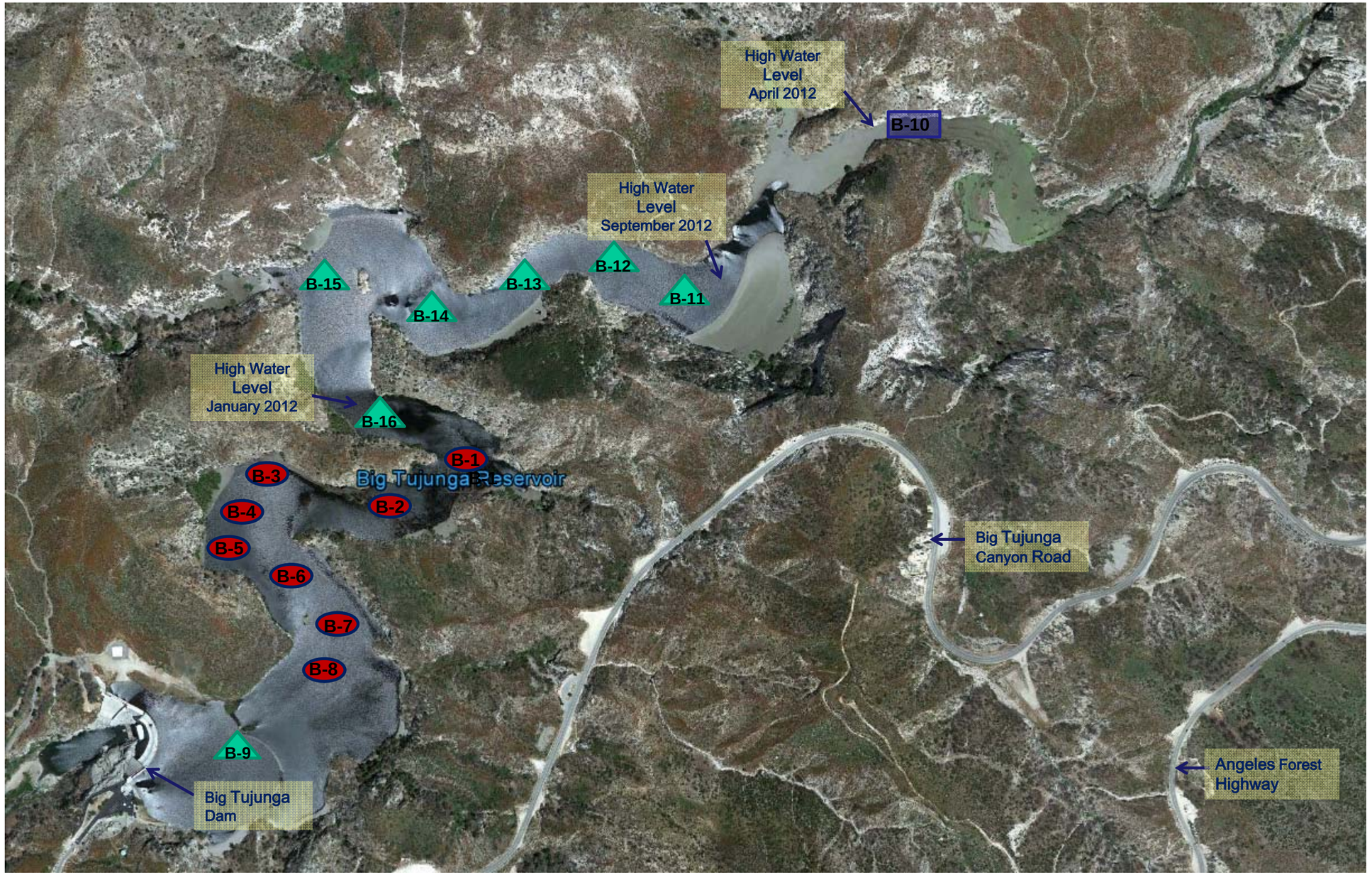
GEOLOGY INVESTIGATIONS

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

SITE LOCATION MAP
BIG TUJUNGA DAM AND RESERVOIR
SEDIMENT REMOVAL PROJECT

Date: 06.05.12	Drafted by: GRM	Scale: NTS	FIGURE 1



North
(Scale 1 in = 550 ft)

Legend

Location	Sample Type
B-7	Geotechnical ponar samples
B-7	Geotechnical test pit
B-7	Environmental and Geotechnical ponar samples

SOILS INVESTIGATIONS

GEOLOGIC AND GEOTECHNICAL ENGINEERING SECTION
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION
LOS ANGELES COUNTY
DEPARTMENT OF PUBLIC WORKS

Big Tujunga Reservoir
Sediment Characterization Study, Angeles National Forest

UNDERWATER SAMPLE AND TEST PIT LOCATION MAP

Prepared By: OMC

Date: September 2012

FIGURE 2

DRAFT

CONTROL LINE COORDINATES			
POINT	STATION	NORTHING	EASTING
POB ( )	0+00.00	1929385.33	6509117.43
PI (A)	4+56.02	1929063.97	6509440.97
PI (B)	7+05.87	1929094.70	6509688.93
PI (C)	13+56.62	1929602.07	6510096.41
PI (D)	16+70.37	1929914.78	6509070.75
PI (E)	23+10.36	1930310.18	6505567.53
PI (F)	25+09.06	1930508.54	6505555.87
PI (G)	25+75.25	1930553.17	6505604.75
PI (H)	32+74.43	1930428.48	6506292.73
PI (I)	37+48.41	1930660.60	6506705.98
PI (J)	39+14.90	1930826.29	6506689.65
PI (K)	44+72.13	1930959.31	6506148.53



NOTES
1 FINISH CONTOURS ARE SCHEMATIC ONLY.

CONCEPT ONLY

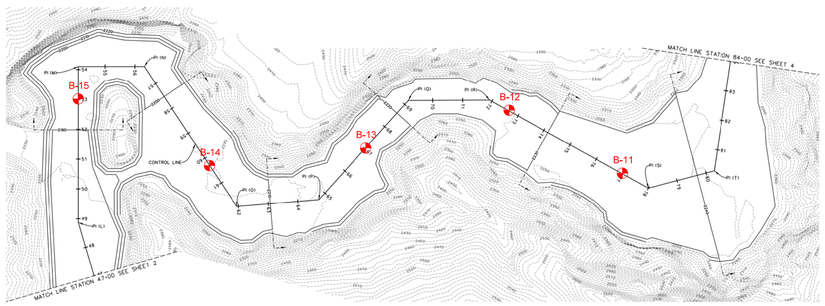
PLAN SCALE
1" = 100'
0 100 200 300

DATE	BY	DESCRIPTION
REVISIONS		

PROJECT ENGINEER ____ DATE ____

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
BIG TUJUNGA DAM AND RESERVOIR
POSTFIRE SEDIMENT REMOVAL
BIG TUJUNGA RESERVOIR
PLAN
STATION 0+00 TO STATION 47+00
JOB WF0710003 DWG SHEET 2 OF 13

DRAFT



CONTROL LINE COORDINATES			
POINT	STATION	NORTHING	EASTING
PI (L)	49+87.48	1931357.77	6506031.33
PI (M)	54+10.21	1931880.51	6506031.33
PI (N)	56+31.79	1931880.51	6506252.91
PI (O)	61+94.15	1931411.45	6506563.12
PI (P)	64+70.50	1931434.08	6506838.54
PI (Q)	69+17.80	1931766.88	6507137.42
PI (R)	71+91.03	1931768.21	6507410.65
PI (S)	78+00.23	1931472.84	6507943.44
PI (T)	80+28.63	1931530.85	6508164.36

NOTES
1 FINISH CONTOURS ARE SCHEMATIC ONLY.

CONCEPT ONLY

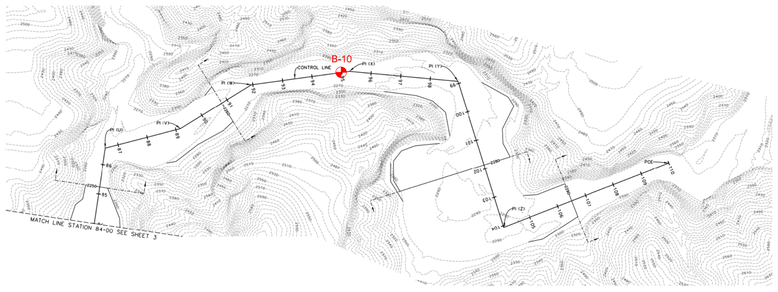
PLAN SCALE
1" = 100'
0 100 200 300

DATE	BY	DESCRIPTION
REVISIONS		

PROJECT ENGINEER ____ DATE ____

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
BIG TUJUNGA DAM AND RESERVOIR
POSTFIRE SEDIMENT REMOVAL
BIG TUJUNGA RESERVOIR
PLAN
STATION 47+00 TO STATION 84+00
JOB WF0710003 DWG SHEET 3 OF 13

DRAFT



CONTROL LINE COORDINATES			
POINT	STATION	NORTHING	EASTING
PI (U)	86+55.54	1932150.92	6508256.65
PI (V)	89+15.78	1932216.27	6508508.56
PI (W)	91+95.13	1932363.18	6508746.15
PI (X)	95+27.47	1932408.00	6509075.46
PI (Y)	98+92.85	1932374.67	6509439.32
PI (Z)	104+05.69	1931885.27	6509592.59
POE ( )	110+00.00	1932101.10	6510146.32

NOTES
1 FINISH CONTOURS ARE SCHEMATIC ONLY.

CONCEPT ONLY

PLAN SCALE
1" = 100'
0 100 200 300

DATE	BY	DESCRIPTION
REVISIONS		

PROJECT ENGINEER ____ DATE ____

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
BIG TUJUNGA DAM AND RESERVOIR
POSTFIRE SEDIMENT REMOVAL
BIG TUJUNGA RESERVOIR
PLAN
STATION 84+00 TO STATION 110+00
JOB WF0710003 DWG SHEET 4 OF 13

LEGEND

B-1 APPROXIMATE BORING LOCATION

LOS ANGELES COUNTY
DEPARTMENT OF PUBLIC WORKS
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

SOIL INVESTIGATIONS UNIT

BIG TUJUNGA DAM AND RESERVOIR
POST FIRE SEDIMENT REMOVAL

UNDERWATER SAMPLE AND
TEST PIT STATION MAP

PREPARED BY:	DATE:	SCALE	PLATE
EDDIE LY	SEPTEMBER 2012	NOT TO SCALE	PLATE 1

APPENDIX A
GEOTECHNICAL LABORATORY DATA

SUMMARY OF LABORATORY TEST RESULTS

Geotechnical Laboratory

PROJECT NAME: Big Tujunga Reservoir Cleanout
TECHNICIAN: HA
PCA: HF00710003

ENGINEER: Olga Cruz
DATE: 02/15/2012
PAGE: 1 **OF** 1

updated 6-29-12
updated 1-9-13

BORING/ SAMPLE	DEPTH	UNIFIED SOIL CLASSIFICATION					MOISTURE AND DRY DENSITY				DIRECT SHEAR				CHEMICAL				Organic Content
		Class.	ATTERBERG LIMITS		#4	#200	γd_{field}	m.c.$_{field}$	$\gamma d_{maximum}$	m.c.$_{optimum}$	$N_{ultimate}$	$c_{ultimate}$	$N_{maximum}$	$c_{maximum}$	pH	Min. Resistivity	Cl	SO_4	
B - S	(ft)		LL	PI	% Pass	% Pass	pcf	%	pcf	%	Degree	psf	Degree	psf		(K ohm-cm)	(ppm)	(ppm)	
B-1	n/a	SP			98.7	4.8		31.6											0.77
B-2	n/a	SM			96.9	42.5		47.7											3.01
B-3	n/a				99.2	92.9		99.2											6.24
B-4	n/a				100.0	95.5		74.2											6.78
B-5	n/a				100.0	94.2		69.5											5.86
B-6	n/a				100.0	94.8		89.4											6.24
B-7	n/a				96.8	93.6		107.5											7.07
B-8	n/a				100.0	98.0		111.4											6.74
B-9	n/a				100.0	97.9		86.6											6.65
B10	n/a	GP			39.4	2.7		6.3											0.46

SUMMARY OF LABORATORY TEST RESULTS

Geotechnical Laboratory

PROJECT NAME: Big Tujunga Reservoir Cleanout
TECHNICIAN: HA-EH
PCA: HF00710003

ENGINEER: Olga Cruz
DATE: 09/24/2012
PAGE: 1 **OF** 1

updated 1-9-13

BORING/ SAMPLE	DEPTH	UNIFIED SOIL CLASSIFICATION					MOISTURE AND DRY DENSITY				DIRECT SHEAR				CHEMICAL				Organic Content
		Class.	ATTERBERG LIMITS		#4	#200	Saturated	$m.c._{field}$	$\gamma_{d_{maximum}}$	$m.c._{optimum}$	$N_{ultimate}$	$c_{ultimate}$	$N_{maximum}$	$c_{maximum}$	pH	Min. Resistivity	Cl	SO_4	
B - S	(ft)		LL	PI	% Pass	% Pass	Moisture	%	pcf	%	Degree	psf	Degree	psf		(K ohm-cm)	(ppm)	(ppm)	
B-11		ML			97.6	52.8	61.1												6.5
B-12		SM			96.7	38.5	55.7												10.2
B-13		ML			98.9	71.7	78.7												5.6
B-14		SM				14.8	24.2												1.2
B-15		ML			99.8	92.6	87.1												6.7
B-16		SM			99.7	24.4	40.8												2.9

LOS ANGELES COUNTY DEPARTMETN OF PUBLIC WORKS
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION
ORGNAIC CONTENT / ASTM D2974

Project Name:	Big Tujunga Reservoir Cleanout	Checked By:	EH
PCA:	HF00710003	Date Checked:	02/02/2012
Tested By:	HA		
Date Tested:	01/31/2012		

	Lab. #	Sample	Cup	Wet Wt. + Tare	Dry Wt. + Tare	Tare	Moisture Content	Ash + Tare	Ash Content	Average Ash Content	Orgnaic Content	Average Organic Content
1	6095	B-1	#3	198.810	169.620	63.560	27.522	168.830	99.255	99.23	0.745	0.77
			#1B	191.700	165.510	66.460	26.441	164.730	99.213		0.787	
2	6096	B-2	#3	156.420	146.310	73.510	13.887	144.080	96.937	96.99	3.063	3.01
			#6	160.170	148.570	63.770	13.679	146.070	97.052		2.948	
3	6097	B-3	#2	141.430	131.310	69.990	16.504	127.640	94.015	93.76	5.985	6.24
			5#1	136.710	125.880	60.180	16.484	121.610	93.501		6.499	
4	6098	B-4	#4	143.280	128.540	61.450	21.970	124.080	93.352	93.22	6.648	6.78
			#9	208.580	189.510	100.860	21.512	183.380	93.085		6.915	
5	6099	B-5	5#1	146.910	122.510	60.180	39.146	119.000	94.369	94.14	5.631	5.86
			#2	166.250	139.220	69.980	39.038	135.000	93.905		6.095	
6	6100	B-6	#3	150.200	112.020	73.530	99.195	109.630	93.791	93.76	6.209	6.24
			#6	143.200	103.810	63.780	98.401	101.300	93.730		6.270	
7	6101	B-7	#5	143.700	100.250	60.180	108.435	97.410	92.912	92.93	7.088	7.07
			#2	202.500	133.790	69.990	107.696	129.290	92.947		7.053	
8	6102	B-8	#4	175.300	116.390	61.460	107.246	111.690	91.444	91.26	8.556	8.74
			#9	203.310	150.210	100.870	107.621	145.810	91.082		8.918	
9	6103	B-9	#1B	182.900	125.780	66.450	96.275	121.820	93.325	93.35	6.675	6.65
			#3R	196.800	130.930	63.560	97.773	126.470	93.380		6.620	
10	6314	B-10	#1	220.000	219.750	66.460	0.163	219.000	99.511	99.54	0.489	0.46
			#3	215.000	214.750	73.500	0.177	214.150	99.575		0.425	
11												
12												
13												

REMARKS:

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
Geotechnical and Materials Engineering Division
Geotechnical Laboratory - ASTM D2487, D6913, C117, C136

SIEVE ANALYSIS WORKSHEET

PROJECT NAME: Big Tujunga Reservoir Cleanout
LAB. ID: 6095
CLASSIFICATION: SP
TESTED BY: HA
CHECKED BY: EH
Cu / Cc: 4.0 0.9

PCA: HF00710003
BORING / SAMPLE: B-1
DEPTH (FT): N/A
DATE TESTED: 1/31/12
DATE CHECKED: 2/2/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel
If % Passing #200 < 50%, SILT, SAND or DUAL

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (lb)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*					
3/4"	*19.1*					
3/8"	*9.52*				100.0	
No. 4	*4.76*	0.07	1.3	1.3	98.7	
PAN	*0*	5.87				
TOTAL FRACTIONS		5.94				
OVEN-DRY FINES		5.39				
*** TOTAL OVEN-DRY**		5.46				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	91.80
MOISTURE (%)	8.9

* Cobbles not included in total oven-dry weight

• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	300.00
CALCULATED OVEN-DRY WEIGHT (gms)	275.40
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	279.03

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	20.60	7.4	8.7	91.3	
20	*0.85*	70.26	25.2	33.9	66.1	
40	*0.425*	90.48	32.4	66.3	33.7	
60	*0.25*	47.03	16.9	83.1	16.9	
140	*0.106*	27.07	9.7	92.8	7.2	
200	*0.074*	6.43	2.3	95.2	4.8	
PAN	*0*	0.91	0.3			
TOTAL FRACTIONS		262.78	94.2			
TOTAL DRY WEIGHT AFTER WET SEIVING		262.80	94.2			
SIEVE LOSS-GAIN		0.02	0.0			

Atterberg Test

Liquid Limit	n/a
Plastic Limit	n/a
Plastic Index	n/a

SOIL DESCRIP. / REMARKS: Non-Plastic Sand W/Trace of Organic,

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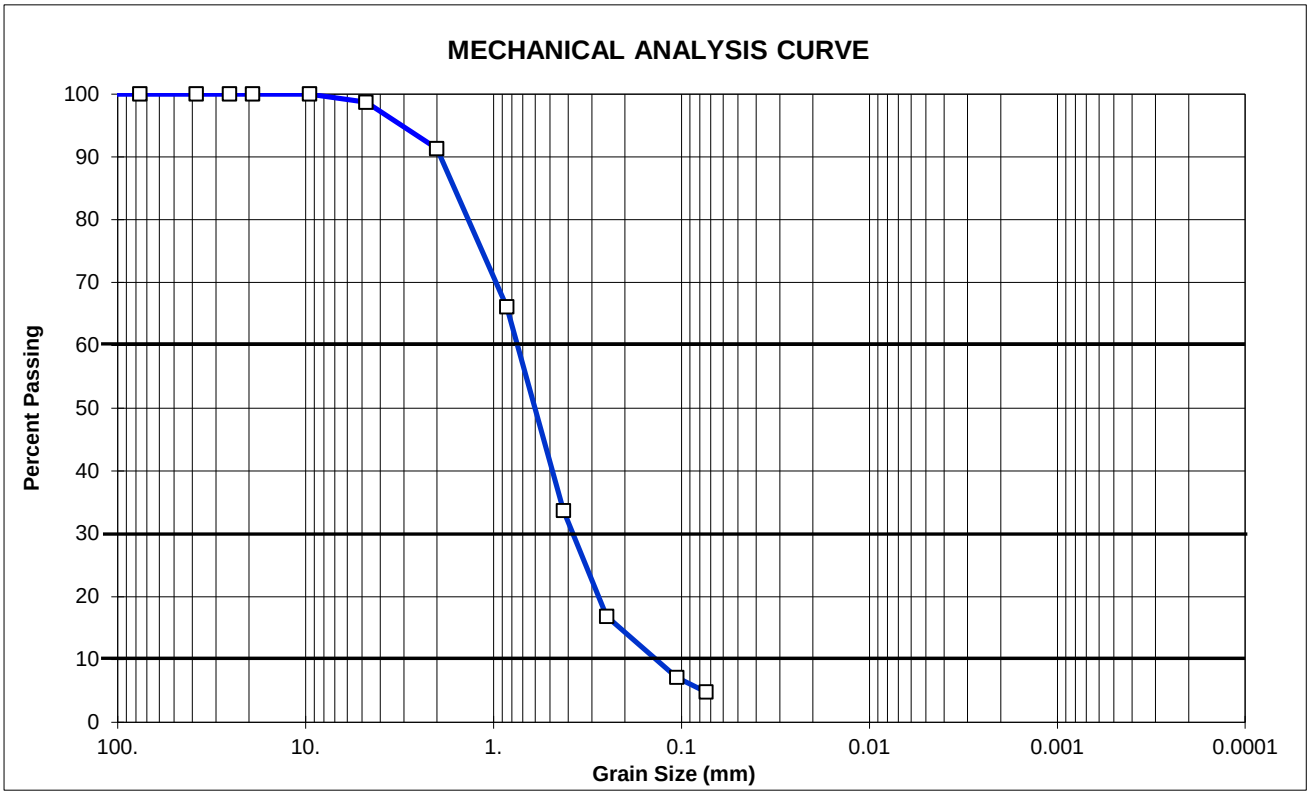
Geotechnical Laboratory

PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga Reservoir Cleanout **PCA:** HF00710003

CLASSIFICATION: SP **BORING/SAMPLE:** B-1



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.0	1.3	7.4	57.6	28.9	4.8	
TOTAL	_	= 1.3		=		93.9	#N/A	#N/A
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270
	V 1st# passing	V 2nd# retaining						

Avg. Organic Content
n/a %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)		
% Retained #200 =	*95.2*	D_{10} =	*0.15*	$C_u = D_{60} / D_{10}$ =	*4.00*
% Retained # 4 =	*1.3*	D_{30} =	*0.28*	$C_c = D_{30}^2 / (D_{10}*D_{60})$ =	*0.87111*
% #4 / % #200 =	*1.4*	D_{60} =	*0.60*		

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
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Geotechnical Laboratory - ASTM D2487, D6913, C117, C136

SIEVE ANALYSIS WORKSHEET

PROJECT NAME: Big Tujunga Reservoir Cleanout
LAB. ID: 6096
CLASSIFICATION: SM
TESTED BY: HA
CHECKED BY: EH

PCA: HF00710003
BORING / SAMPLE: B-2
DEPTH (FT): N/A
DATE TESTED: 1/31/12
DATE CHECKED: 2/2/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel
If % Passing #200 < 50%, SILT, SAND or DUAL

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (lb)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*					
3/4"	*19.1*				100.0	
3/8"	*9.52*	0.02	0.6	0.6	99.4	
No. 4	*4.76*	0.06	2.5	3.1	96.9	
PAN	*0*	2.65				
TOTAL FRACTIONS		2.73				
OVEN-DRY FINES		2.35				
*** TOTAL OVEN-DRY**		2.42				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	88.50
MOISTURE (%)	13.0

* Cobbles not included in total oven-dry weight

• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	300.00
CALCULATED OVEN-DRY WEIGHT (gms)	265.50
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	273.99

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	7.32	2.7	5.8	94.2	
20	*0.85*	13.06	4.8	10.5	89.5	
40	*0.425*	16.35	6.0	16.5	83.5	
60	*0.25*	19.69	7.2	23.7	76.3	
140	*0.106*	50.99	18.6	42.3	57.7	
200	*0.074*	41.58	15.2	57.5	42.5	
PAN	*0*	21.48	7.8			
TOTAL FRACTIONS		170.47	62.2			
TOTAL DRY WEIGHT AFTER WET SEIVING		170.60	62.3			
SIEVE LOSS-GAIN		0.13	0.0			

Atterberg Test

Liquid Limit	n/a
Plastic Limit	n/a
Plastic Index	n/a

SOIL DESCRIP. / REMARKS: Dark Gray Silty Sand W/Trace of Organic, Non-plastic,

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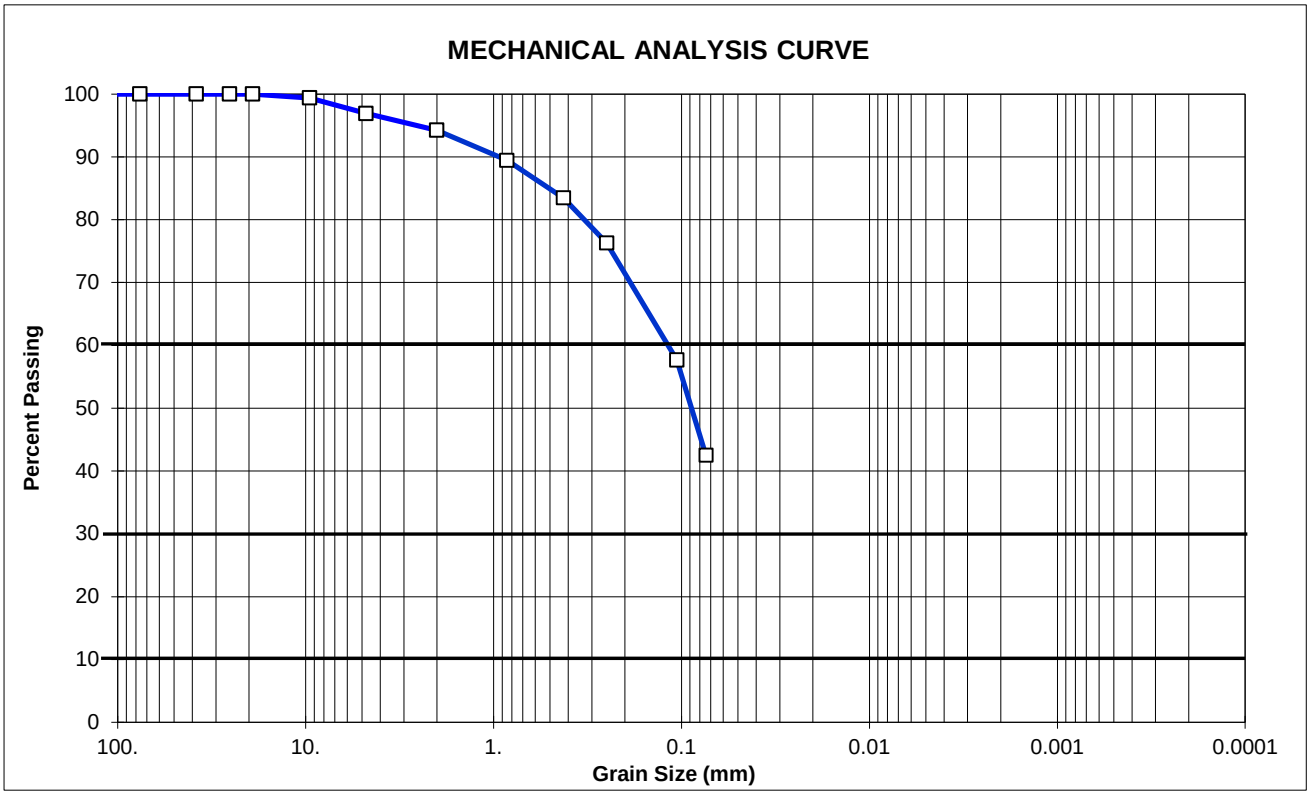
Geotechnical Laboratory

PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga Reservoir Cleanout **PCA:** HF00710003

CLASSIFICATION: SM **BORING/SAMPLE:** B-2



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.0	3.1	2.7	10.7	41.0	42.5	
TOTAL	-	= 3.1			=	54.4	#N/A	#N/A
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270

V 1st# passing

V 2nd# retaining

Avg. Organic Content

n/a %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)	
% Retained #200 =	*57.5*	D_{10} =		C_u = D_{60} / D_{10} =
% Retained # 4 =	*3.1*	D_{30} =		C_c = D_{30}^2 / (D_{10}*D_{60}) =
% #4 / % #200 =	*5.4*	D_{60} =		

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SIEVE ANALYSIS WORKSHEET

PROJECT NAME: Big Tujunga Reservoir Cleanout
LAB. ID: 6097
CLASSIFICATION: N/A
TESTED BY: HA
CHECKED BY: EH

PCA: HF00710003
BORING / SAMPLE: B-3
DEPTH (FT): N/A
DATE TESTED: 1/31/12
DATE CHECKED: 2/2/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel
If % Passing #200 > 50%, CLAY or SILT

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (lb)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*					
3/4"	*19.1*				100.0	
3/8"	*9.52*	0.01	0.4	0.4	99.6	
No. 4	*4.76*	0.01	0.4	0.8	99.2	
PAN	*0*	1.39				
TOTAL FRACTIONS		1.40				
OVEN-DRY FINES		1.20				
*** TOTAL OVEN-DRY**		1.21				

* Cobbles not included in total oven-dry weight

• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	85.80
MOISTURE (%)	16.6

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	300.00
CALCULATED OVEN-DRY WEIGHT (gms)	257.40
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	259.55

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	1.03	0.4	1.2	98.8	
20	*0.85*	2.34	0.9	2.1	97.9	
40	*0.425*	1.30	0.5	2.6	97.4	
60	*0.25*	0.97	0.4	3.0	97.0	
140	*0.106*	4.58	1.8	4.8	95.2	
200	*0.074*	6.03	2.3	7.1	92.9	
PAN	*0*	5.10	2.0			
TOTAL FRACTIONS		21.35	8.2			
TOTAL DRY WEIGHT AFTER WET SEIVING		21.39	8.2			
SIEVE LOSS-GAIN		0.04	0.0			

Atterberg Test

Liquid Limit	n/a
Plastic Limit	n/a
Plastic Index	n/a

SOIL DESCRIP. / REMARKS: Dark Gray Silt W/Few Fine Sand W/Few Organic, Slitly Plastic,

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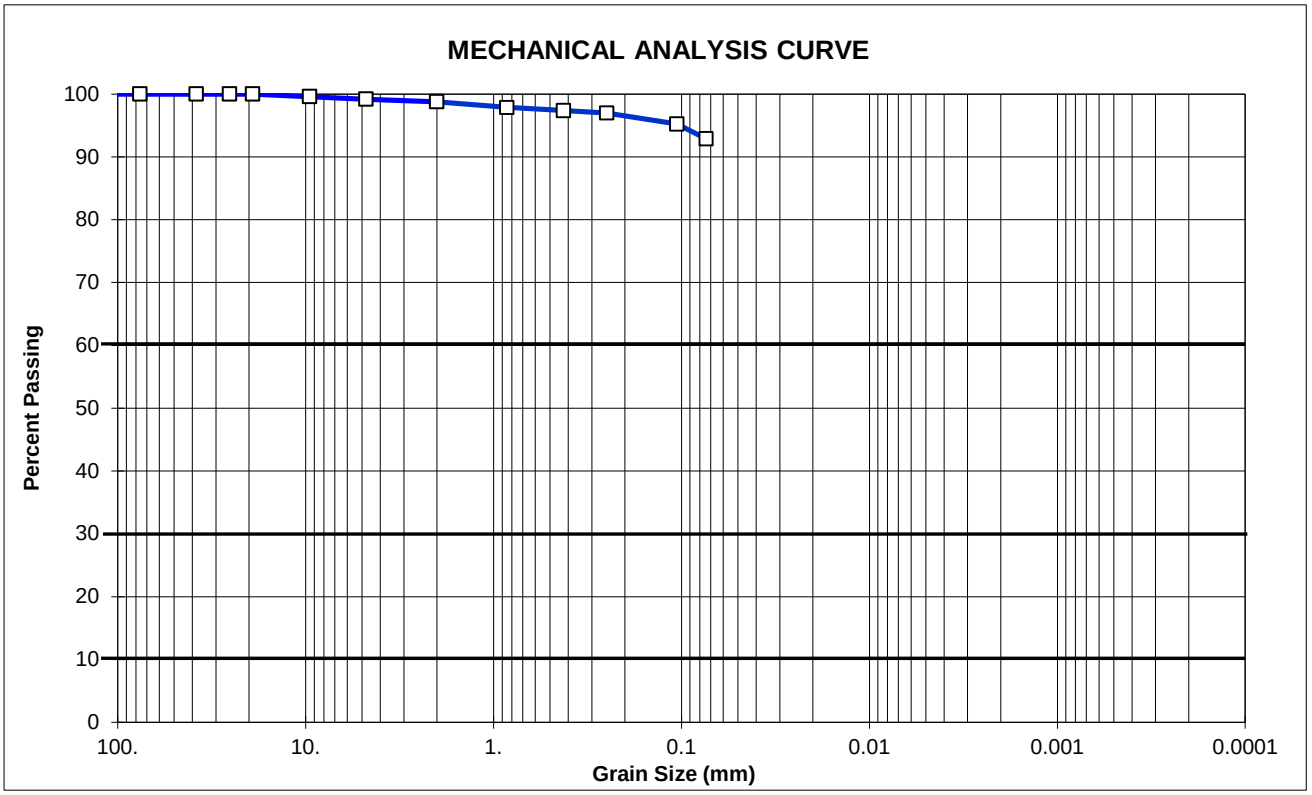
Geotechnical Laboratory

PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga Reservoir Cleanout **PCA:** HF00710003

CLASSIFICATION: N/A **BORING/SAMPLE:** B-3



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.0	0.8	0.4	1.4	4.5	92.9	
TOTAL	_	= 0.8		= 6.3			#N/A	#N/A
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270
	V 1st# passing	V 2nd# retaining						

Avg. Organic Content
n/a %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)	
% Retained #200 =	*7.1*	D_{10} =		C_u = D_{60} / D_{10} =
% Retained # 4 =	*0.8*	D_{30} =		C_c = D_{30}^2 / (D_{10}*D_{60}) =
% #4 / % #200 =	*11.7*	D_{60} =		

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SIEVE ANALYSIS WORKSHEET

PROJECT NAME:	**Big Tujunga Reservoir Cleanout**	**PCA:**	HF00710003
LAB. ID:	6098	**BORING / SAMPLE:**	B-4
CLASSIFICATION:	**N/A**	**DEPTH (FT):**	N/A
TESTED BY:	HA	**DATE TESTED:**	1/31/12
CHECKED BY:	**EH**	**DATE CHECKED:**	2/1/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel

If % Passing #200 > 50%, CLAY or SILT

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (lb)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*					
3/4"	*19.1*					
3/8"	*9.52*				100.0	
No. 4	*4.76*	0.00	0.0	0.0	100.0	
PAN	*0*	5.48				
TOTAL FRACTIONS		5.48				
OVEN-DRY FINES		4.52				
*** TOTAL OVEN-DRY**		4.52				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	82.50
MOISTURE (%)	21.2

* Cobbles not included in total oven-dry weight

• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	300.00
CALCULATED OVEN-DRY WEIGHT (gms)	247.50
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	247.50

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	0.52	0.2	0.2	99.8	
20	*0.85*	1.32	0.5	0.7	99.3	
40	*0.425*	0.94	0.4	1.1	98.9	
60	*0.25*	0.70	0.3	1.4	98.6	
140	*0.106*	3.07	1.2	2.6	97.4	
200	*0.074*	4.47	1.8	4.5	95.5	
PAN	*0*	2.12	0.9			
TOTAL FRACTIONS		13.14	5.3			
TOTAL DRY WEIGHT AFTER WET SEIVING		13.20	5.3			
SIEVE LOSS-GAIN		0.06	0.0			

Atterberg Test

Liquid **L**imit	n/a
Plastic Limit	n/a
Plastic **I**ndex	n/a

SOIL DESCRIP. / REMARKS: Dark Gray Silt W/Few Organic W/Trace of Clay,Plastic soil,

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

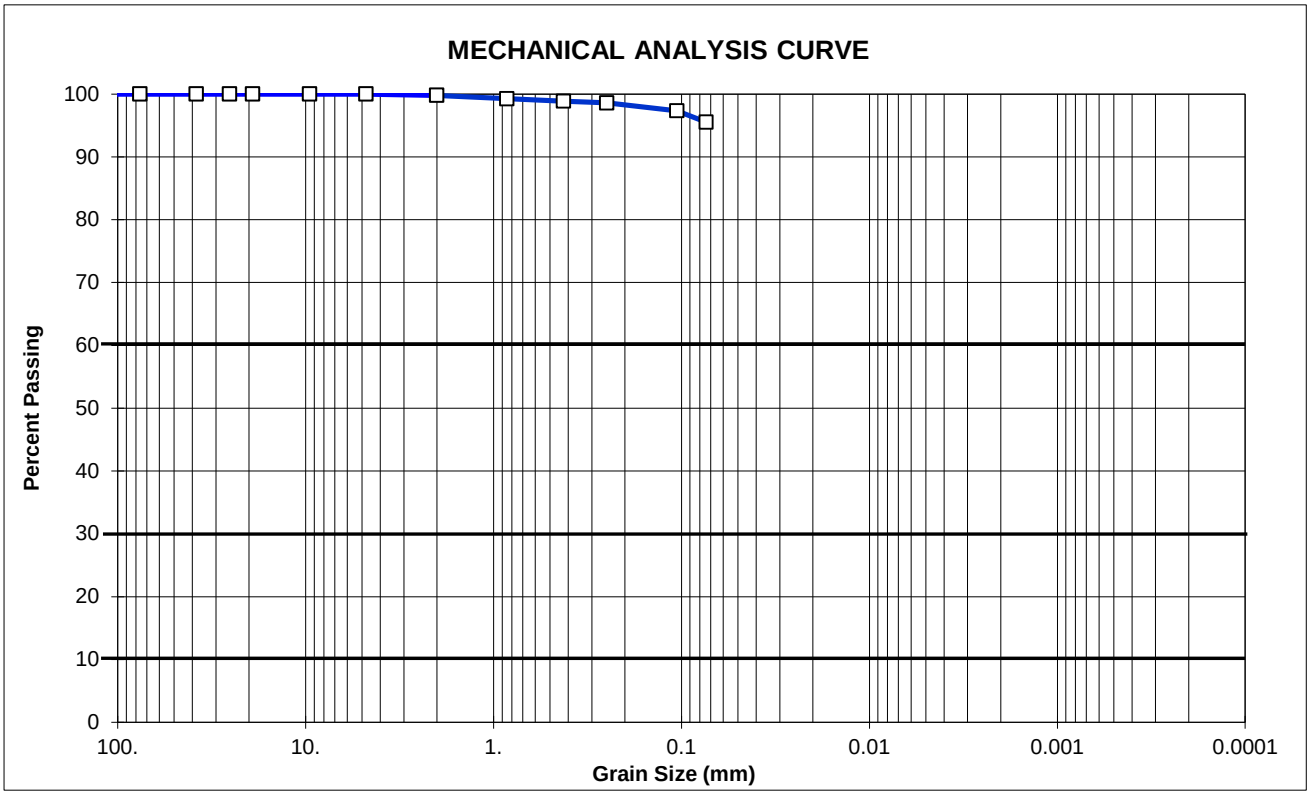
MATERIALS ENGINEERING DIVISION

Geotechnical Laboratory

PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga Reservoir Cleanout **PCA:** HF00710003

CLASSIFICATION: N/A **BORING/SAMPLE:** B-4



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.0	0.0	0.2	0.9	3.3	95.5	
TOTAL		= 0.0			=	4.5	#N/A	#N/A
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270
	V 1st# passing	V 2nd# retaining						

Avg. Organic Content
n/a %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)
% Retained #200 =	*4.5*	D_{10} =	
% Retained # 4 =	*0.0*	D_{30} =	
% #4 / % #200 =	*0.0*	D_{60} =	

$C_u = D_{60} / D_{10} =$

$C_c = D_{30}^2 / (D_{10} * D_{60}) =$

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SIEVE ANALYSIS WORKSHEET

PROJECT NAME:	**Big Tujunga Reservoir Cleanout**	**PCA:**	HF00710003
LAB. ID:	6099	**BORING / SAMPLE:**	B-5
CLASSIFICATION:	**N/A**	**DEPTH (FT):**	N/A
TESTED BY:	HA	**DATE TESTED:**	1/30/12
CHECKED BY:	**EH**	**DATE CHECKED:**	2/2/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel

If % Passing #200 > 50%, CLAY or SILT

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (lb)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*					
3/4"	*19.1*					
3/8"	*9.52*				100.0	
No. 4	*4.76*	0.00	0.0	0.0	100.0	
PAN	*0*	3.45				
TOTAL FRACTIONS		3.45				
OVEN-DRY FINES		2.47				
*** TOTAL OVEN-DRY**		2.47				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	71.70
MOISTURE (%)	39.5

* Cobbles not included in total oven-dry weight

• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	300.00
CALCULATED OVEN-DRY WEIGHT (gms)	215.10
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	215.10

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	0.24	0.1	0.1	99.9	
20	*0.85*	0.73	0.3	0.5	99.5	
40	*0.425*	0.65	0.3	0.8	99.2	
60	*0.25*	0.49	0.2	1.0	99.0	
140	*0.106*	3.03	1.4	2.4	97.6	
200	*0.074*	7.37	3.4	5.8	94.2	
PAN	*0*	5.12	2.4			
TOTAL FRACTIONS		17.63	8.2			
TOTAL DRY WEIGHT AFTER WET SEIVING		17.64	8.2			
SIEVE LOSS-GAIN		0.01	0.0			

Atterberg Test

Liquid **L**imit	n/a
Plastic Limit	n/a
Plastic **I**ndex	n/a

SOIL DESCRIP. / REMARKS: Dark Gray Silt W/Trace of Clay W/Few Organic, Low plastic,

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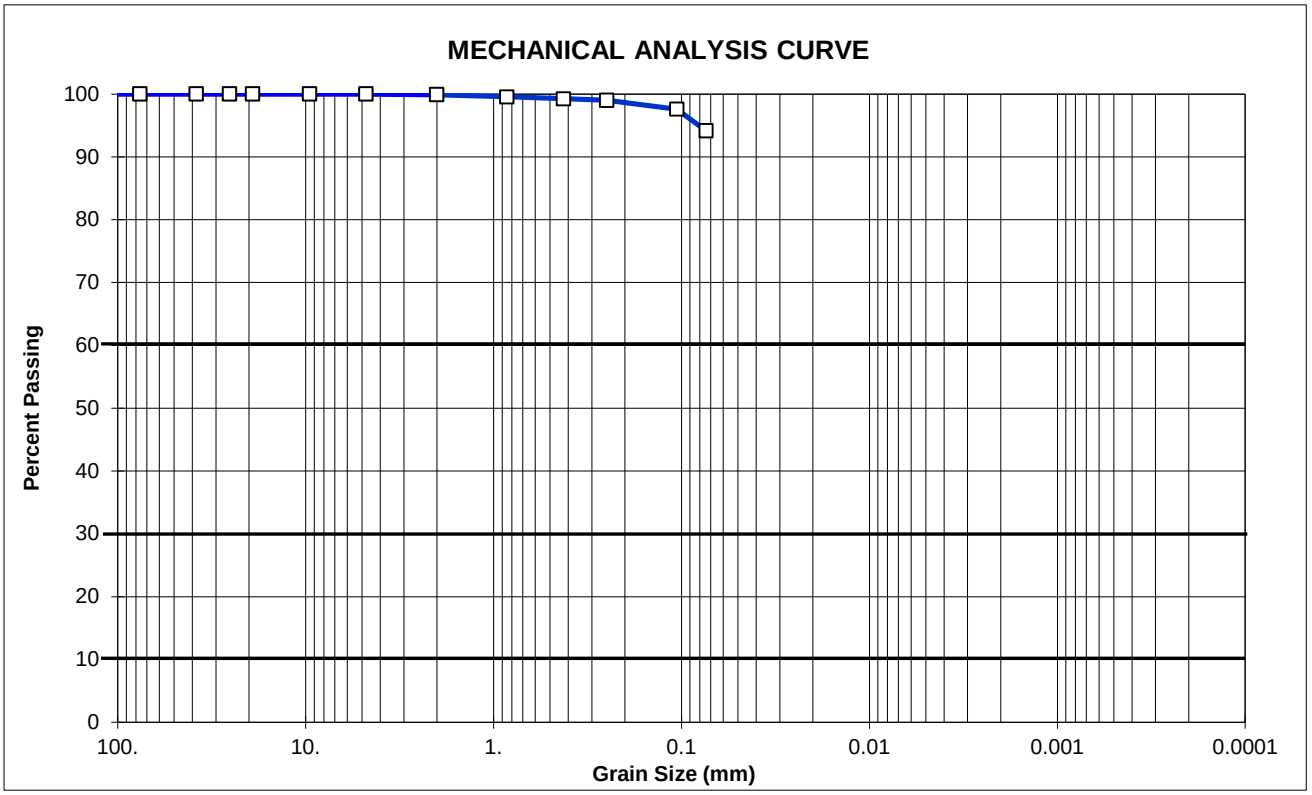
PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga Reservoir Cleanout **PCA:** HF00710003

CLASSIFICATION: N/A **BORING/SAMPLE:** B-5



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.0	0.0	0.1	0.6	5.1	94.2	
TOTAL	_	= 0.0		=		5.8	#N/A	#N/A
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270

1st# passing *2nd# retaining*

Avg. Organic Content
n/a %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)
% Retained #200 =	*5.8*	D_{10} =	
% Retained # 4 =	*0.0*	D_{30} =	
% #4 / % #200 =	*0.0*	D_{60} =	

$C_u = D_{60} / D_{10} =$

$C_c = D_{30}^2 / (D_{10} * D_{60}) =$

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SIEVE ANALYSIS WORKSHEET

PROJECT NAME:	**Big Tujunga Reservoir Cleanout**	**PCA:**	HF00710003
LAB. ID:	6100	**BORING / SAMPLE:**	B-6
CLASSIFICATION:	**N/A**	**DEPTH (FT):**	N/A
TESTED BY:	HA	**DATE TESTED:**	1/31/12
CHECKED BY:	**EH**	**DATE CHECKED:**	2/2/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel

If % Passing #200 > 50%, CLAY or SILT

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (lb)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*					
3/4"	*19.1*					
3/8"	*9.52*				100.0	
No. 4	*4.76*	0.00	0.0	0.0	100.0	
PAN	*0*	2.24				
TOTAL FRACTIONS		2.24				
OVEN-DRY FINES		1.63				
*** TOTAL OVEN-DRY**		1.63				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	72.70
MOISTURE (%)	37.6

* Cobbles not included in total oven-dry weight

• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	300.00
CALCULATED OVEN-DRY WEIGHT (gms)	218.10
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	218.10

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	0.41	0.2	0.2	99.8	
20	*0.85*	0.92	0.4	0.6	99.4	
40	*0.425*	0.80	0.4	1.0	99.0	
60	*0.25*	0.57	0.3	1.2	98.8	
140	*0.106*	2.63	1.2	2.4	97.6	
200	*0.074*	5.96	2.7	5.2	94.8	
PAN	*0*	8.15	3.7			
TOTAL FRACTIONS		19.44	8.9			
TOTAL DRY WEIGHT AFTER WET SEIVING		19.48	8.9			
SIEVE LOSS-GAIN		0.04	0.0			

Atterberg Test

Liquid **L**imit	n/a
Plastic Limit	n/a
Plastic **I**ndex	n/a

SOIL DESCRIP. / REMARKS: Dark Gray Silt W/Few Sand ,W/Trace of Clay , W/Few Organic, Low plastic,

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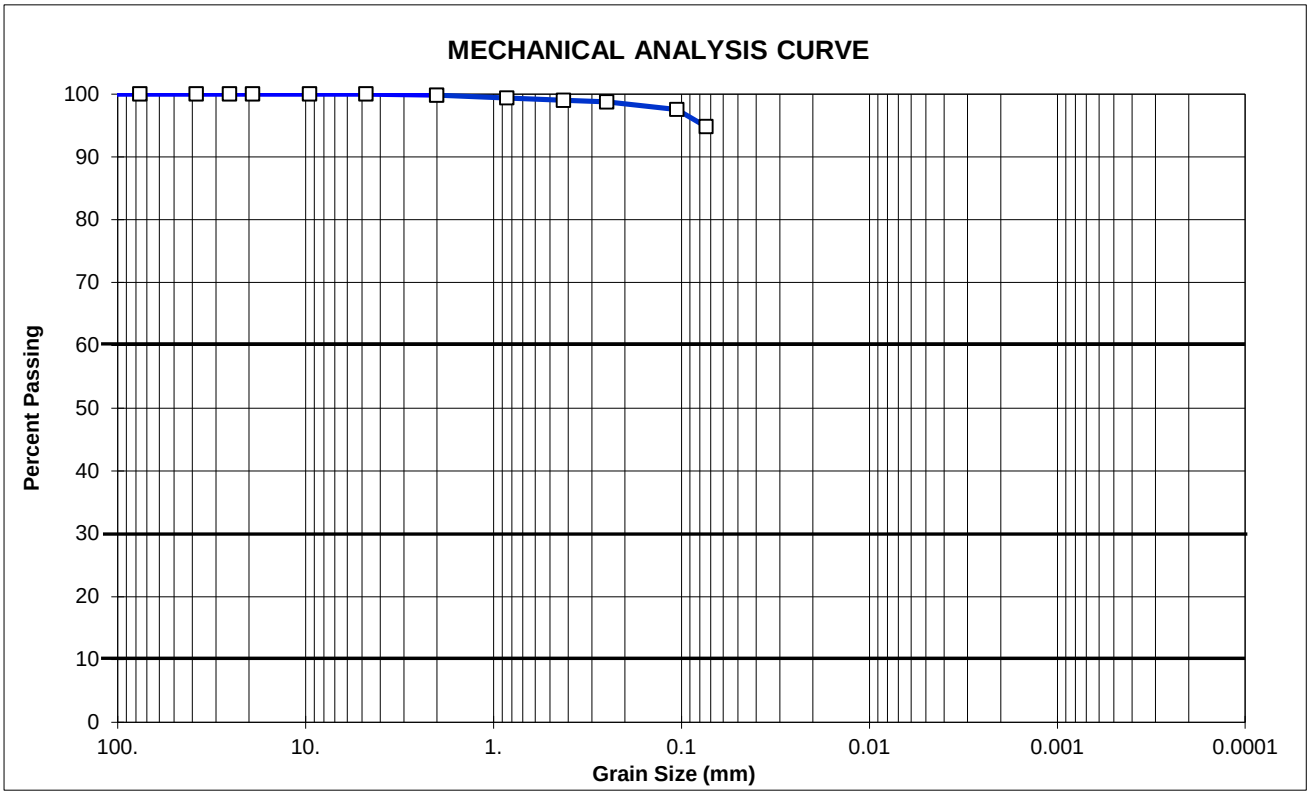
PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga Reservoir Cleanout **PCA:** HF00710003

CLASSIFICATION: N/A **BORING/SAMPLE:** B-6



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.0	0.0	0.2	0.8	4.2	94.8	
TOTAL	_	= 0.0			=	5.2	#N/A	#N/A
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270
	V 1st# passing	V 2nd# retaining						

Avg. Organic Content
n/a %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)
% Retained #200 =	*5.2*	D_{10} =	
% Retained # 4 =	*0.0*	D_{30} =	
% #4 / % #200 =	*0.0*	D_{60} =	

$C_u = D_{60} / D_{10} =$

$C_c = D_{30}^2 / (D_{10} * D_{60}) =$

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SIEVE ANALYSIS WORKSHEET

PROJECT NAME: Big Tujunga Reservoir Cleanout
LAB. ID: 6101
CLASSIFICATION: N/A
TESTED BY: HA
CHECKED BY: EH

PCA: HF00710003
BORING / SAMPLE: B-7
DEPTH (FT): N/A
DATE TESTED: 1/31/12
DATE CHECKED: 2/2/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel
If % Passing #200 > 50%, CLAY or SILT

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (lb)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*				100.0	
3/4"	*19.1*	0.01	0.8	0.8	99.2	
3/8"	*9.52*	0.01	0.8	1.6	98.4	
No. 4	*4.76*	0.02	1.6	3.2	96.8	
PAN	*0*	1.46				
TOTAL FRACTIONS		1.50				
OVEN-DRY FINES		1.22				
*** TOTAL OVEN-DRY**		1.26				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	83.70
MOISTURE (%)	19.5

* Cobbles not included in total oven-dry weight

• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	300.00
CALCULATED OVEN-DRY WEIGHT (gms)	251.10
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	259.32

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	1.35	0.5	3.7	96.3	
20	*0.85*	2.10	0.8	4.5	95.5	
40	*0.425*	1.12	0.4	4.9	95.1	
60	*0.25*	0.63	0.2	5.2	94.8	
140	*0.106*	1.92	0.7	5.9	94.1	
200	*0.074*	1.20	0.5	6.4	93.6	
PAN	*0*	0.96	0.4			
TOTAL FRACTIONS		9.28	3.6			
TOTAL DRY WEIGHT AFTER WET SEIVING		9.30	3.6			
SIEVE LOSS-GAIN		0.02	0.0			

Atterberg Test

Liquid Limit	n/a
Plastic Limit	n/a
Plastic Index	n/a

SOIL DESCRIP. / REMARKS: Dark Gray Silt W/Few Organic W/Trace Of Clay W/Trace of fine sand ,Low Plastic,

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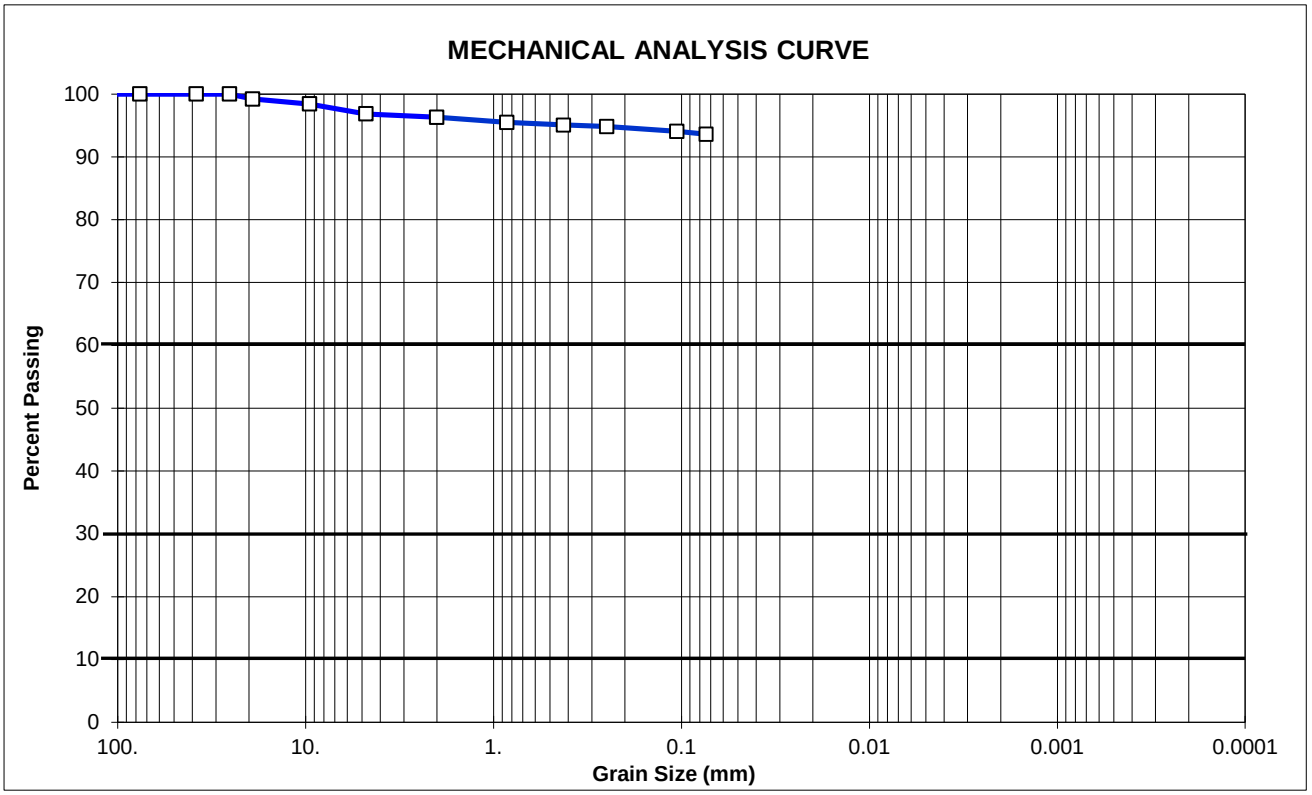
PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga Reservoir Cleanout **PCA:** HF00710003

CLASSIFICATION: N/A **BORING/SAMPLE:** B-7



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.8	2.4	0.5	1.2	1.4	93.6	
TOTAL	-	= 3.2		=		3.2	#N/A	#N/A
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270
	V 1st# passing	V 2nd# retaining						

Avg. Organic Content
n/a %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

(mm)

% Retained #200 =	*6.4*	D_{10} =	
% Retained # 4 =	*3.2*	D_{30} =	
% #4 / % #200 =	*49.7*	D_{60} =	

$C_u = D_{60} / D_{10} =$

$C_c = D_{30}^2 / (D_{10} * D_{60}) =$

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SIEVE ANALYSIS WORKSHEET

PROJECT NAME: Big Tujunga Reservoir Cleanout
LAB. ID: 6102
CLASSIFICATION: N/A
TESTED BY: HA
CHECKED BY: EH

PCA: HF00710003
BORING / SAMPLE: B-8
DEPTH (FT): N/A
DATE TESTED: 1/31/12
DATE CHECKED: 2/2/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel
If % Passing #200 > 50%, CLAY or SILT

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (lb)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*					
3/4"	*19.1*					
3/8"	*9.52*				100.0	
No. 4	*4.76*	0.00	0.0	0.0	100.0	
PAN	*0*	4.37				
TOTAL FRACTIONS		4.37				
OVEN-DRY FINES		3.69				
*** TOTAL OVEN-DRY**		3.69				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	84.50
MOISTURE (%)	18.3

* Cobbles not included in total oven-dry weight
• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	300.00
CALCULATED OVEN-DRY WEIGHT (gms)	253.50
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	253.50

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	1.00	0.4	0.4	99.6	
20	*0.85*	2.07	0.8	1.2	98.8	
40	*0.425*	0.93	0.4	1.6	98.4	
60	*0.25*	0.30	0.1	1.7	98.3	
140	*0.106*	0.46	0.2	1.9	98.1	
200	*0.074*	0.38	0.1	2.0	98.0	
PAN	*0*	0.19	0.1			
TOTAL FRACTIONS		5.33	2.1			
TOTAL DRY WEIGHT AFTER WET SEIVING		5.37	2.1			
SIEVE LOSS-GAIN		0.04	0.0			

Atterberg Test

Liquid Limit	n/a
Plastic Limit	n/a
Plastic Index	n/a

SOIL DESCRIP. / REMARKS: Dark Gray Silt W/Few Organic, Low Plastic,

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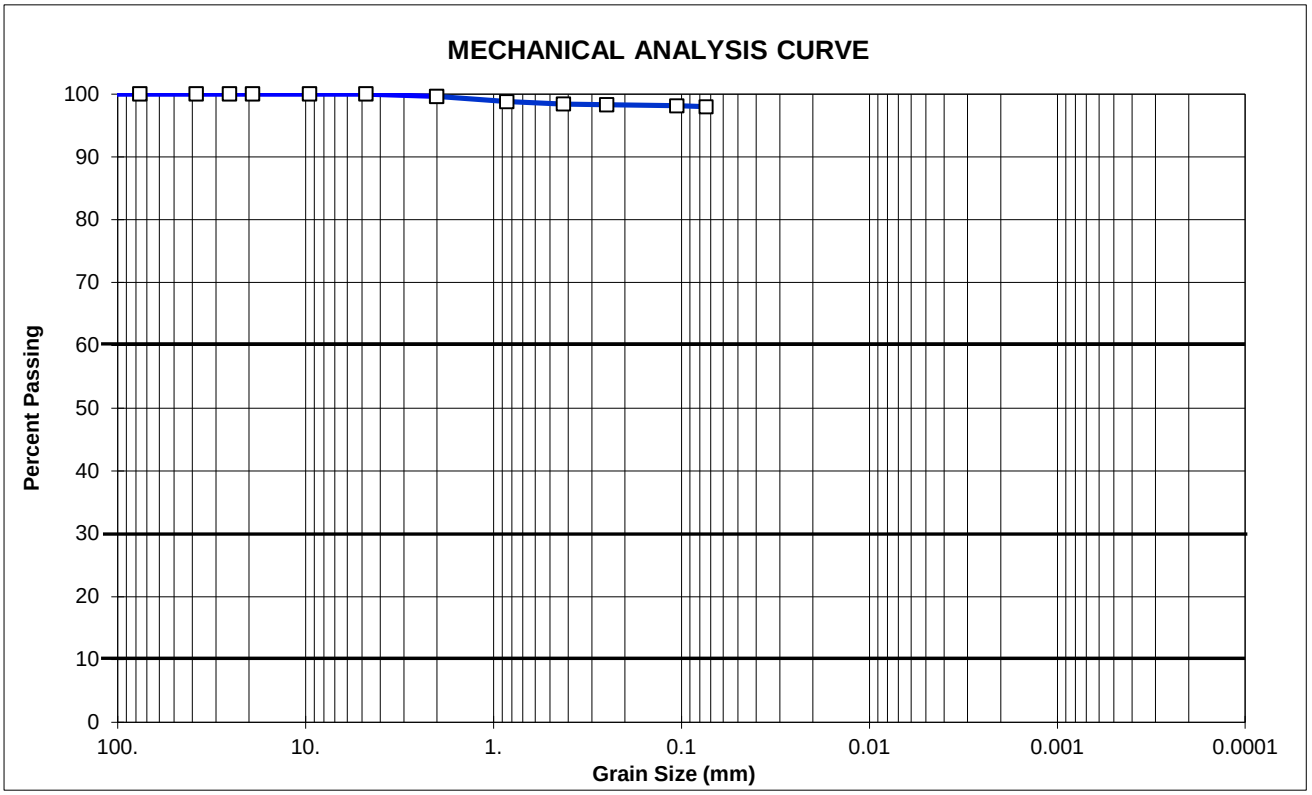
PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga Reservoir Cleanout **PCA:** HF00710003

CLASSIFICATION: N/A **BORING/SAMPLE:** B-8



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.0	0.0	0.4	1.2	0.4	98.0	
TOTAL	_	= 0.0		= 2.0			#N/A	#N/A
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270
	V 1st# passing	V 2nd# retaining						

Avg. Organic Content
n/a %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)	
% Retained #200 =	*2.0*	D_{10} =		C_u = D_{60} / D_{10} =
% Retained # 4 =	*0.0*	D_{30} =		C_c = D_{30}^2 / (D_{10}*D_{60}) =
% #4 / % #200 =	*0.0*	D_{60} =		

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SIEVE ANALYSIS WORKSHEET

PROJECT NAME:	**Big Tujunga Reservoir Cleanout**	**PCA:**	HF00710003
LAB. ID:	6103	**BORING / SAMPLE:**	B-9
CLASSIFICATION:	**N/A**	**DEPTH (FT):**	N/A
TESTED BY:	HA	**DATE TESTED:**	1/30/12
CHECKED BY:	**EH**	**DATE CHECKED:**	2/2/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel

If % Passing #200 > 50%, CLAY or SILT

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (lb)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*					
3/4"	*19.1*					
3/8"	*9.52*				100.0	
No. 4	*4.76*	0.00	0.0	0.0	100.0	
PAN	*0*	3.57				
TOTAL FRACTIONS		3.57				
OVEN-DRY FINES		2.48				
*** TOTAL OVEN-DRY**		2.48				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	69.60
MOISTURE (%)	43.7

* Cobbles not included in total oven-dry weight

• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	300.00
CALCULATED OVEN-DRY WEIGHT (gms)	208.80
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	208.80

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	0.55	0.3	0.3	99.7	
20	*0.85*	1.59	0.8	1.0	99.0	
40	*0.425*	1.08	0.5	1.5	98.5	
60	*0.25*	0.43	0.2	1.7	98.3	
140	*0.106*	0.48	0.2	2.0	98.0	
200	*0.074*	0.23	0.1	2.1	97.9	
PAN	*0*	0.09	0.0			
TOTAL FRACTIONS		4.45	2.1			
TOTAL DRY WEIGHT AFTER WET SEIVING		4.47	2.1			
SIEVE LOSS-GAIN		0.02	0.0			

Atterberg Test

Liquid **L**imit	n/a
Plastic Limit	n/a
Plastic **I**ndex	n/a

SOIL DESCRIP. / REMARKS: Dark Gray Silt W/Few Organic, Low Plastic,

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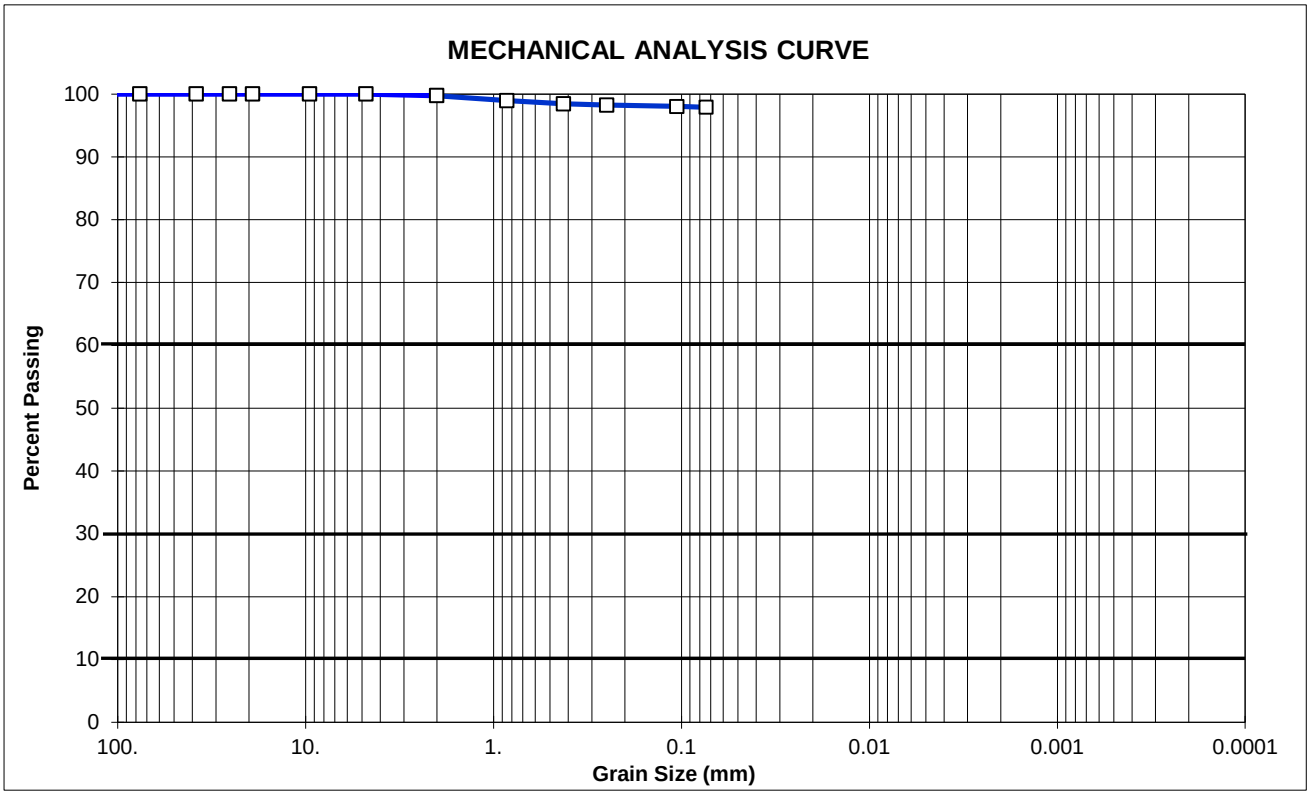
PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga Reservoir Cleanout **PCA:** HF00710003

CLASSIFICATION: N/A **BORING/SAMPLE:** B-9



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.0	0.0	0.3	1.3	0.5	97.9	
TOTAL	_	= 0.0		= 2.1			#N/A	#N/A
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270

1st# passing *2nd# retaining*

Avg. Organic Content
n/a %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)	
% Retained #200 =	*2.1*	D_{10} =		C_u = D_{60} / D_{10} =
% Retained # 4 =	*0.0*	D_{30} =		C_c = D_{30}^2 / (D_{10}*D_{60}) =
% #4 / % #200 =	*0.0*	D_{60} =		

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SIEVE ANALYSIS WORKSHEET

PROJECT NAME: Big Tujunga Reservoir Cleanout
LAB. ID: n/a
CLASSIFICATION: GP
TESTED BY: EM/EH
CHECKED BY: EH
Cu / Cc: 160.0 0.3

PCA: HF00710003
BORING / SAMPLE: B10
DEPTH (FT): n/a
DATE TESTED: 4/4/12
DATE CHECKED: 6/25/12
'% ret. #4 / % ret. #200 : 62.3

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel
If % Passing #200 < 50%, SILT, SAND or DUAL

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (lb)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*				100.0	
3"	*76.2*	4.00	24.6	24.6	75.4	
1 1/2"	*38.1*	3.20	10.2	34.8	65.2	
1"	*25.4*	1.82	5.8	40.6	59.4	
3/4"	*19.1*	1.04	3.3	43.9	56.1	
3/8"	*9.52*	1.22	3.9	47.8	52.2	
No. 4	*4.76*	4.02	12.8	60.6	39.4	
PAN	*0*	17.28				
TOTAL FRACTIONS		32.58				
OVEN-DRY FINES		16.25				
*** TOTAL OVEN-DRY**		31.40				

* 3" Rock included in total oven-dry weight

• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	32.58
DRY WEIGHT (gm)	30.64
MOISTURE (%)	6.3

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	554.67
CALCULATED OVEN-DRY WEIGHT (gms)	521.64
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	1324.02

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	79.04	6.0	66.6	33.4	
20	*0.85*	71.51	5.4	72.0	28.0	
40	*0.425*	79.42	6.0	78.0	22.0	
60	*0.25*	97.49	7.4	85.3	14.7	
140	*0.106*	131.22	9.9	95.2	4.8	
200	*0.074*	26.70	2.0	97.3	2.7	
PAN	*0*	6.22	0.5			
TOTAL FRACTIONS		491.60	37.1			
TOTAL DRY WEIGHT AFTER WET SEIVING		491.50	37.1			
SIEVE LOSS-GAIN		-0.10	0.0			

Atterberg Test

Liquid **L**imit	n/a
Plastic Limit	n/a
Plastic **I**ndex	n/a

SOIL DESCRIP. / REMARKS: Sand w/ trace silts & gravels, non plastic

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

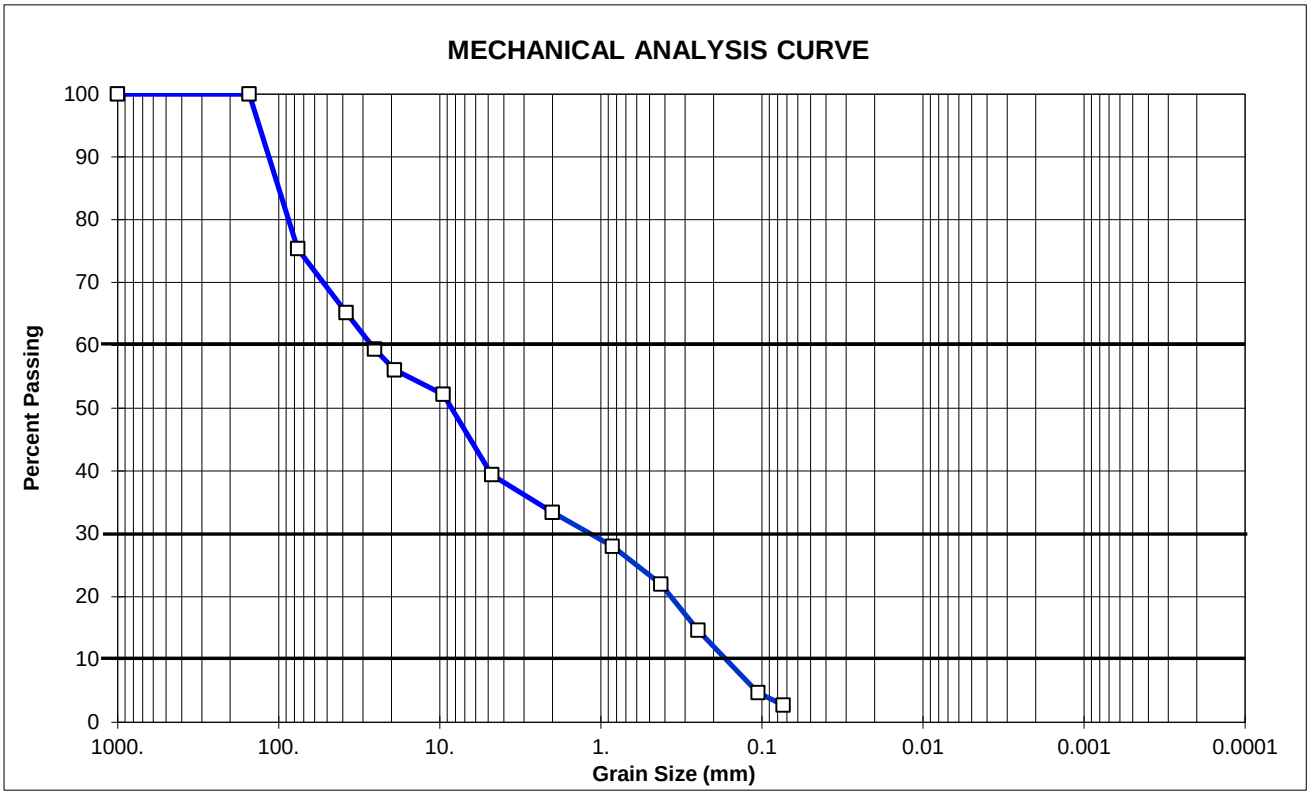
MATERIALS ENGINEERING DIVISION

Geotechnical Laboratory

PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga Reservoir Cleanout **PCA:** HF00710003

CLASSIFICATION: GP **BORING/SAMPLE:** B10



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	24.6	19.3	16.7	6.0	11.4	19.3	2.7	
TOTAL	24.6	= 36.0			=	36.7	#N/A	#N/A
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270

1st# passing *2nd# retaining*

Avg. Organic Content
n/a %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)		
% Retained #200 =	*97.3*	D_{10} =	*0.175*	$C_u = D_{60} / D_{10}$ =	*160.00*
% Retained # 4 =	*60.6*	D_{30} =	*1.25*	$C_c = D_{30}^2 / (D_{10}*D_{60})$ =	*0.31888*
% #4 / % #200 =	*62.3*	D_{60} =	*28.00*		

LOS ANGELES COUNTY DEPARTMETN OF PUBLIC WORKS
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

ORGANIC CONTENT / ASTM D2974

Project Name:	Big Tujunga-Ponar Sampling	Checked By:	EH
PCA:	HF00710003	Date Checked:	09/19/2012
Tested By:	HA		
Date Tested:	09/12/2012		

	Lab. #	Sample # / ID, Location	Date Received	Cup	Wet Wt. + Tare	Dry Wt. + Tare	Tare	Moisture Content	Ash + Tare	Ash Content	Average Ash Content	Orgnaic Content	Average Organic Content "As Received"	Total ret. #4 "As recived"
1	6384	B-11	09/06/2012	#2	164.400	161.670	69.990	2.978	155.880	93.685	93.50	6.315	6.50	2%
				#5	157.760	154.930	60.190	2.987	148.600	93.319		6.681		
2	6385	B-12	"	#3	192.140	184.250	63.570	6.538	172.210	90.023	89.81	9.977	10.19	3%
				#6	188.240	180.580	63.780	6.558	168.430	89.598		10.402		
3	6386	B-13	"	#3	164.370	163.040	73.510	1.486	158.010	94.382	94.43	5.618	5.57	1%
				#1	144.350	143.140	66.470	1.578	138.910	94.483		5.517		
4	6387	B-14	"	#2	200.500	199.960	69.990	0.415	198.440	98.830	98.81	1.170	1.19	13%
				#5	190.180	189.750	60.190	0.332	188.180	98.788		1.212		
5	6388	B-15	"	#1	146.560	145.000	66.470	1.987	139.970	93.595	93.32	6.405	6.68	0%
				#3	161.490	159.790	73.510	1.970	153.790	93.046		6.954		
6	6389	B-16	"	#8	253.580	252.180	105.650	0.955	247.610	96.881	97.10	3.119	2.90	0%
				#4	155.020	154.150	61.460	0.939	151.670	97.324		2.676		
7														
8														
9														
10														
11														
12														
13														

REMARKS:

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
Geotechnical and Materials Engineering Division
Geotechnical Laboratory - ASTM D2487, D6913, C117, C136

SIEVE ANALYSIS WORKSHEET

PROJECT NAME: Big Tujunga-Ponar Sampling
LAB. ID: 6384
CLASSIFICATION: ML
TESTED BY: HA
CHECKED BY: EH
Cu / Cc: 28.3 0.3

PCA: HF00710003
BORING / SAMPLE: B-11
DEPTH (FT): N/A
DATE TESTED: 9/12/12
DATE CHECKED: 9/19/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel
If % Passing #200 > 50%, CLAY or SILT

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*					
3/4"	*19.1*				100.0	
3/8"	*9.52*	5.60	0.3	0.3	99.7	
No. 4	*4.76*	40.60	2.1	2.4	97.6	
PAN	*0*	1943.10				
TOTAL FRACTIONS		1989.30				
OVEN-DRY FINES		1887.72				
*** TOTAL OVEN-DRY**		1933.46				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	97.15
MOISTURE (%)	2.9

* Cobbles not included in total oven-dry weight

• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	300.00
CALCULATED OVEN-DRY WEIGHT (gms)	291.45
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	298.58

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	19.44	6.5	8.9	91.1	
20	*0.85*	31.97	10.7	19.6	80.4	
40	*0.425*	32.02	10.7	30.3	69.7	
60	*0.25*	14.36	4.8	35.1	64.9	
140	*0.106*	25.86	8.7	43.8	56.2	
200	*0.074*	10.07	3.4	47.2	52.8	
PAN	*0*	3.65	1.2			
TOTAL FRACTIONS		137.37	46.0			
TOTAL DRY WEIGHT AFTER WET SEIVING		137.45	46.0			
SIEVE LOSS-GAIN		0.08	0.0			

Atterberg Test

Liquid **L**imit	#NAME?
Plastic Limit	#NAME?
Plastic **I**ndex	#NAME?

SOIL DESCRIP. / REMARKS: Gray Sandy Silt W/Few Organic, Non-Plastic,

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

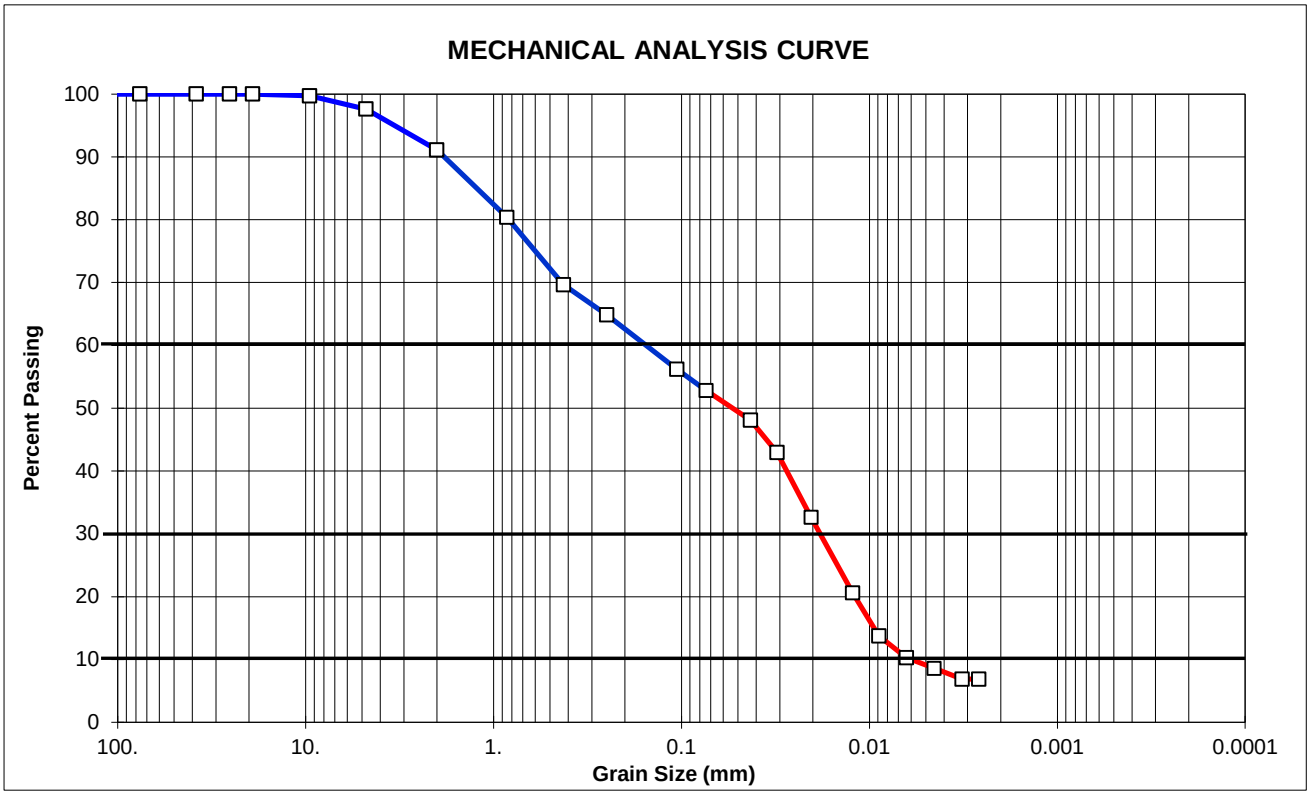
MATERIALS ENGINEERING DIVISION

Geotechnical Laboratory

PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga-Ponar Sampling **PCA:** HF00710003

CLASSIFICATION: ML **BORING/SAMPLE:** B-11



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.0	2.4	6.5	21.4	16.8	52.8	
TOTAL		= 2.4			= 44.8		42.5	10.30928
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270

V *1st# passing* V *2nd# retaining*

Avg. Organic Content
6.5 %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)		
% Retained #200 =	*47.2*	D_{10} =	*0.006*	$C_u = D_{60} / D_{10}$ =	*28.33*
% Retained # 4 =	*2.4*	D_{30} =	*0.018*	$C_c = D_{30}^2 / (D_{10}*D_{60})$ =	*0.31765*
% #4 / % #200 =	*5.1*	D_{60} =	*0.170*		

DEPARTMENT OF PUBLIC WORKS, LOS ANGELES
GEOTECHNICAL & MATERIALS ENGINEERING
MECHANICAL ANALYSIS - ASTM D422 & CTM 203

Project: **Big Tujunga-Ponar Sampling** Lab #: 6384

Boring / Sample: B-11 Depth (ft): N/A Date: 09/18/2012 PCA: HF00710003

Prepared By: HA Tech.: HA Calcul. By: HA Checked By: EH

T = MINUTES; **R** = HYDROMETER READING; **C** = TEMPERATURE;
R' = CORRECTED HYDROMETER READING; **P** = PERCENTAGE OF SIZE (R'/Wd);
P' = CORRECTED PERCENTAGE OF SIZE (P x % Passing No. 4 Sieve);
L = ASTM : D422, *Table II* ; **K** = ASTM : D422, *Table III* ;
D = PARTICLE SIZE (K x SQRT(L/T))

T,min.	R	C	Corrt C	R'	P	P'	L	K	D
1	30	26.0	2.0	28.0	48.1	47.0	11.4	0.01272	0.0429
2	27	26.0	2.0	25.0	43.0	41.9	11.9	0.01272	0.0310
5	21	26.0	2.0	19.0	32.6	31.9	12.9	0.01272	0.0204
15	14	26.0	2.0	12.0	20.6	20.1	14.0	0.01272	0.0123
30	10	26.0	2.0	8.0	13.7	13.4	14.7	0.01272	0.0089
60	8	26.0	2.0	6.0	10.3	10.1	15.0	0.01272	0.0064
120	7	26.0	2.0	5.0	8.6	8.4	15.2	0.01272	0.0045
240	6	26.0	2.0	4.0	6.9	6.7	15.3	0.01272	0.0032
360	6	26.0	2.0	4.0	6.9	6.7	15.3	0.01272	0.0026

SPECIFIC GRAVITY = 2.65 Cylinder #: 11

MOISTURE CONTENT

Wet Wt. of Sample + Container =	100.00	g
Dry Wt. of Sample + Container =	97.00	g
Loss of Moisture =	3.00	g
Tare =	0.00	g
Dry Wt. of Sample =	97.00	g
Moisture Content =	3.09	%

DRY WEIGHT OF TEST SAMPLE, Wd

$$= \frac{\text{Wet Wt. of Test Sample}}{100 + \text{Moisture Content}} \times 100$$

$$= \frac{60.00}{100 + 3} \times 100 = 58.20$$

CORRECTED GRADATION

Sieve Size	% Passing
1 1/2"	100.00
1"	100.00
34"	100.00
3/8"	99.71
4	97.61
10	91.10
20	80.39
40	69.67
60	64.86
140	56.20
200	52.83
PAN	
5 Microns	
1 Microns	

REMARKS:

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
Geotechnical and Materials Engineering Division
Geotechnical Laboratory - ASTM D2487, D6913, C117, C136

SIEVE ANALYSIS WORKSHEET

PROJECT NAME: Big Tujunga-Ponar Sampling
LAB. ID: 6385
CLASSIFICATION: SM
TESTED BY: HA
CHECKED BY: EH
Cu / Cc: 58.3 0.6

PCA: HF00710003
BORING / SAMPLE: B-12
DEPTH (FT): N/A
DATE TESTED: 9/13/12
DATE CHECKED: 9/19/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel
If % Passing #200 < 50%, SILT, SAND or DUAL

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*					
3/4"	*19.1*				100.0	
3/8"	*9.52*	7.40	0.4	0.4	99.6	
No. 4	*4.76*	60.10	3.0	3.3	96.7	
PAN	*0*	2095.90				
TOTAL FRACTIONS		2163.40				
OVEN-DRY FINES		1968.05				
*** TOTAL OVEN-DRY**		2034.88				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	93.90
MOISTURE (%)	6.5

* Cobbles not included in total oven-dry weight

• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	300.00
CALCULATED OVEN-DRY WEIGHT (gms)	281.70
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	291.37

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	23.11	7.9	11.2	88.8	
20	*0.85*	34.86	12.0	23.2	76.8	
40	*0.425*	36.49	12.5	35.7	64.3	
60	*0.25*	27.45	9.4	45.2	54.8	
140	*0.106*	37.82	13.0	58.1	41.9	
200	*0.074*	9.71	3.3	61.5	38.5	
PAN	*0*	9.34	3.2			
TOTAL FRACTIONS		178.78	61.4			
TOTAL DRY WEIGHT AFTER WET SEIVING		178.80	61.4			
SIEVE LOSS-GAIN		0.02	0.0			

Atterberg Test

Liquid **L**imit	#NAME?
Plastic Limit	#NAME?
Plastic **I**ndex	#NAME?

SOIL DESCRIP. / REMARKS: Gray Silty Sand W/Few Organic W/Trace Of Gravel,

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

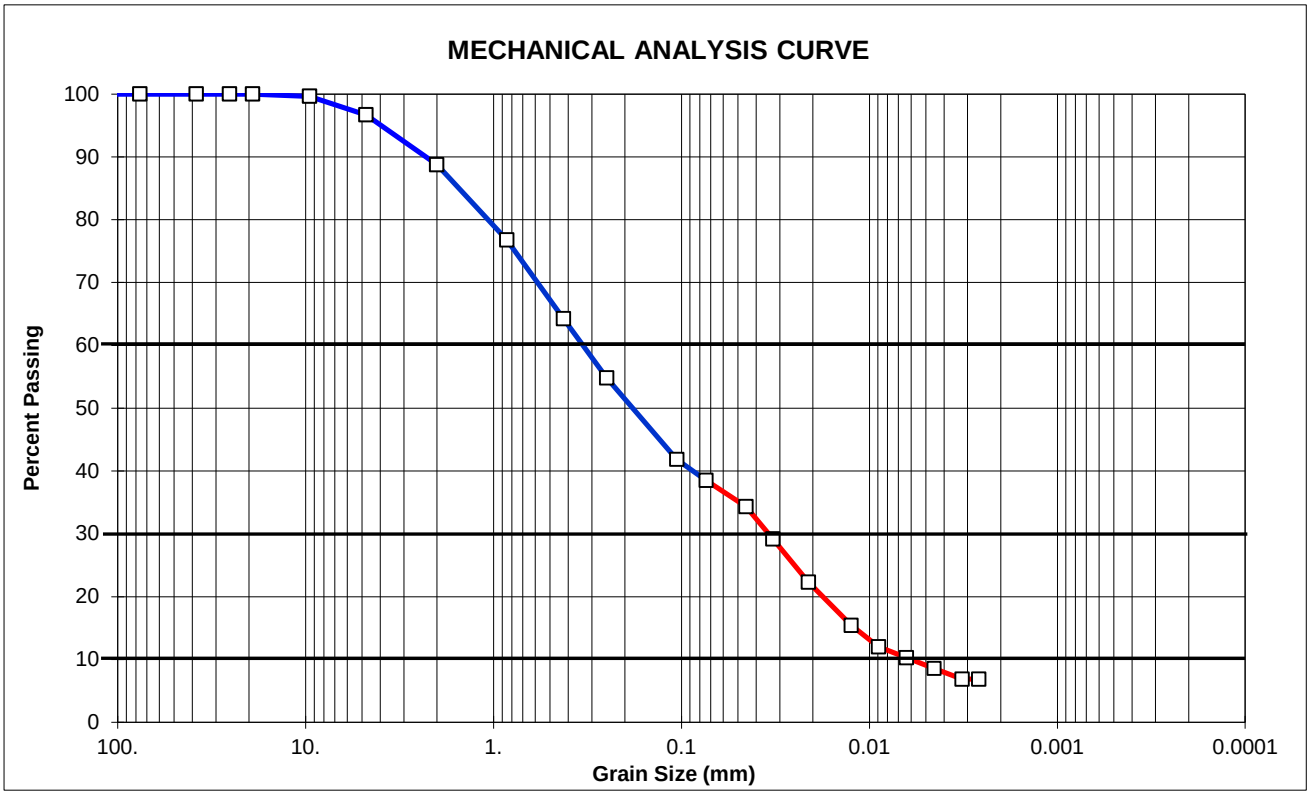
MATERIALS ENGINEERING DIVISION

Geotechnical Laboratory

PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga-Ponar Sampling **PCA:** HF00710003

CLASSIFICATION: SM **BORING/SAMPLE:** B-12



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.0	3.3	7.9	24.5	25.7	38.5	
TOTAL	-	= 3.3		= 58.2			28.2	10.30186
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270

V *1st# passing* V *2nd# retaining*

Avg. Organic Content
10.2 %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)		
% Retained #200 =	*61.5*	D_{10} =	*0.006*	$C_u = D_{60} / D_{10}$ =	*58.33*
% Retained # 4 =	*3.3*	D_{30} =	*0.035*	$C_c = D_{30}^2 / (D_{10}*D_{60})$ =	*0.58333*
% #4 / % #200 =	*5.4*	D_{60} =	*0.350*		

DEPARTMENT OF PUBLIC WORKS, LOS ANGELES
GEOTECHNICAL & MATERIALS ENGINEERING
MECHANICAL ANALYSIS - ASTM D422 & CTM 203

Project: **Big Tujunga-Ponar Sampling** Lab #: 6385

Boring / Sample: B-12 Depth (ft): N/A Date: 09/18/2012 PCA: HF00710003

Prepared By: HA Tech.: HA Calcul. By: HA Checked By: EH

T = MINUTES; **R** = HYDROMETER READING; **C** = TEMPERATURE;
R' = CORRECTED HYDROMETER READING; **P** = PERCENTAGE OF SIZE (R'/Wd);
P' = CORRECTED PERCENTAGE OF SIZE (P x % Passing No. 4 Sieve);
L = ASTM : D422, *Table II* ; **K** = ASTM : D422, *Table III* ;
D = PARTICLE SIZE (K x SQRT(L/T))

T,min.	R	C	Corrt C	R'	P	P'	L	K	D
1	22	26.0	2.0	20.0	35.5	34.3	12.7	0.01272	0.0453
2	19	26.0	2.0	17.0	30.2	29.2	13.2	0.01272	0.0327
5	15	26.0	2.0	13.0	23.1	22.3	13.8	0.01272	0.0211
15	11	26.0	2.0	9.0	16.0	15.5	14.5	0.01272	0.0125
30	9	26.0	2.0	7.0	12.4	12.0	14.8	0.01272	0.0089
60	8	26.0	2.0	6.0	10.7	10.3	15.0	0.01272	0.0064
120	7	26.0	2.0	5.0	8.9	8.6	15.2	0.01272	0.0045
240	6	26.0	2.0	4.0	7.1	6.9	15.3	0.01272	0.0032
360	6	26.0	2.0	4.0	7.1	6.9	15.3	0.01272	0.0026

SPECIFIC GRAVITY = 2.65 Cylinder #: 12

MOISTURE CONTENT

Wet Wt. of Sample + Container =	100.00	g
Dry Wt. of Sample + Container =	93.85	g
Loss of Moisture =	6.15	g
Tare =	0.00	g
Dry Wt. of Sample =	93.85	g
Moisture Content =	6.55	%

DRY WEIGHT OF TEST SAMPLE, Wd

$$= \frac{\text{Wet Wt. of Test Sample}}{100 + \text{Moisture Content}} \times 100$$

$$= \frac{60.00}{100 + } \times 100 \quad 56.31$$

CORRECTED GRADATION

Sieve Size	% Passing
1 1/2"	100.00
1"	100.00
34"	100.00
3/8"	99.64
4	96.68
10	88.75
20	76.79
40	64.26
60	54.84
140	41.86
200	38.53
PAN	
5 Microns	
1 Microns	

REMARKS:

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
Geotechnical and Materials Engineering Division
Geotechnical Laboratory - ASTM D2487, D6913, C117, C136

SIEVE ANALYSIS WORKSHEET

PROJECT NAME: Big Tujunga-Ponar Sampling
LAB. ID: 6386
CLASSIFICATION: ML
TESTED BY: HA
CHECKED BY: EH
Cu / Cc: 14.7 1.7

PCA: HF00710003
BORING / SAMPLE: B-13
DEPTH (FT): N/A
DATE TESTED: 9/13/12
DATE CHECKED: 9/19/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel
If % Passing #200 > 50%, CLAY or SILT

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*				100.0	
3/4"	*19.1*	14.60	1.0	1.0	99.0	
3/8"	*9.52*	0.90	0.1	1.0	99.0	
No. 4	*4.76*	1.00	0.1	1.1	98.9	
PAN	*0*	1534.20				
TOTAL FRACTIONS		1550.70				
OVEN-DRY FINES		1511.19				
*** TOTAL OVEN-DRY**		1527.52				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	98.50
MOISTURE (%)	1.5

* Cobbles not included in total oven-dry weight
• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	300.00
CALCULATED OVEN-DRY WEIGHT (gms)	295.50
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	298.73

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	1.25	0.4	1.5	98.5	
20	*0.85*	4.63	1.5	3.0	97.0	
40	*0.425*	4.04	1.4	4.4	95.6	
60	*0.25*	3.63	1.2	5.6	94.4	
140	*0.106*	31.71	10.6	16.2	83.8	
200	*0.074*	36.13	12.1	28.3	71.7	
PAN	*0*	55.12	18.5			
TOTAL FRACTIONS		136.51	45.7			
TOTAL DRY WEIGHT AFTER WET SEIVING		136.58	45.7			
SIEVE LOSS-GAIN		0.07	0.0			

Atterberg Test

Liquid **L**imit	#NAME?
Plastic Limit	#NAME?
Plastic **I**ndex	#NAME?

SOIL DESCRIP. / REMARKS: Gray Fine Sandy Silt W/Few Organic W/Trace Of Gravel, Non-Plastic,

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

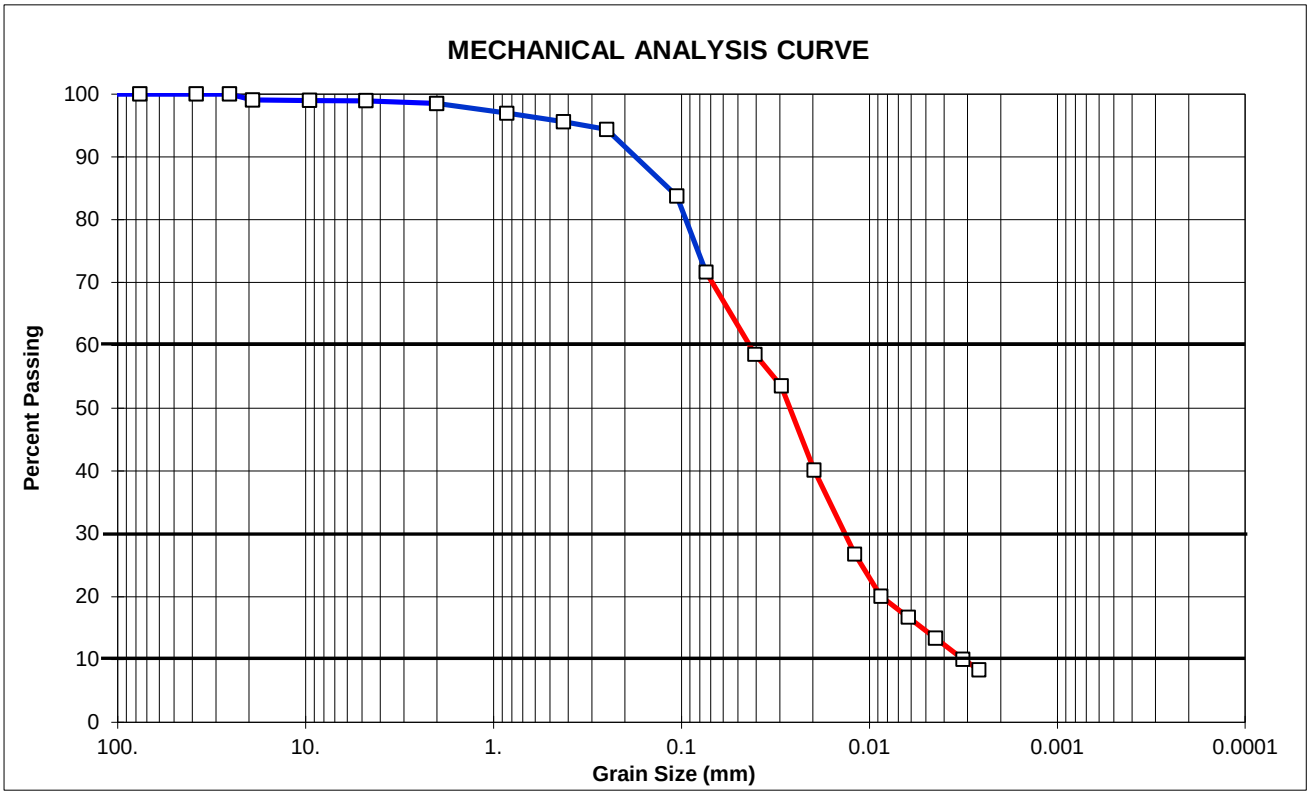
MATERIALS ENGINEERING DIVISION

Geotechnical Laboratory

PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga-Ponar Sampling **PCA:** HF00710003

CLASSIFICATION: ML **BORING/SAMPLE:** B-13



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	1.0	0.1	0.4	2.9	23.9	71.7	
TOTAL	-	= 1.1		=		27.2	54.9	16.7377
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270
	V 1st# passing	V 2nd# retaining						

Avg. Organic Content
5.6 %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)		
% Retained #200 =	*28.3*	D_{10} =	*0.003*	$C_u = D_{60} / D_{10}$ =	*14.67*
% Retained # 4 =	*1.1*	D_{30} =	*0.015*	$C_c = D_{30}^2 / (D_{10}*D_{60})$ =	*1.70455*
% #4 / % #200 =	*3.8*	D_{60} =	*0.044*		

DEPARTMENT OF PUBLIC WORKS, LOS ANGELES
GEOTECHNICAL & MATERIALS ENGINEERING
MECHANICAL ANALYSIS - ASTM D422 & CTM 203

Project: **Big Tujunga-Ponar Sampling** Lab #: 6386

Boring / Sample: B-13 Depth (ft): N/A Date: 09/18/2012 PCA: HF00710003

Prepared By: HA Tech.: HA Calcul. By: HA Checked By: EH

T = MINUTES; **R** = HYDROMETER READING; **C** = TEMPERATURE;
R' = CORRECTED HYDROMETER READING; **P** = PERCENTAGE OF SIZE (R'/Wd);
P' = CORRECTED PERCENTAGE OF SIZE (P x % Passing No. 4 Sieve);
L = ASTM : D422, *Table II* ; **K** = ASTM : D422, *Table III* ;
D = PARTICLE SIZE (K x SQRT(L/T))

T,min.	R	C	Corrt C	R'	P	P'	L	K	D
1	37	26.0	2.0	35.0	59.2	58.6	10.2	0.01272	0.0406
2	34	26.0	2.0	32.0	54.1	53.6	10.7	0.01272	0.0294
5	26	26.0	2.0	24.0	40.6	40.2	12.0	0.01272	0.0197
15	18	26.0	2.0	16.0	27.1	26.8	13.3	0.01272	0.0120
30	14	26.0	2.0	12.0	20.3	20.1	14.0	0.01272	0.0087
60	12	26.0	2.0	10.0	16.9	16.7	14.3	0.01272	0.0062
120	10	26.0	2.0	8.0	13.5	13.4	14.7	0.01272	0.0045
240	8	26.0	2.0	6.0	10.2	10.0	15.0	0.01272	0.0032
360	7	26.0	2.0	5.0	8.5	8.4	15.2	0.01272	0.0026

SPECIFIC GRAVITY = 2.65 Cylinder #: 13

MOISTURE CONTENT

Wet Wt. of Sample + Container =	100.00	g
Dry Wt. of Sample + Container =	98.50	g
Loss of Moisture =	1.50	g
Tare =	0.00	g
Dry Wt. of Sample =	98.50	g
Moisture Content =	1.52	%

DRY WEIGHT OF TEST SAMPLE, Wd

$$= \frac{\text{Wet Wt. of Test Sample}}{100 + \text{Moisture Content}} \times 100$$

$$= \frac{60.00}{100 +} \times 100 \qquad 59.10$$

CORRECTED GRADATION

Sieve Size	% Passing
1 1/2"	100.00
1"	100.00
34"	99.04
3/8"	98.99
4	98.92
10	98.50
20	96.95
40	95.60
60	94.38
140	83.77
200	71.67
PAN	
5 Microns	
1 Microns	

REMARKS:

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
Geotechnical and Materials Engineering Division
Geotechnical Laboratory - ASTM D2487, D6913, C117, C136

SIEVE ANALYSIS WORKSHEET

PROJECT NAME: Big Tujunga-Ponar Sampling
LAB. ID: 6387
CLASSIFICATION: SM
TESTED BY: HA
CHECKED BY: EH
Cu / Cc: 68.4 3.6

PCA: HF00710003
BORING / SAMPLE: B-14
DEPTH (FT): N/A
DATE TESTED: 9/13/12
DATE CHECKED: 9/19/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel
If % Passing #200 < 50%, SILT, SAND or DUAL

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*				100.0	
3/4"	*19.1*	18.60	0.8	0.8	99.2	
3/8"	*9.52*	80.50	3.7	4.5	95.5	
No. 4	*4.76*	185.90	8.5	13.0	87.0	
PAN	*0*	1925.00				
TOTAL FRACTIONS		2210.00				
OVEN-DRY FINES		1916.92				
*** TOTAL OVEN-DRY**		2199.09				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	99.58
MOISTURE (%)	0.4

* Cobbles not included in total oven-dry weight
• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	500.00
CALCULATED OVEN-DRY WEIGHT (gms)	497.90
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	572.04

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	85.97	15.0	28.0	72.0	
20	*0.85*	108.43	19.0	46.9	53.1	
40	*0.425*	88.56	15.5	62.4	37.6	
60	*0.25*	62.45	10.9	73.3	26.7	
140	*0.106*	62.71	11.0	84.3	15.7	
200	*0.074*	5.02	0.9	85.2	14.8	
PAN	*0*	1.49	0.3			
TOTAL FRACTIONS		414.63	72.5			
TOTAL DRY WEIGHT AFTER WET SEIVING		414.70	72.5			
SIEVE LOSS-GAIN		0.07	0.0			

Atterberg Test

Liquid **L**imit	#NAME?
Plastic Limit	#NAME?
Plastic **I**ndex	#NAME?

SOIL DESCRIP. / REMARKS: Gray Sand W/Few Gravel W/Few Silt W/Trace Of Organic, Non-Plastic,

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

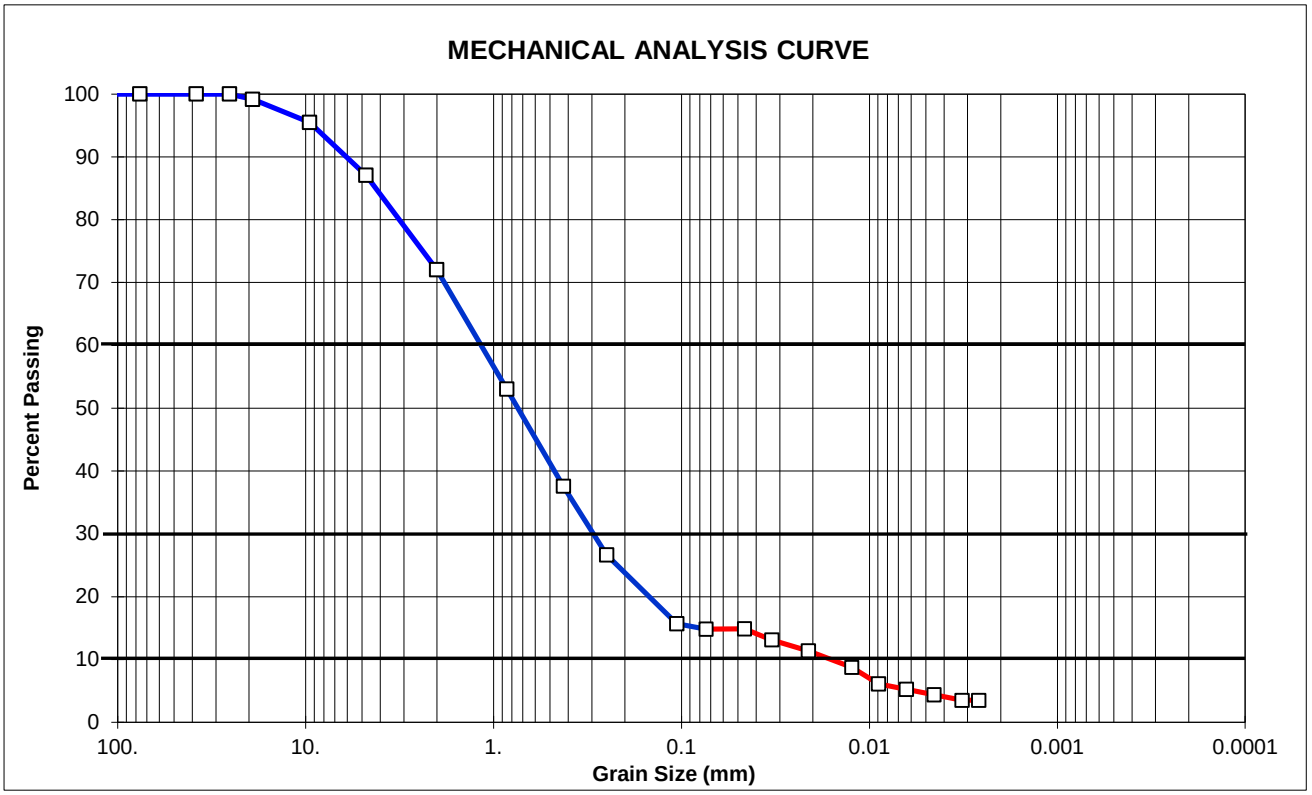
MATERIALS ENGINEERING DIVISION

Geotechnical Laboratory

PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga-Ponar Sampling **PCA:** HF00710003

CLASSIFICATION: SM **BORING/SAMPLE:** B-14



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.8	12.1	15.0	34.4	22.8	14.8	
TOTAL		= 13.0			= 72.2		9.6	5.24865
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270
	V 1st# passing	V 2nd# retaining						

Avg. Organic Content
1.2 %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)		
% Retained #200 =	*85.2*	D_{10} =	*0.019*	$C_u = D_{60} / D_{10}$ =	*68.42*
% Retained # 4 =	*13.0*	D_{30} =	*0.300*	$C_c = D_{30}^2 / (D_{10}*D_{60})$ =	*3.64372*
% #4 / % #200 =	*15.2*	D_{60} =	*1.300*		

DEPARTMENT OF PUBLIC WORKS, LOS ANGELES
GEOTECHNICAL & MATERIALS ENGINEERING
MECHANICAL ANALYSIS - ASTM D422 & CTM 203

Project: **Big Tujunga-Ponar Sampling** Lab #: 6387

Boring / Sample: B-14 Depth (ft): N/A Date: 09/18/2012 PCA: HF00710003

Prepared By: HA Tech.: HA Calcul. By: HA Checked By: EH

T = MINUTES; **R** = HYDROMETER READING; **C** = TEMPERATURE;
R' = CORRECTED HYDROMETER READING; **P** = PERCENTAGE OF SIZE (R'/Wd);
P' = CORRECTED PERCENTAGE OF SIZE (P x % Passing No. 4 Sieve);
L = ASTM : D422, *Table II* ; **K** = ASTM : D422, *Table III* ;
D = PARTICLE SIZE (K x SQRT(L/T))

T,min.	R	C	Corrt C	R'	P	P'	L	K	D
1	19	26.0	2.0	17.0	17.1	14.9	13.2	0.01272	0.0462
2	17	26.0	2.0	15.0	15.1	13.1	13.5	0.01272	0.0330
5	15	26.0	2.0	13.0	13.1	11.4	13.8	0.01272	0.0211
15	12	26.0	2.0	10.0	10.1	8.7	14.3	0.01272	0.0124
30	9	26.0	2.0	7.0	7.0	6.1	14.8	0.01272	0.0089
60	8	26.0	2.0	6.0	6.0	5.2	15.0	0.01272	0.0064
120	7	26.0	2.0	5.0	5.0	4.4	15.2	0.01272	0.0045
240	6	26.0	2.0	4.0	4.0	3.5	15.3	0.01272	0.0032
360	6	26.0	2.0	4.0	4.0	3.5	15.3	0.01272	0.0026

SPECIFIC GRAVITY = 2.65 Cylinder #: 14

MOISTURE CONTENT

Wet Wt. of Sample + Container =	100.00	g
Dry Wt. of Sample + Container =	99.50	g
Loss of Moisture =	0.50	g
Tare =	0.00	g
Dry Wt. of Sample =	99.50	g
Moisture Content =	0.50	%

DRY WEIGHT OF TEST SAMPLE, Wd

$$= \frac{\text{Wet Wt. of Test Sample}}{\text{100 + Moisture Content}} \times 100$$

$$= \frac{\text{100.00}}{\text{100 +}} \times 100 \quad 99.50$$

CORRECTED GRADATION

Sieve Size	% Passing
1 1/2"	100.00
1"	100.00
34"	99.15
3/8"	95.49
4	87.04
10	72.01
20	53.06
40	37.57
60	26.66
140	15.69
200	14.82
PAN	
5 Microns	
1 Microns	

REMARKS:

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
Geotechnical and Materials Engineering Division
Geotechnical Laboratory - ASTM D2487, D6913, C117, C136

SIEVE ANALYSIS WORKSHEET

PROJECT NAME: Big Tujunga-Ponar Sampling
LAB. ID: 6388
CLASSIFICATION: ML
TESTED BY: HA
CHECKED BY: EH

PCA: HF00710003
BORING / SAMPLE: B-15
DEPTH (FT): N/A
DATE TESTED: 9/13/12
DATE CHECKED: 9/19/12

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel
If % Passing #200 > 50%, CLAY or SILT

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*					
3/4"	*19.1*					
3/8"	*9.52*				100.0	
No. 4	*4.76*	2.50	0.2	0.2	99.8	
PAN	*0*	1690.00				
TOTAL FRACTIONS		1692.50				
OVEN-DRY FINES		1657.05				
*** TOTAL OVEN-DRY**		1659.52				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	98.05
MOISTURE (%)	2.0

* Cobbles not included in total oven-dry weight

• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	300.00
CALCULATED OVEN-DRY WEIGHT (gms)	294.15
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	294.59

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	0.85	0.3	0.4	99.6	
20	*0.85*	2.43	0.8	1.3	98.7	
40	*0.425*	2.30	0.8	2.0	98.0	
60	*0.25*	1.94	0.7	2.7	97.3	
140	*0.106*	6.45	2.2	4.9	95.1	
200	*0.074*	7.40	2.5	7.4	92.6	
PAN	*0*	15.17	5.1			
TOTAL FRACTIONS		36.54	12.4			
TOTAL DRY WEIGHT AFTER WET SEIVING		36.54	12.4			
SIEVE LOSS-GAIN		0.00	0.0			

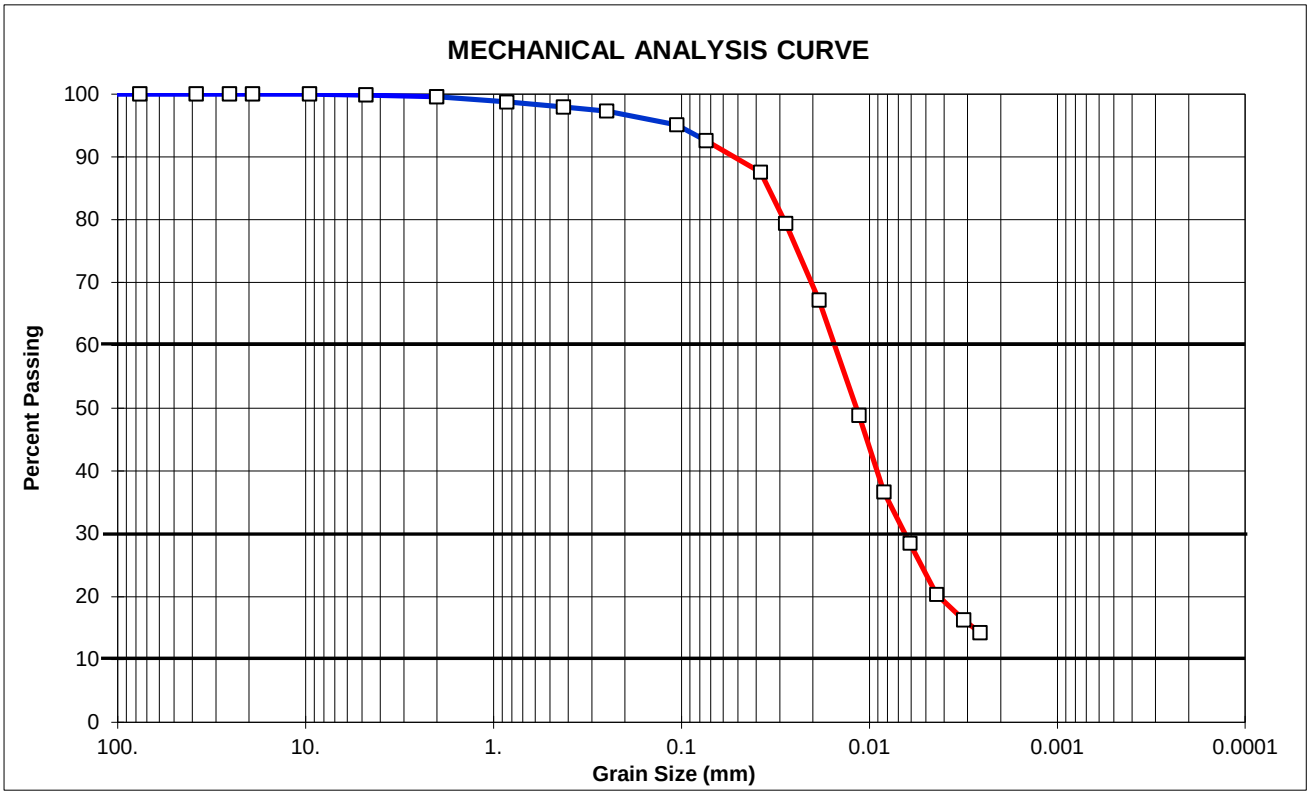
Atterberg Test

Liquid **L**imit	#NAME?
Plastic Limit	#NAME?
Plastic **I**ndex	#NAME?

SOIL DESCRIP. / REMARKS: L. Gray Silt W/Few Sand W/Few Organic Low Plastic - non rollable

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
Geotechnical Laboratory
PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga-Ponar Sampling **PCA:** HF00710003
CLASSIFICATION: ML **BORING/SAMPLE:** B-15



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.0	0.2	0.3	1.6	5.4	92.6	
TOTAL	-	= 0.2			=	7.3	64.1	28.51093
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270

V	V
1st# passing	*2nd# retaining*

Avg. Organic Content
6.7 %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)
% Retained #200 =	*7.4*	D_{10} =	
% Retained # 4 =	*0.2*	D_{30} =	
% #4 / % #200 =	*2.0*	D_{60} =	

$C_u = D_{60} / D_{10} =$

$C_c = D_{30}^2 / (D_{10} * D_{60}) =$

DEPARTMENT OF PUBLIC WORKS, LOS ANGELES
GEOTECHNICAL & MATERIALS ENGINEERING
MECHANICAL ANALYSIS - ASTM D422 & CTM 203

Project: **Big Tujunga-Ponar Sampling**

Lab #: 6388

Boring / Sample: B-15 Depth (ft): N/A Date: 09/18/2012 PCA: HP0071000-2

Prepared By: HA Tech.: HA Calcul. By: HA Checked By: EH

T = MINUTES; **R** = HYDROMETER READING; **C** = TEMPERATURE;
R' = CORRECTED HYDROMETER READING; **P** = PERCENTAGE OF SIZE (R'/Wd);
P' = CORRECTED PERCENTAGE OF SIZE (P x % Passing No. 4 Sieve);
L = ASTM : D422, *Table II* ; **K** = ASTM : D422, *Table III* ;
D = PARTICLE SIZE (K x SQRT(L/T))

T,min.	R	C	Corrt C	R'	P	P'	L	K	D
1	45	26.0	2.0	43.0	87.7	87.6	8.9	0.01272	0.0379
2	41	26.0	2.0	39.0	79.5	79.4	9.6	0.01272	0.0279
5	35	26.0	2.0	33.0	67.3	67.2	10.6	0.01272	0.0185
15	26	26.0	2.0	24.0	48.9	48.9	12.0	0.01272	0.0114
30	20	26.0	2.0	18.0	36.7	36.7	13.0	0.01272	0.0084
60	16	26.0	2.0	14.0	28.6	28.5	13.7	0.01272	0.0061
120	12	26.0	2.0	10.0	20.4	20.4	14.3	0.01272	0.0044
240	10	26.0	2.0	8.0	16.3	16.3	14.7	0.01272	0.0031
360	9	26.0	2.0	7.0	14.3	14.3	14.8	0.01272	0.0026

SPECIFIC GRAVITY = 2.65 Cylinder #: 15

MOISTURE CONTENT

Wet Wt. of Sample + Container =	100.00	g
Dry Wt. of Sample + Container =	98.06	g
Loss of Moisture =	1.94	g
Tare =	0.00	g
Dry Wt. of Sample =	98.06	g
Moisture Content =	1.98	%

DRY WEIGHT OF TEST SAMPLE, Wd

$$= \frac{\text{Wet Wt. of Test Sample}}{\text{100 + Moisture Content}} \times 100$$

50.00

$$= \frac{}{100 +} \times 100 = 49.03$$

CORRECTED GRADATION

Sieve Size	% Passing
1 1/2"	100.00
1"	100.00
34"	100.00
3/8"	100.00
4	99.85
10	99.56
20	98.74
40	97.96
60	97.30
140	95.11
200	92.60
PAN	
5 Microns	
1 Microns	

REMARKS:

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
Geotechnical and Materials Engineering Division
Geotechnical Laboratory - ASTM D2487, D6913, C117, C136

SIEVE ANALYSIS WORKSHEET

PROJECT NAME:	**Big Tujunga-Ponar Sampling**	**PCA:**	HF00710003
LAB. ID:	6389	**BORING / SAMPLE:**	B-16
CLASSIFICATION:	**SM**	**DEPTH (FT):**	N/A
TESTED BY:	HA	**DATE TESTED:**	9/13/12
CHECKED BY:	**EH**	**DATE CHECKED:**	9/19/12
Cu / Cc:	35.0	4.1	

If % Accum. Ret. #4 / % Accum. Ret. #200 > 50%, then Gravel
If % Passing #200 < 50%, SILT, SAND or DUAL

COARSE (Plus no. 4)

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
6"	*152.4*					
3"	*76.2*					
1 1/2"	*38.1*					
1"	*25.4*					
3/4"	*19.1*					
3/8"	*9.52*				100.0	
No. 4	*4.76*	5.60	0.3	0.3	99.7	
PAN	*0*	1695.00				
TOTAL FRACTIONS		1700.60				
OVEN-DRY FINES		1678.90				
*** TOTAL OVEN-DRY**		1684.44				

MOISTURE CONTENT OF FINES	
WET WEIGHT (gm)	100.00
DRY WEIGHT (gm)	99.05
MOISTURE (%)	1.0

* Cobbles not included in total oven-dry weight

• If moisture was not taken from Course material a 1% moisture content will be assumed.

MOISTURE CONTENT OF COURSE	
Wet WGT. (gm)	
Dry WGT. (gm)	
MOISTURE (%)	0.01

FINES (Minus no. 4)

WET WEIGHT OF FINES USED FOR WASHING (gms)	500.00
CALCULATED OVEN-DRY WEIGHT (gms)	495.25
WT. OF TOTAL SAMPLE REPRESENTED BY FINES, OVEN-DRY (gms):	496.90

ASTM SIEVE NUMBER	SIZE (mm)	RETAINED (gms)	% OF TOTAL OVEN DRY RETAINED	ACCUM. % RETAINED	ACCUM. % PASSING ACTUAL	ACCUM. % PASSING SPEC. REQ.
10	*2*	16.44	3.3	3.6	96.4	
20	*0.85*	52.72	10.6	14.3	85.7	
40	*0.425*	90.56	18.2	32.5	67.5	
60	*0.25*	86.69	17.4	49.9	50.1	
140	*0.106*	104.29	21.0	70.9	29.1	
200	*0.074*	23.28	4.7	75.6	24.4	
PAN	*0*	7.38	1.5			
TOTAL FRACTIONS		381.36	76.7			
TOTAL DRY WEIGHT AFTER WET SEIVING		381.40	76.8			
SIEVE LOSS-GAIN		0.04	0.0			

Atterberg Test

Liquid **L**imit	#NAME?
Plastic Limit	#NAME?
Plastic **I**ndex	#NAME?

SOIL DESCRIP. / REMARKS: L. Gray Silty Sand W/Trace Of Organic, Non-Plastic,

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

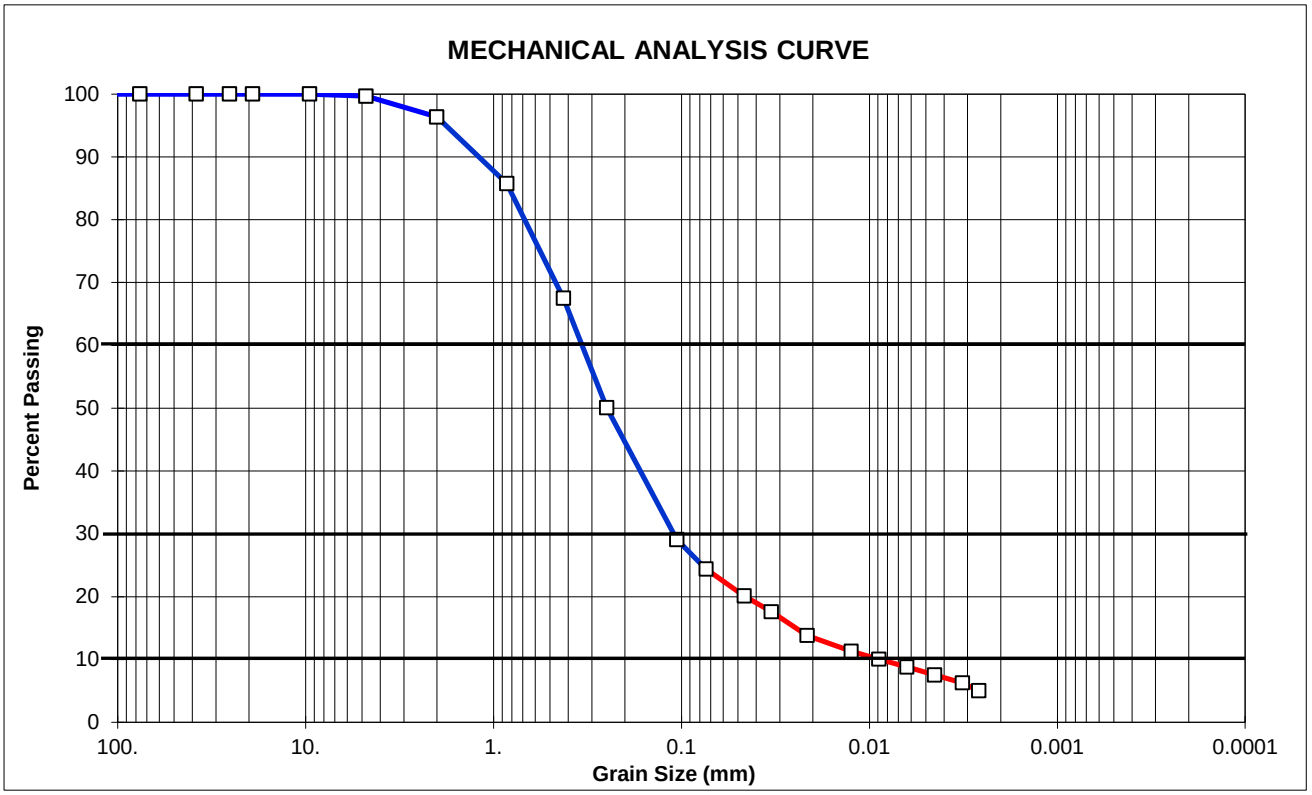
MATERIALS ENGINEERING DIVISION

Geotechnical Laboratory

PARTICLE SIZE DISTRIBUTION REPORT

PROJECT NAME: Big Tujunga-Ponar Sampling **PCA:** HF00710003

CLASSIFICATION: SM **BORING/SAMPLE:** B-16



	% COBBLES	% GRAVEL		% SAND			% FINES	
		coarse	fine	coarse	medium	fine	silt +	clay
(mm)*	(300-75)	(75-19)	(19-4.75)	(4.75-2)	(2-.425)	(.425-.075)	(-.075)	(-.005)
(%)	0.0	0.0	0.3	3.3	28.8	43.1	24.4	
TOTAL	-	= 0.3			=	75.3	15.6	8.803665
*sieve#	(12" - 3")	(3" - 3/4")	(3/4"- #4)	(#4 - #10)	(#10 - #40)	(#40 - #200)	pass#200	pass#270

1st# passing *2nd# retaining*

Avg. Organic Content
2.9 %

SAND EQUIVALENT / ASTM D2419

	Cylind. 1	Cylind. 2	VALUE
Sand			n/a
Clay			

			(mm)		
% Retained #200 =	*75.6*	D_{10} =	*0.010*	$C_u = D_{60} / D_{10}$ =	*35.00*
% Retained # 4 =	*0.3*	D_{30} =	*0.120*	$C_c = D_{30}^2 / (D_{10}*D_{60})$ =	*4.11429*
% #4 / % #200 =	*0.4*	D_{60} =	*0.350*		

DEPARTMENT OF PUBLIC WORKS, LOS ANGELES
GEOTECHNICAL & MATERIALS ENGINEERING
MECHANICAL ANALYSIS - ASTM D422 & CTM 203

Project: **Big Tujunga-Ponar Sampling** Lab #: 6389

Boring / Sample: B-16 Depth (ft): N/A Date: 09/18/2012 PCA: HF00710003

Prepared By: HA Tech.: HA Calcul. By: HA Checked By: EH

T = MINUTES; **R** = HYDROMETER READING; **C** = TEMPERATURE;
R' = CORRECTED HYDROMETER READING; **P** = PERCENTAGE OF SIZE (R'/Wd);
P' = CORRECTED PERCENTAGE OF SIZE (P x % Passing No. 4 Sieve);
L = ASTM : D422, *Table II* ; **K** = ASTM : D422, *Table III* ;
D = PARTICLE SIZE (K x SQRT(L/T))

T,min.	R	C	Corrt C	R'	P	P'	L	K	D
1	18	26.0	2.0	16.0	20.2	20.1	13.3	0.01272	0.0464
2	16	26.0	2.0	14.0	17.7	17.6	13.7	0.01272	0.0333
5	13	26.0	2.0	11.0	13.9	13.8	14.2	0.01272	0.0214
15	11	26.0	2.0	9.0	11.4	11.3	14.5	0.01272	0.0125
30	10	26.0	2.0	8.0	10.1	10.1	14.7	0.01272	0.0089
60	9	26.0	2.0	7.0	8.8	8.8	14.8	0.01272	0.0063
120	8	26.0	2.0	6.0	7.6	7.5	15.0	0.01272	0.0045
240	7	26.0	2.0	5.0	6.3	6.3	15.2	0.01272	0.0032
360	6	26.0	2.0	4.0	5.0	5.0	15.3	0.01272	0.0026

SPECIFIC GRAVITY = 2.65 Cylinder #: 16

MOISTURE CONTENT

Wet Wt. of Sample + Container =	100.00	g
Dry Wt. of Sample + Container =	99.06	g
Loss of Moisture =	0.94	g
Tare =	0.00	g
Dry Wt. of Sample =	99.06	g
Moisture Content =	0.95	%

DRY WEIGHT OF TEST SAMPLE, Wd

$$= \frac{\text{Wet Wt. of Test Sample}}{100 + \text{Moisture Content}} \times 100$$

$$= \frac{80.00}{100 + } \times 100 \quad 79.25$$

CORRECTED GRADATION

Sieve Size	% Passing
1 1/2"	100.00
1"	100.00
34"	100.00
3/8"	100.00
4	99.67
10	96.36
20	85.75
40	67.52
60	50.08
140	29.09
200	24.41
PAN	
5 Microns	
1 Microns	

REMARKS:

APPENDIX B
ENVIRONMENTAL ANALYTICAL RESULTS

Table 2

Summary of Analytical Test Results

Sample Identification			B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-10-2
Matrix			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
EPA Method	Analyte	Units	01/09/12	01/09/12	01/09/12	01/09/12	01/09/12	01/10/12	01/10/12	01/10/12	04/18/12
Metals [1,2]											
6010B	**Barium**	mg/kg	**62**	**99**	**100**	**110**	**110**	**120**	**130**	**130**	**37**
6010B	**Cobalt**	mg/kg	**5.4**	**10**	**11**	**11**	**11**	**12**	**12**	**11**	**7.3**
6010B	**Chromium**	mg/kg	**5.5**	**19**	**21**	**22**	**20**	**22**	**22**	**20**	**4.8**
6010B	**Copper**	mg/kg	**7.3**	**17**	**22**	**23**	**23**	**25**	**27**	**27**	**12**
6010B	**Nickel**	mg/kg	**5.5**	**14**	**16**	**17**	**16**	**17**	**18**	**17**	**6.5**
6010B	**Lead**	mg/kg	ND	**5.3**	**7.6**	**8.3**	**8.5**	**8.6**	**10**	**11**	ND
6010B	**Vanadium**	mg/kg	**15**	**31**	**32**	**33**	**32**	**35**	**36**	**35**	**9.1**
6010B	**Zinc**	mg/kg	**19**	**38**	**39**	**40**	**38**	**42**	**43**	**42**	**11**
Volatile Organic Compounds (VOCs) [2,3,4]											
8260B	**Benzene**	µg/kg	**23**	**23**	**21**	**18**	**25**	**16**	**21**	**19**	**58**
8260B	**Tert-butyl alcohol**	µg/kg	**360**	**160**	ND<5.0	ND<5.0	**1600**	ND<5.0	ND<5.0	ND<5.0	ND<5.0
8260B	**Toluene**	µg/kg	**14**	**29**	**66**	**66**	**94**	**35**	**59**	**28**	ND<5.0
Carbofurans											
8321		µg/kg	ND<25	ND<25	NR	ND<25	NR	NR	NR	ND<25	ND<25
Organochlorine Pesticides (OCPs)											
8081A		µg/kg	ND<2.0	ND<2.0	ND<2.0	ND<2.0	ND<2.0	ND<2.0	ND<2.0	ND<2.0	ND<2.0
Chlorinated Herbicides (CHs)											
8151A		µg/kg	ND<2.0	ND<2.0	ND<2.0	ND<2.0	ND<2.0	ND<2.0	ND<2.0	ND<2.0	ND<2.0
Polynuclear Aromatic Hydrocarbons (PAHs)											
8310		mg/kg	ND<0.200	ND<0.200	ND<0.200	ND<0.200	ND<0.200	ND<0.200	ND<0.200	ND<0.200	ND<0.200
Semivolatile Organic Compounds (SVOCs)											
8270C		mg/kg	ND<0.33	ND<0.33	ND<0.33	ND<0.33	ND<0.33	ND<0.33	ND<0.33	ND<0.33	ND<0.33
Polychlorinated Biphenyls (PCBs)											
8082		µg/kg	ND<20	ND<20	ND<20	ND<20	ND<20	ND<20	ND<20	ND<20	ND<20
2,3,7,8-TCDD (Dioxin)											
8290		ng/kg	ND<2.02	ND<1.65	NR	ND<2.55	NR	NR	NR	ND<2.15	ND<1.0
1,4 Dioxane											
8270		µg/kg	ND<230	ND<230	NR	ND<230	NR	NR	NR	ND<230	ND<61

Notes:

1. All other metals (by EPA 6010B) including mercury (by EPA 7471) not detected from 0.2 to 5.0 mg/kg.
2. See analytical laboratory reports for analytes tested and analyte specific reporting limits.
3. All other VOCs not detected above 5.0 µg/kg.
4. Including EDB (Dibromomethane) and DBCP (Dibromochloropropane).

ND = Analyte not detected at or above the reporting limit.
NR = Not reported.
mg/kg = Milligrams per kilogram.
µg/kg = Micrograms per kilogram.
ng/kg = Nanograms per kilogram.

SIERRA ANALYTICAL

23 January 2012

Geir Mathisen
Los Angeles County Dept. of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803

RE:Big T Res. Sed. Char. Program

Work Order No.: 1201110

Attached are the results of the analyses for samples received by the laboratory on 01/10/12 11:30.

The samples were received by Sierra Analytical Labs, Inc. with a chain of custody record attached or completed at the submittal of the samples.

The analyses were performed according to the prescribed method as outlined by EPA, Standard Methods, and A.S.T.M.

The remaining portions of the samples will be disposed of within 30 days from the date of this report.
If you require any additional retaining time, please advise us.

Sincerely,

Richard K. Forsyth

Richard K. Forsyth

Laboratory Director

Sierra Analytical Labs, Inc. is certified by the California Department of Health Services (DOHS),
Environmental Laboratory Accredidation Program (ELAP) No. 2320.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B-1	1201110-01	Soil	01/09/12 09:30	01/10/12 11:30
B-2	1201110-02	Soil	01/09/12 09:50	01/10/12 11:30
B-3	1201110-03	Soil	01/09/12 10:40	01/10/12 11:30
B-4	1201110-04	Soil	01/09/12 11:00	01/10/12 11:30
B-5	1201110-05	Soil	01/09/12 11:20	01/10/12 11:30

CASE NARRATIVE

SAMPLE RECEIPT: Samples were received intact, at 4°C, and accompanied by chain of custody documentation.
PRESERVATION: Samples requiring preservation were verified prior to sample preparation and analysis.
HOLDING TIMES: All holding times were met, unless otherwises noted in the report with data qualifiers.
QA/QC CRITERIA: All quality objective criteria were met, except as noted in the report with data qualifiers.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

26052 MERIT CIRCLE SUITE 105, LAGUNA HILLS, CALIFORNIA 92653
TELEPHONE: (949) 348-9389 FAX: (949) 348-9115
E-MAIL: SIERRALABS @ SIERRALABS.NET

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Metals by EPA 6000/7000 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-1 (1201110-01) Soil Sampled: 01/09/12 09:30 Received: 01/10/12 11:30									
Silver	ND	1.0	mg/kg	1	B2A1102	01/11/12	01/11/12 16:07	EPA 6010B	
Arsenic	ND	3.5	"	"	"	"	01/11/12 16:08	"	
Barium	**62**	6.5	"	"	"	"	01/11/12 16:07	"	
Beryllium	ND	0.50	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	01/11/12 16:08	"	
Cobalt	**5.4**	2.5	"	"	"	"	"	"	
Chromium	**5.5**	3.0	"	"	"	"	"	"	
Copper	**7.3**	2.0	"	"	"	"	01/11/12 16:07	"	
Mercury	ND	0.15	"	"	B2A1101	01/11/12	01/11/12 12:02	EPA 7471A	
Molybdenum	ND	1.0	"	"	B2A1102	01/11/12	01/11/12 16:08	EPA 6010B	
Nickel	**5.5**	4.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Antimony	ND	2.5	"	"	"	"	"	"	
Selenium	ND	6.0	"	"	"	"	"	"	
Thallium	ND	2.5	"	"	"	"	"	"	
Vanadium	**15**	6.0	"	"	"	"	01/11/12 16:07	"	
Zinc	**19**	10	"	"	"	"	01/11/12 16:08	"	
B-2 (1201110-02) Soil Sampled: 01/09/12 09:50 Received: 01/10/12 11:30									
Silver	ND	1.0	mg/kg	1	B2A1102	01/11/12	01/11/12 16:24	EPA 6010B	
Arsenic	ND	3.5	"	"	"	"	"	"	
Barium	**99**	6.5	"	"	"	"	"	"	
Beryllium	ND	0.50	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	"	"	
Cobalt	**10**	2.5	"	"	"	"	"	"	
Chromium	**19**	3.0	"	"	"	"	"	"	
Copper	**17**	2.0	"	"	"	"	"	"	
Mercury	ND	0.13	"	"	B2A1101	01/11/12	01/11/12 12:08	EPA 7471A	
Molybdenum	ND	1.0	"	"	B2A1102	01/11/12	01/11/12 16:24	EPA 6010B	
Nickel	**14**	4.0	"	"	"	"	"	"	
Lead	**5.3**	3.0	"	"	"	"	"	"	
Antimony	ND	2.5	"	"	"	"	"	"	
Selenium	ND	6.0	"	"	"	"	"	"	
Thallium	ND	2.5	"	"	"	"	"	"	
Vanadium	**31**	6.0	"	"	"	"	"	"	
Zinc	**38**	10	"	"	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Metals by EPA 6000/7000 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-3 (1201110-03) Soil Sampled: 01/09/12 10:40 Received: 01/10/12 11:30									
Silver	ND	0.91	mg/kg	1	B2A1102	01/11/12	01/11/12 16:29	EPA 6010B	
Arsenic	ND	3.2	"	"	"	"	01/11/12 16:30	"	
Barium	**100**	5.9	"	"	"	"	01/11/12 16:29	"	
Beryllium	ND	0.45	"	"	"	"	"	"	
Cadmium	ND	0.45	"	"	"	"	01/11/12 16:30	"	
Cobalt	**11**	2.3	"	"	"	"	"	"	
Chromium	**21**	2.7	"	"	"	"	"	"	
Copper	**22**	1.8	"	"	"	"	01/11/12 16:29	"	
Mercury	ND	0.14	"	"	B2A1101	01/11/12	01/11/12 12:10	EPA 7471A	
Molybdenum	ND	0.91	"	"	B2A1102	01/11/12	01/11/12 16:30	EPA 6010B	
Nickel	**16**	3.6	"	"	"	"	"	"	
Lead	**7.6**	2.7	"	"	"	"	"	"	
Antimony	ND	2.3	"	"	"	"	"	"	
Selenium	ND	5.5	"	"	"	"	"	"	
Thallium	ND	2.3	"	"	"	"	"	"	
Vanadium	**32**	5.5	"	"	"	"	01/11/12 16:29	"	
Zinc	**39**	9.1	"	"	"	"	"	"	
B-4 (1201110-04) Soil Sampled: 01/09/12 11:00 Received: 01/10/12 11:30									
Silver	ND	1.0	mg/kg	1	B2A1102	01/11/12	01/11/12 16:35	EPA 6010B	
Arsenic	ND	3.5	"	"	"	"	"	"	
Barium	**110**	6.5	"	"	"	"	"	"	
Beryllium	ND	0.50	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	"	"	
Cobalt	**11**	2.5	"	"	"	"	"	"	
Chromium	**22**	3.0	"	"	"	"	"	"	
Copper	**23**	2.0	"	"	"	"	"	"	
Mercury	ND	0.15	"	"	B2A1101	01/11/12	01/11/12 12:16	EPA 7471A	
Molybdenum	ND	1.0	"	"	B2A1102	01/11/12	01/11/12 16:35	EPA 6010B	
Nickel	**17**	4.0	"	"	"	"	"	"	
Lead	**8.3**	3.0	"	"	"	"	"	"	
Antimony	ND	2.5	"	"	"	"	"	"	
Selenium	ND	6.0	"	"	"	"	"	"	
Thallium	ND	2.5	"	"	"	"	"	"	
Vanadium	**33**	6.0	"	"	"	"	"	"	
Zinc	**40**	10	"	"	"	"	"	"	

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900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Metals by EPA 6000/7000 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-5 (1201110-05) Soil Sampled: 01/09/12 11:20 Received: 01/10/12 11:30									
Silver	ND	1.0	mg/kg	1	B2A1102	01/11/12	01/11/12 16:40	EPA 6010B	
Arsenic	ND	3.5	"	"	"	"	01/11/12 16:41	"	
Barium	**110**	6.5	"	"	"	"	01/11/12 16:40	"	
Beryllium	ND	0.50	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	01/11/12 16:41	"	
Cobalt	**11**	2.5	"	"	"	"	"	"	
Chromium	**20**	3.0	"	"	"	"	"	"	
Copper	**23**	2.0	"	"	"	"	01/11/12 16:40	"	
Mercury	ND	0.13	"	"	B2A1101	01/11/12	01/11/12 13:52	EPA 7471A	
Molybdenum	ND	1.0	"	"	B2A1102	01/11/12	01/11/12 16:41	EPA 6010B	
Nickel	**16**	4.0	"	"	"	"	"	"	
Lead	**8.5**	3.0	"	"	"	"	"	"	
Antimony	ND	2.5	"	"	"	"	"	"	
Selenium	ND	6.0	"	"	"	"	"	"	
Thallium	ND	2.5	"	"	"	"	"	"	
Vanadium	**32**	6.0	"	"	"	"	01/11/12 16:40	"	
Zinc	**38**	10	"	"	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Organochlorine Pesticides by EPA Method 8081A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-1 (1201110-01) Soil Sampled: 01/09/12 09:30 Received: 01/10/12 11:30									
Aldrin	ND	0.0020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8081A	
HCH-alpha	ND	0.0020	"	"	"	"	"	"	
HCH-beta	ND	0.0040	"	"	"	"	"	"	
HCH-delta	ND	0.0020	"	"	"	"	"	"	
HCH-gamma (Lindane)	ND	0.0020	"	"	"	"	"	"	
Chlordane	ND	0.0040	"	"	"	"	"	"	
4,4´-DDD	ND	0.0030	"	"	"	"	"	"	
4,4´-DDE	ND	0.0020	"	"	"	"	"	"	
4,4´-DDT	ND	0.0030	"	"	"	"	"	"	
Dieldrin	ND	0.0020	"	"	"	"	"	"	
Endosulfan I	ND	0.0020	"	"	"	"	"	"	
Endosulfan II	ND	0.0040	"	"	"	"	"	"	
Endosulfan sulfate	ND	0.0020	"	"	"	"	"	"	
Endrin	ND	0.0020	"	"	"	"	"	"	
Endrin aldehyde	ND	0.0020	"	"	"	"	"	"	
Endrin ketone	ND	0.0020	"	"	"	"	"	"	
Heptachlor	ND	0.0020	"	"	"	"	"	"	
Heptachlor epoxide	ND	0.0020	"	"	"	"	"	"	
Methoxychlor	ND	0.010	"	"	"	"	"	"	
Toxaphene	ND	0.040	"	"	"	"	"	"	
Mirex	ND	0.0040	"	"	"	"	"	"	
Kepone	ND	0.0040	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*74.7 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*69.9 %*		*42-147*	"	"	"	"	

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900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Organochlorine Pesticides by EPA Method 8081A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-2 (1201110-02) Soil Sampled: 01/09/12 09:50 Received: 01/10/12 11:30									
Aldrin	ND	0.0020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8081A	
HCH-alpha	ND	0.0020	"	"	"	"	"	"	
HCH-beta	ND	0.0040	"	"	"	"	"	"	
HCH-delta	ND	0.0020	"	"	"	"	"	"	
HCH-gamma (Lindane)	ND	0.0020	"	"	"	"	"	"	
Chlordane	ND	0.0040	"	"	"	"	"	"	
4,4´-DDD	ND	0.0030	"	"	"	"	"	"	
4,4´-DDE	ND	0.0020	"	"	"	"	"	"	
4,4´-DDT	ND	0.0030	"	"	"	"	"	"	
Dieldrin	ND	0.0020	"	"	"	"	"	"	
Endosulfan I	ND	0.0020	"	"	"	"	"	"	
Endosulfan II	ND	0.0040	"	"	"	"	"	"	
Endosulfan sulfate	ND	0.0020	"	"	"	"	"	"	
Endrin	ND	0.0020	"	"	"	"	"	"	
Endrin aldehyde	ND	0.0020	"	"	"	"	"	"	
Endrin ketone	ND	0.0020	"	"	"	"	"	"	
Heptachlor	ND	0.0020	"	"	"	"	"	"	
Heptachlor epoxide	ND	0.0020	"	"	"	"	"	"	
Methoxychlor	ND	0.010	"	"	"	"	"	"	
Toxaphene	ND	0.040	"	"	"	"	"	"	
Mirex	ND	0.0040	"	"	"	"	"	"	
Kepone	ND	0.0040	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*43.3 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*48.6 %*		*42-147*	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Organochlorine Pesticides by EPA Method 8081A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-3 (1201110-03) Soil Sampled: 01/09/12 10:40 Received: 01/10/12 11:30									
Aldrin	ND	0.0020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8081A	
HCH-alpha	ND	0.0020	"	"	"	"	"	"	
HCH-beta	ND	0.0040	"	"	"	"	"	"	
HCH-delta	ND	0.0020	"	"	"	"	"	"	
HCH-gamma (Lindane)	ND	0.0020	"	"	"	"	"	"	
Chlordane	ND	0.0040	"	"	"	"	"	"	
4,4´-DDD	ND	0.0030	"	"	"	"	"	"	
4,4´-DDE	ND	0.0020	"	"	"	"	"	"	
4,4´-DDT	ND	0.0030	"	"	"	"	"	"	
Dieldrin	ND	0.0020	"	"	"	"	"	"	
Endosulfan I	ND	0.0020	"	"	"	"	"	"	
Endosulfan II	ND	0.0040	"	"	"	"	"	"	
Endosulfan sulfate	ND	0.0020	"	"	"	"	"	"	
Endrin	ND	0.0020	"	"	"	"	"	"	
Endrin aldehyde	ND	0.0020	"	"	"	"	"	"	
Endrin ketone	ND	0.0020	"	"	"	"	"	"	
Heptachlor	ND	0.0020	"	"	"	"	"	"	
Heptachlor epoxide	ND	0.0020	"	"	"	"	"	"	
Methoxychlor	ND	0.010	"	"	"	"	"	"	
Toxaphene	ND	0.040	"	"	"	"	"	"	
Mirex	ND	0.0040	"	"	"	"	"	"	
Kepone	ND	0.0040	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*49.2 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*59.5 %*		*42-147*	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Organochlorine Pesticides by EPA Method 8081A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-4 (1201110-04) Soil Sampled: 01/09/12 11:00 Received: 01/10/12 11:30									
Aldrin	ND	0.0020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8081A	
HCH-alpha	ND	0.0020	"	"	"	"	"	"	
HCH-beta	ND	0.0040	"	"	"	"	"	"	
HCH-delta	ND	0.0020	"	"	"	"	"	"	
HCH-gamma (Lindane)	ND	0.0020	"	"	"	"	"	"	
Chlordane	ND	0.0040	"	"	"	"	"	"	
4,4´-DDD	ND	0.0030	"	"	"	"	"	"	
4,4´-DDE	ND	0.0020	"	"	"	"	"	"	
4,4´-DDT	ND	0.0030	"	"	"	"	"	"	
Dieldrin	ND	0.0020	"	"	"	"	"	"	
Endosulfan I	ND	0.0020	"	"	"	"	"	"	
Endosulfan II	ND	0.0040	"	"	"	"	"	"	
Endosulfan sulfate	ND	0.0020	"	"	"	"	"	"	
Endrin	ND	0.0020	"	"	"	"	"	"	
Endrin aldehyde	ND	0.0020	"	"	"	"	"	"	
Endrin ketone	ND	0.0020	"	"	"	"	"	"	
Heptachlor	ND	0.0020	"	"	"	"	"	"	
Heptachlor epoxide	ND	0.0020	"	"	"	"	"	"	
Methoxychlor	ND	0.010	"	"	"	"	"	"	
Toxaphene	ND	0.040	"	"	"	"	"	"	
Mirex	ND	0.0040	"	"	"	"	"	"	
Kepone	ND	0.0040	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*67.1 %*	*42-147*		*"*	*"*	*"*	*"*	
Surrogate: Tetrachloro-meta-xylene		*67.6 %*	*42-147*		*"*	*"*	*"*	*"*	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Organochlorine Pesticides by EPA Method 8081A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-5 (1201110-05) Soil Sampled: 01/09/12 11:20 Received: 01/10/12 11:30									
Aldrin	ND	0.0020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8081A	
HCH-alpha	ND	0.0020	"	"	"	"	"	"	
HCH-beta	ND	0.0040	"	"	"	"	"	"	
HCH-delta	ND	0.0020	"	"	"	"	"	"	
HCH-gamma (Lindane)	ND	0.0020	"	"	"	"	"	"	
Chlordane	ND	0.0040	"	"	"	"	"	"	
4,4´-DDD	ND	0.0030	"	"	"	"	"	"	
4,4´-DDE	ND	0.0020	"	"	"	"	"	"	
4,4´-DDT	ND	0.0030	"	"	"	"	"	"	
Dieldrin	ND	0.0020	"	"	"	"	"	"	
Endosulfan I	ND	0.0020	"	"	"	"	"	"	
Endosulfan II	ND	0.0040	"	"	"	"	"	"	
Endosulfan sulfate	ND	0.0020	"	"	"	"	"	"	
Endrin	ND	0.0020	"	"	"	"	"	"	
Endrin aldehyde	ND	0.0020	"	"	"	"	"	"	
Endrin ketone	ND	0.0020	"	"	"	"	"	"	
Heptachlor	ND	0.0020	"	"	"	"	"	"	
Heptachlor epoxide	ND	0.0020	"	"	"	"	"	"	
Methoxychlor	ND	0.010	"	"	"	"	"	"	
Toxaphene	ND	0.040	"	"	"	"	"	"	
Mirex	ND	0.0040	"	"	"	"	"	"	
Kepone	ND	0.0040	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*63.4 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*65.5 %*		*42-147*	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Polychlorinated Biphenyls by EPA Method 8082

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-1 (1201110-01) Soil Sampled: 01/09/12 09:30 Received: 01/10/12 11:30									
PCB-1016	ND	0.020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8082	
PCB-1221	ND	0.020	"	"	"	"	"	"	
PCB-1232	ND	0.020	"	"	"	"	"	"	
PCB-1242	ND	0.020	"	"	"	"	"	"	
PCB-1248	ND	0.020	"	"	"	"	"	"	
PCB-1254	ND	0.020	"	"	"	"	"	"	
PCB-1260	ND	0.020	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*74.7 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*69.9 %*		*42-147*	"	"	"	"	
B-2 (1201110-02) Soil Sampled: 01/09/12 09:50 Received: 01/10/12 11:30									
PCB-1016	ND	0.020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8082	
PCB-1221	ND	0.020	"	"	"	"	"	"	
PCB-1232	ND	0.020	"	"	"	"	"	"	
PCB-1242	ND	0.020	"	"	"	"	"	"	
PCB-1248	ND	0.020	"	"	"	"	"	"	
PCB-1254	ND	0.020	"	"	"	"	"	"	
PCB-1260	ND	0.020	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*43.3 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*48.6 %*		*42-147*	"	"	"	"	
B-3 (1201110-03) Soil Sampled: 01/09/12 10:40 Received: 01/10/12 11:30									
PCB-1016	ND	0.020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8082	
PCB-1221	ND	0.020	"	"	"	"	"	"	
PCB-1232	ND	0.020	"	"	"	"	"	"	
PCB-1242	ND	0.020	"	"	"	"	"	"	
PCB-1248	ND	0.020	"	"	"	"	"	"	
PCB-1254	ND	0.020	"	"	"	"	"	"	
PCB-1260	ND	0.020	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*49.2 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*59.5 %*		*42-147*	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Polychlorinated Biphenyls by EPA Method 8082

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-4 (1201110-04) Soil Sampled: 01/09/12 11:00 Received: 01/10/12 11:30									
PCB-1016	ND	0.020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8082	
PCB-1221	ND	0.020	"	"	"	"	"	"	
PCB-1232	ND	0.020	"	"	"	"	"	"	
PCB-1242	ND	0.020	"	"	"	"	"	"	
PCB-1248	ND	0.020	"	"	"	"	"	"	
PCB-1254	ND	0.020	"	"	"	"	"	"	
PCB-1260	ND	0.020	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*67.1 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*67.6 %*		*42-147*	"	"	"	"	
B-5 (1201110-05) Soil Sampled: 01/09/12 11:20 Received: 01/10/12 11:30									
PCB-1016	ND	0.020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8082	
PCB-1221	ND	0.020	"	"	"	"	"	"	
PCB-1232	ND	0.020	"	"	"	"	"	"	
PCB-1242	ND	0.020	"	"	"	"	"	"	
PCB-1248	ND	0.020	"	"	"	"	"	"	
PCB-1254	ND	0.020	"	"	"	"	"	"	
PCB-1260	ND	0.020	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*63.4 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*65.5 %*		*42-147*	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Chlorinated Herbicides by EPA Method 8151A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-1 (1201110-01) Soil Sampled: 01/09/12 09:30 Received: 01/10/12 11:30									
2,4,5-T	ND	1.6	µg/kg	1	B2A1603	01/16/12	01/18/12 10:18	EPA 8151A	
2,4,5-TP (Silvex)	ND	1.6	"	"	"	"	"	"	
2,4-D	ND	1.6	"	"	"	"	"	"	
2,4-DB	ND	4.0	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	2.0	"	"	"	"	"	"	
4-Nitrophenol	ND	2.0	"	"	"	"	"	"	
Acifluorfen	ND	1.6	"	"	"	"	"	"	
Bentazon	ND	1.6	"	"	"	"	"	"	
Chloramben	ND	1.6	"	"	"	"	"	"	
Dalapon	ND	20	"	"	"	"	"	"	
DCPA diacid	ND	1.6	"	"	"	"	"	"	
Dicamba	ND	1.6	"	"	"	"	"	"	
Dichlorprop	ND	1.6	"	"	"	"	"	"	
Dinoseb	ND	1.6	"	"	"	"	"	"	
Pentachlorophenol	ND	1.6	"	"	"	"	"	"	
Picloram	ND	1.6	"	"	"	"	"	"	
Surrogate: 2,4-Dichlorophenylacetic Acid		*127 %*		*35-150*	"	"	"	"	
B-2 (1201110-02) Soil Sampled: 01/09/12 09:50 Received: 01/10/12 11:30									
2,4,5-T	ND	1.6	µg/kg	1	B2A1603	01/16/12	01/18/12 10:18	EPA 8151A	
2,4,5-TP (Silvex)	ND	1.6	"	"	"	"	"	"	
2,4-D	ND	1.6	"	"	"	"	"	"	
2,4-DB	ND	4.0	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	2.0	"	"	"	"	"	"	
4-Nitrophenol	ND	2.0	"	"	"	"	"	"	
Acifluorfen	ND	1.6	"	"	"	"	"	"	
Bentazon	ND	1.6	"	"	"	"	"	"	
Chloramben	ND	1.6	"	"	"	"	"	"	
Dalapon	ND	20	"	"	"	"	"	"	
DCPA diacid	ND	1.6	"	"	"	"	"	"	
Dicamba	ND	1.6	"	"	"	"	"	"	
Dichlorprop	ND	1.6	"	"	"	"	"	"	
Dinoseb	ND	1.6	"	"	"	"	"	"	
Pentachlorophenol	ND	1.6	"	"	"	"	"	"	
Picloram	ND	1.6	"	"	"	"	"	"	
Surrogate: 2,4-Dichlorophenylacetic Acid		*148 %*		*35-150*	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Chlorinated Herbicides by EPA Method 8151A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-3 (1201110-03) Soil Sampled: 01/09/12 10:40 Received: 01/10/12 11:30									
2,4,5-T	ND	1.6	µg/kg	1	B2A1603	01/16/12	01/18/12 10:18	EPA 8151A	
2,4,5-TP (Silvex)	ND	1.6	"	"	"	"	"	"	
2,4-D	ND	1.6	"	"	"	"	"	"	
2,4-DB	ND	4.0	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	2.0	"	"	"	"	"	"	
4-Nitrophenol	ND	2.0	"	"	"	"	"	"	
Acifluorfen	ND	1.6	"	"	"	"	"	"	
Bentazon	ND	1.6	"	"	"	"	"	"	
Chloramben	ND	1.6	"	"	"	"	"	"	
Dalapon	ND	20	"	"	"	"	"	"	
DCPA diacid	ND	1.6	"	"	"	"	"	"	
Dicamba	ND	1.6	"	"	"	"	"	"	
Dichlorprop	ND	1.6	"	"	"	"	"	"	
Dinoseb	ND	1.6	"	"	"	"	"	"	
Pentachlorophenol	ND	1.6	"	"	"	"	"	"	
Picloram	ND	1.6	"	"	"	"	"	"	
Surrogate: 2,4-Dichlorophenylacetic Acid		*103 %*		*35-150*	"	"	"	"	
B-4 (1201110-04) Soil Sampled: 01/09/12 11:00 Received: 01/10/12 11:30									
2,4,5-T	ND	1.6	µg/kg	1	B2A1603	01/16/12	01/18/12 10:18	EPA 8151A	
2,4,5-TP (Silvex)	ND	1.6	"	"	"	"	"	"	
2,4-D	ND	1.6	"	"	"	"	"	"	
2,4-DB	ND	4.0	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	2.0	"	"	"	"	"	"	
4-Nitrophenol	ND	2.0	"	"	"	"	"	"	
Acifluorfen	ND	1.6	"	"	"	"	"	"	
Bentazon	ND	1.6	"	"	"	"	"	"	
Chloramben	ND	1.6	"	"	"	"	"	"	
Dalapon	ND	20	"	"	"	"	"	"	
DCPA diacid	ND	1.6	"	"	"	"	"	"	
Dicamba	ND	1.6	"	"	"	"	"	"	
Dichlorprop	ND	1.6	"	"	"	"	"	"	
Dinoseb	ND	1.6	"	"	"	"	"	"	
Pentachlorophenol	ND	1.6	"	"	"	"	"	"	
Picloram	ND	1.6	"	"	"	"	"	"	
Surrogate: 2,4-Dichlorophenylacetic Acid		*64.0 %*		*35-150*	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Chlorinated Herbicides by EPA Method 8151A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-5 (1201110-05) Soil Sampled: 01/09/12 11:20 Received: 01/10/12 11:30									
2,4,5-T	ND	1.6	µg/kg	1	B2A1603	01/16/12	01/18/12 10:18	EPA 8151A	
2,4,5-TP (Silvex)	ND	1.6	"	"	"	"	"	"	
2,4-D	ND	1.6	"	"	"	"	"	"	
2,4-DB	ND	4.0	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	2.0	"	"	"	"	"	"	
4-Nitrophenol	ND	2.0	"	"	"	"	"	"	
Acifluorfen	ND	1.6	"	"	"	"	"	"	
Bentazon	ND	1.6	"	"	"	"	"	"	
Chloramben	ND	1.6	"	"	"	"	"	"	
Dalapon	ND	20	"	"	"	"	"	"	
DCPA diacid	ND	1.6	"	"	"	"	"	"	
Dicamba	ND	1.6	"	"	"	"	"	"	
Dichlorprop	ND	1.6	"	"	"	"	"	"	
Dinoseb	ND	1.6	"	"	"	"	"	"	
Pentachlorophenol	ND	1.6	"	"	"	"	"	"	
Picloram	ND	1.6	"	"	"	"	"	"	
Surrogate: 2,4-Dichlorophenylacetic Acid		*40.7 %*		*35-150*	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-1 (1201110-01) Soil Sampled: 01/09/12 09:30 Received: 01/10/12 11:30									
Benzene	**23**	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Bromobenzene	ND	5.0	"	"	"	"	"	"	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Di-isopropyl ether	ND	5.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project:	Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number:	HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager:	Geir Mathisen	01/23/12 09:36

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-1 (1201110-01) Soil Sampled: 01/09/12 09:30 Received: 01/10/12 11:30									
Methylene chloride	ND	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Methyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	5.0	"	"	"	"	"	"	
Tert-butyl alcohol	**360**	25	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
Toluene	**14**	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*102 %*	*80-120*		"	"	"	"	
Surrogate: Toluene-d8		*115 %*	*81-117*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*96.0 %*	*74-121*		"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-2 (1201110-02) Soil Sampled: 01/09/12 09:50 Received: 01/10/12 11:30									
Benzene	**23**	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Bromobenzene	ND	5.0	"	"	"	"	"	"	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Di-isopropyl ether	ND	5.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-2 (1201110-02) Soil Sampled: 01/09/12 09:50 Received: 01/10/12 11:30									
Methylene chloride	ND	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Methyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	5.0	"	"	"	"	"	"	
Tert-butyl alcohol	**160**	25	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
Toluene	**29**	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*120 %*		*80-120*	"	"	"	"	
Surrogate: Toluene-d8		*95.0 %*		*81-117*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*95.6 %*		*74-121*	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-3 (1201110-03) Soil Sampled: 01/09/12 10:40 Received: 01/10/12 11:30									
Benzene	**21**	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Bromobenzene	ND	5.0	"	"	"	"	"	"	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Di-isopropyl ether	ND	5.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-3 (1201110-03) Soil Sampled: 01/09/12 10:40 Received: 01/10/12 11:30									
Methylene chloride	ND	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Methyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	5.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	25	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
Toluene	**66**	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*107 %*	*80-120*		"	"	"	"	
Surrogate: Toluene-d8		*116 %*	*81-117*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*96.6 %*	*74-121*		"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-4 (1201110-04) Soil Sampled: 01/09/12 11:00 Received: 01/10/12 11:30									
Benzene	**18**	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Bromobenzene	ND	5.0	"	"	"	"	"	"	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Di-isopropyl ether	ND	5.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-4 (1201110-04) Soil Sampled: 01/09/12 11:00 Received: 01/10/12 11:30									
Methylene chloride	ND	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Methyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	5.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	25	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
Toluene	**66**	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*101 %*	*80-120*		"	"	"	"	
Surrogate: Toluene-d8		*115 %*	*81-117*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*98.6 %*	*74-121*		"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-5 (1201110-05) Soil Sampled: 01/09/12 11:20 Received: 01/10/12 11:30									
Benzene	**25**	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Bromobenzene	ND	5.0	"	"	"	"	"	"	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Di-isopropyl ether	ND	5.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-5 (1201110-05) Soil Sampled: 01/09/12 11:20 Received: 01/10/12 11:30									
Methylene chloride	ND	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Methyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	5.0	"	"	"	"	"	"	
Tert-butyl alcohol	**1600**	25	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
Toluene	**94**	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*108 %*	*80-120*		"	"	"	"	
Surrogate: Toluene-d8		*93.8 %*	*81-117*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*95.0 %*	*74-121*		"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-1 (1201110-01) Soil Sampled: 01/09/12 09:30 Received: 01/10/12 11:30									
Acenaphthene	ND	0.33	mg/kg	1	B2A1914	01/11/12	01/17/12 17:40	EPA 8270C	
Acenaphthylene	ND	0.33	"	"	"	"	"	"	
Anthracene	ND	0.33	"	"	"	"	"	"	
Benzidine	ND	0.33	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.33	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.33	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	0.33	"	"	"	"	"	"	
Benzyl alcohol	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	0.33	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	0.33	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	0.33	"	"	"	"	"	"	
4-Chloroaniline	ND	0.33	"	"	"	"	"	"	
2-Chlorophenol	ND	0.33	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	0.33	"	"	"	"	"	"	
2-Chloronaphthalene	ND	0.33	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Chrysene	ND	0.33	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.33	"	"	"	"	"	"	
Dibenzofuran	ND	0.33	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
3,3´-Dichlorobenzidine	ND	0.33	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	0.33	"	"	"	"	"	"	
Diethyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	0.33	"	"	"	"	"	"	
Dimethyl phthalate	ND	0.33	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	0.33	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	0.33	"	"	"	"	"	"	
1,2-Diphenylhydrazine	ND	0.33	"	"	"	"	"	"	
Fluoranthene	ND	0.33	"	"	"	"	"	"	
Fluorene	ND	0.33	"	"	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-1 (1201110-01) Soil Sampled: 01/09/12 09:30 Received: 01/10/12 11:30									
Hexachlorobenzene	ND	0.33	mg/kg	1	B2A1914	01/11/12	01/17/12 17:40	EPA 8270C	
Hexachlorobutadiene	ND	0.33	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	0.33	"	"	"	"	"	"	
Hexachloroethane	ND	0.33	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.33	"	"	"	"	"	"	
Isophorone	ND	0.33	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.33	"	"	"	"	"	"	
2-Methylphenol	ND	0.33	"	"	"	"	"	"	
4-Methylphenol	ND	0.33	"	"	"	"	"	"	
Naphthalene	ND	0.33	"	"	"	"	"	"	
2-Nitroaniline	ND	0.33	"	"	"	"	"	"	
3-Nitroaniline	ND	0.33	"	"	"	"	"	"	
4-Nitroaniline	ND	0.33	"	"	"	"	"	"	
Nitrobenzene	ND	0.33	"	"	"	"	"	"	
2-Nitrophenol	ND	0.33	"	"	"	"	"	"	
4-Nitrophenol	ND	0.33	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	0.33	"	"	"	"	"	"	
Diphenylamine	ND	0.33	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	0.33	"	"	"	"	"	"	
Pentachlorophenol	ND	0.33	"	"	"	"	"	"	
Phenanthrene	ND	0.33	"	"	"	"	"	"	
Phenol	ND	0.33	"	"	"	"	"	"	
Pyrene	ND	0.33	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.33	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*78.4 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*86.6 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*81.7 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*83.5 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*68.6 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-d14		*96.7 %*	*18-137*		"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-2 (1201110-02) Soil Sampled: 01/09/12 09:50 Received: 01/10/12 11:30									
Acenaphthene	ND	0.33	mg/kg	1	B2A1914	01/11/12	01/17/12 18:20	EPA 8270C	
Acenaphthylene	ND	0.33	"	"	"	"	"	"	
Anthracene	ND	0.33	"	"	"	"	"	"	
Benzidine	ND	0.33	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.33	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.33	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	0.33	"	"	"	"	"	"	
Benzyl alcohol	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	0.33	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	0.33	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	0.33	"	"	"	"	"	"	
4-Chloroaniline	ND	0.33	"	"	"	"	"	"	
2-Chlorophenol	ND	0.33	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	0.33	"	"	"	"	"	"	
2-Chloronaphthalene	ND	0.33	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Chrysene	ND	0.33	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.33	"	"	"	"	"	"	
Dibenzofuran	ND	0.33	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
3,3´-Dichlorobenzidine	ND	0.33	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	0.33	"	"	"	"	"	"	
Diethyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	0.33	"	"	"	"	"	"	
Dimethyl phthalate	ND	0.33	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	0.33	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	0.33	"	"	"	"	"	"	
1,2-Diphenylhydrazine	ND	0.33	"	"	"	"	"	"	
Fluoranthene	ND	0.33	"	"	"	"	"	"	
Fluorene	ND	0.33	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-2 (1201110-02) Soil Sampled: 01/09/12 09:50 Received: 01/10/12 11:30									
Hexachlorobenzene	ND	0.33	mg/kg	1	B2A1914	01/11/12	01/17/12 18:20	EPA 8270C	
Hexachlorobutadiene	ND	0.33	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	0.33	"	"	"	"	"	"	
Hexachloroethane	ND	0.33	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.33	"	"	"	"	"	"	
Isophorone	ND	0.33	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.33	"	"	"	"	"	"	
2-Methylphenol	ND	0.33	"	"	"	"	"	"	
4-Methylphenol	ND	0.33	"	"	"	"	"	"	
Naphthalene	ND	0.33	"	"	"	"	"	"	
2-Nitroaniline	ND	0.33	"	"	"	"	"	"	
3-Nitroaniline	ND	0.33	"	"	"	"	"	"	
4-Nitroaniline	ND	0.33	"	"	"	"	"	"	
Nitrobenzene	ND	0.33	"	"	"	"	"	"	
2-Nitrophenol	ND	0.33	"	"	"	"	"	"	
4-Nitrophenol	ND	0.33	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	0.33	"	"	"	"	"	"	
Diphenylamine	ND	0.33	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	0.33	"	"	"	"	"	"	
Pentachlorophenol	ND	0.33	"	"	"	"	"	"	
Phenanthrene	ND	0.33	"	"	"	"	"	"	
Phenol	ND	0.33	"	"	"	"	"	"	
Pyrene	ND	0.33	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.33	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*86.2 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*83.8 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*99.7 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*98.5 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*73.2 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-d14		*97.3 %*	*18-137*		"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-3 (1201110-03) Soil Sampled: 01/09/12 10:40 Received: 01/10/12 11:30									
Acenaphthene	ND	0.33	mg/kg	1	B2A1914	01/11/12	01/17/12 18:59	EPA 8270C	
Acenaphthylene	ND	0.33	"	"	"	"	"	"	
Anthracene	ND	0.33	"	"	"	"	"	"	
Benzidine	ND	0.33	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.33	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.33	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	0.33	"	"	"	"	"	"	
Benzyl alcohol	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	0.33	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	0.33	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	0.33	"	"	"	"	"	"	
4-Chloroaniline	ND	0.33	"	"	"	"	"	"	
2-Chlorophenol	ND	0.33	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	0.33	"	"	"	"	"	"	
2-Chloronaphthalene	ND	0.33	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Chrysene	ND	0.33	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.33	"	"	"	"	"	"	
Dibenzofuran	ND	0.33	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
3,3´-Dichlorobenzidine	ND	0.33	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	0.33	"	"	"	"	"	"	
Diethyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	0.33	"	"	"	"	"	"	
Dimethyl phthalate	ND	0.33	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	0.33	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	0.33	"	"	"	"	"	"	
1,2-Diphenylhydrazine	ND	0.33	"	"	"	"	"	"	
Fluoranthene	ND	0.33	"	"	"	"	"	"	
Fluorene	ND	0.33	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-3 (1201110-03) Soil Sampled: 01/09/12 10:40 Received: 01/10/12 11:30									
Hexachlorobenzene	ND	0.33	mg/kg	1	B2A1914	01/11/12	01/17/12 18:59	EPA 8270C	
Hexachlorobutadiene	ND	0.33	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	0.33	"	"	"	"	"	"	
Hexachloroethane	ND	0.33	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.33	"	"	"	"	"	"	
Isophorone	ND	0.33	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.33	"	"	"	"	"	"	
2-Methylphenol	ND	0.33	"	"	"	"	"	"	
4-Methylphenol	ND	0.33	"	"	"	"	"	"	
Naphthalene	ND	0.33	"	"	"	"	"	"	
2-Nitroaniline	ND	0.33	"	"	"	"	"	"	
3-Nitroaniline	ND	0.33	"	"	"	"	"	"	
4-Nitroaniline	ND	0.33	"	"	"	"	"	"	
Nitrobenzene	ND	0.33	"	"	"	"	"	"	
2-Nitrophenol	ND	0.33	"	"	"	"	"	"	
4-Nitrophenol	ND	0.33	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	0.33	"	"	"	"	"	"	
Diphenylamine	ND	0.33	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	0.33	"	"	"	"	"	"	
Pentachlorophenol	ND	0.33	"	"	"	"	"	"	
Phenanthrene	ND	0.33	"	"	"	"	"	"	
Phenol	ND	0.33	"	"	"	"	"	"	
Pyrene	ND	0.33	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.33	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*78.4 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*81.6 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*91.3 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*96.4 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*66.6 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-d14		*98.5 %*	*18-137*		"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-4 (1201110-04) Soil Sampled: 01/09/12 11:00 Received: 01/10/12 11:30									
Acenaphthene	ND	0.33	mg/kg	1	B2A1914	01/11/12	01/17/12 19:38	EPA 8270C	
Acenaphthylene	ND	0.33	"	"	"	"	"	"	
Anthracene	ND	0.33	"	"	"	"	"	"	
Benzidine	ND	0.33	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.33	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.33	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	0.33	"	"	"	"	"	"	
Benzyl alcohol	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	0.33	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	0.33	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	0.33	"	"	"	"	"	"	
4-Chloroaniline	ND	0.33	"	"	"	"	"	"	
2-Chlorophenol	ND	0.33	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	0.33	"	"	"	"	"	"	
2-Chloronaphthalene	ND	0.33	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Chrysene	ND	0.33	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.33	"	"	"	"	"	"	
Dibenzofuran	ND	0.33	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
3,3´-Dichlorobenzidine	ND	0.33	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	0.33	"	"	"	"	"	"	
Diethyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	0.33	"	"	"	"	"	"	
Dimethyl phthalate	ND	0.33	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	0.33	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	0.33	"	"	"	"	"	"	
1,2-Diphenylhydrazine	ND	0.33	"	"	"	"	"	"	
Fluoranthene	ND	0.33	"	"	"	"	"	"	
Fluorene	ND	0.33	"	"	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-4 (1201110-04) Soil Sampled: 01/09/12 11:00 Received: 01/10/12 11:30									
Hexachlorobenzene	ND	0.33	mg/kg	1	B2A1914	01/11/12	01/17/12 19:38	EPA 8270C	
Hexachlorobutadiene	ND	0.33	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	0.33	"	"	"	"	"	"	
Hexachloroethane	ND	0.33	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.33	"	"	"	"	"	"	
Isophorone	ND	0.33	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.33	"	"	"	"	"	"	
2-Methylphenol	ND	0.33	"	"	"	"	"	"	
4-Methylphenol	ND	0.33	"	"	"	"	"	"	
Naphthalene	ND	0.33	"	"	"	"	"	"	
2-Nitroaniline	ND	0.33	"	"	"	"	"	"	
3-Nitroaniline	ND	0.33	"	"	"	"	"	"	
4-Nitroaniline	ND	0.33	"	"	"	"	"	"	
Nitrobenzene	ND	0.33	"	"	"	"	"	"	
2-Nitrophenol	ND	0.33	"	"	"	"	"	"	
4-Nitrophenol	ND	0.33	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	0.33	"	"	"	"	"	"	
Diphenylamine	ND	0.33	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	0.33	"	"	"	"	"	"	
Pentachlorophenol	ND	0.33	"	"	"	"	"	"	
Phenanthrene	ND	0.33	"	"	"	"	"	"	
Phenol	ND	0.33	"	"	"	"	"	"	
Pyrene	ND	0.33	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.33	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*79.8 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*81.8 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*97.0 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*96.7 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*74.0 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-d14		*91.0 %*	*18-137*		"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-5 (1201110-05) Soil Sampled: 01/09/12 11:20 Received: 01/10/12 11:30									
Acenaphthene	ND	0.33	mg/kg	1	B2A1914	01/11/12	01/17/12 20:18	EPA 8270C	
Acenaphthylene	ND	0.33	"	"	"	"	"	"	
Anthracene	ND	0.33	"	"	"	"	"	"	
Benzidine	ND	0.33	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.33	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.33	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	0.33	"	"	"	"	"	"	
Benzyl alcohol	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	0.33	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	0.33	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	0.33	"	"	"	"	"	"	
4-Chloroaniline	ND	0.33	"	"	"	"	"	"	
2-Chlorophenol	ND	0.33	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	0.33	"	"	"	"	"	"	
2-Chloronaphthalene	ND	0.33	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Chrysene	ND	0.33	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.33	"	"	"	"	"	"	
Dibenzofuran	ND	0.33	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
3,3´-Dichlorobenzidine	ND	0.33	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	0.33	"	"	"	"	"	"	
Diethyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	0.33	"	"	"	"	"	"	
Dimethyl phthalate	ND	0.33	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	0.33	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	0.33	"	"	"	"	"	"	
1,2-Diphenylhydrazine	ND	0.33	"	"	"	"	"	"	
Fluoranthene	ND	0.33	"	"	"	"	"	"	
Fluorene	ND	0.33	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-5 (1201110-05) Soil Sampled: 01/09/12 11:20 Received: 01/10/12 11:30									
Hexachlorobenzene	ND	0.33	mg/kg	1	B2A1914	01/11/12	01/17/12 20:18	EPA 8270C	
Hexachlorobutadiene	ND	0.33	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	0.33	"	"	"	"	"	"	
Hexachloroethane	ND	0.33	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.33	"	"	"	"	"	"	
Isophorone	ND	0.33	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.33	"	"	"	"	"	"	
2-Methylphenol	ND	0.33	"	"	"	"	"	"	
4-Methylphenol	ND	0.33	"	"	"	"	"	"	
Naphthalene	ND	0.33	"	"	"	"	"	"	
2-Nitroaniline	ND	0.33	"	"	"	"	"	"	
3-Nitroaniline	ND	0.33	"	"	"	"	"	"	
4-Nitroaniline	ND	0.33	"	"	"	"	"	"	
Nitrobenzene	ND	0.33	"	"	"	"	"	"	
2-Nitrophenol	ND	0.33	"	"	"	"	"	"	
4-Nitrophenol	ND	0.33	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	0.33	"	"	"	"	"	"	
Diphenylamine	ND	0.33	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	0.33	"	"	"	"	"	"	
Pentachlorophenol	ND	0.33	"	"	"	"	"	"	
Phenanthrene	ND	0.33	"	"	"	"	"	"	
Phenol	ND	0.33	"	"	"	"	"	"	
Pyrene	ND	0.33	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.33	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*74.6 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*79.4 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*84.7 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*89.8 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*66.8 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-d14		*97.3 %*	*18-137*		"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Polynuclear Aromatic Compounds by EPA Method 8310

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-1 (1201110-01) Soil Sampled: 01/09/12 09:30 Received: 01/10/12 11:30									
Naphthalene	ND	40.0	µg/kg	1	B2A1812	01/18/12	01/20/12 11:06	EPA 8310	
Acenaphthylene	ND	200	"	"	"	"	"	"	
Acenaphthene	ND	50.0	"	"	"	"	"	"	
Fluorene	ND	5.00	"	"	"	"	"	"	
Phenanthrene	ND	5.00	"	"	"	"	"	"	
Anthracene	ND	2.00	"	"	"	"	"	"	
Fluoranthene	ND	5.00	"	"	"	"	"	"	
Pyrene	ND	5.00	"	"	"	"	"	"	
Benzo (a) anthracene	ND	2.00	"	"	"	"	"	"	
Chrysene	ND	5.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	2.00	"	"	"	"	"	"	
Benzo (a) pyrene	ND	2.00	"	"	"	"	"	"	
Dibenzo(a,h)anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	5.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	5.00	"	"	"	"	"	"	
Surrogate: Decafluorobiphenyl		*91.6 %*	*30-140*		"	"	"	"	
B-2 (1201110-02) Soil Sampled: 01/09/12 09:50 Received: 01/10/12 11:30									
Naphthalene	ND	40.0	µg/kg	1	B2A1812	01/18/12	01/20/12 11:06	EPA 8310	
Acenaphthylene	ND	200	"	"	"	"	"	"	
Acenaphthene	ND	50.0	"	"	"	"	"	"	
Fluorene	ND	5.00	"	"	"	"	"	"	
Phenanthrene	ND	5.00	"	"	"	"	"	"	
Anthracene	ND	2.00	"	"	"	"	"	"	
Fluoranthene	ND	5.00	"	"	"	"	"	"	
Pyrene	ND	5.00	"	"	"	"	"	"	
Benzo (a) anthracene	ND	2.00	"	"	"	"	"	"	
Chrysene	ND	5.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	2.00	"	"	"	"	"	"	
Benzo (a) pyrene	ND	2.00	"	"	"	"	"	"	
Dibenzo(a,h)anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	5.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	5.00	"	"	"	"	"	"	
Surrogate: Decafluorobiphenyl		*43.0 %*	*30-140*		"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Polynuclear Aromatic Compounds by EPA Method 8310

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-3 (1201110-03) Soil Sampled: 01/09/12 10:40 Received: 01/10/12 11:30									
Naphthalene	ND	40.0	µg/kg	1	B2A1812	01/18/12	01/20/12 11:06	EPA 8310	
Acenaphthylene	ND	200	"	"	"	"	"	"	
Acenaphthene	ND	50.0	"	"	"	"	"	"	
Fluorene	ND	5.00	"	"	"	"	"	"	
Phenanthrene	ND	5.00	"	"	"	"	"	"	
Anthracene	ND	2.00	"	"	"	"	"	"	
Fluoranthene	ND	5.00	"	"	"	"	"	"	
Pyrene	ND	5.00	"	"	"	"	"	"	
Benzo (a) anthracene	ND	2.00	"	"	"	"	"	"	
Chrysene	ND	5.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	2.00	"	"	"	"	"	"	
Benzo (a) pyrene	ND	2.00	"	"	"	"	"	"	
Dibenzo(a,h)anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	5.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	5.00	"	"	"	"	"	"	
Surrogate: Decafluorobiphenyl		*53.2 %*		*30-140*	"	"	"	"	
B-4 (1201110-04) Soil Sampled: 01/09/12 11:00 Received: 01/10/12 11:30									
Naphthalene	ND	40.0	µg/kg	1	B2A1812	01/18/12	01/20/12 11:06	EPA 8310	
Acenaphthylene	ND	200	"	"	"	"	"	"	
Acenaphthene	ND	50.0	"	"	"	"	"	"	
Fluorene	ND	5.00	"	"	"	"	"	"	
Phenanthrene	ND	5.00	"	"	"	"	"	"	
Anthracene	ND	2.00	"	"	"	"	"	"	
Fluoranthene	ND	5.00	"	"	"	"	"	"	
Pyrene	ND	5.00	"	"	"	"	"	"	
Benzo (a) anthracene	ND	2.00	"	"	"	"	"	"	
Chrysene	ND	5.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	2.00	"	"	"	"	"	"	
Benzo (a) pyrene	ND	2.00	"	"	"	"	"	"	
Dibenzo(a,h)anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	5.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	5.00	"	"	"	"	"	"	
Surrogate: Decafluorobiphenyl		*71.4 %*		*30-140*	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Polynuclear Aromatic Compounds by EPA Method 8310

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-5 (1201110-05) Soil Sampled: 01/09/12 11:20 Received: 01/10/12 11:30									
Naphthalene	ND	40.0	µg/kg	1	B2A1812	01/18/12	01/20/12 11:06	EPA 8310	
Acenaphthylene	ND	200	"	"	"	"	"	"	
Acenaphthene	ND	50.0	"	"	"	"	"	"	
Fluorene	ND	5.00	"	"	"	"	"	"	
Phenanthrene	ND	5.00	"	"	"	"	"	"	
Anthracene	ND	2.00	"	"	"	"	"	"	
Fluoranthene	ND	5.00	"	"	"	"	"	"	
Pyrene	ND	5.00	"	"	"	"	"	"	
Benzo (a) anthracene	ND	2.00	"	"	"	"	"	"	
Chrysene	ND	5.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	2.00	"	"	"	"	"	"	
Benzo (a) pyrene	ND	2.00	"	"	"	"	"	"	
Dibenzo(a,h)anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	5.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	5.00	"	"	"	"	"	"	
Surrogate: Decafluorobiphenyl		*84.2 %*	*30-140*		*"*	*"*	*"*	*"*	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Metals by EPA 6000/7000 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1101 - EPA 7471A										
Blank (B2A1101-BLK1)				Prepared & Analyzed: 01/11/12						
Mercury	ND	0.15	mg/kg							
LCS (B2A1101-BS1)				Prepared & Analyzed: 01/11/12						
Mercury	0.14	0.15	mg/kg	0.167		83.8	70-130			
Matrix Spike (B2A1101-MS1)		**Source: 1201110-01**		Prepared & Analyzed: 01/11/12						
Mercury	0.15	0.15	mg/kg	0.161	0.02	80.7	70-130			
Matrix Spike Dup (B2A1101-MSD1)		**Source: 1201110-01**		Prepared & Analyzed: 01/11/12						
Mercury	0.15	0.15	mg/kg	0.162	0.02	80.2	70-130	0.00	30	
Batch B2A1102 - EPA 3050B										
Blank (B2A1102-BLK1)				Prepared & Analyzed: 01/11/12						
Antimony	ND	2.5	mg/kg							
Arsenic	ND	3.5	"							
Barium	ND	6.5	"							
Beryllium	ND	0.50	"							
Cadmium	ND	0.50	"							
Chromium	ND	3.0	"							
Cobalt	ND	2.5	"							
Copper	ND	2.0	"							
Lead	ND	3.0	"							
Molybdenum	ND	1.0	"							
Nickel	ND	4.0	"							
Selenium	ND	6.0	"							
Silver	ND	1.0	"							
Thallium	ND	2.5	"							
Vanadium	ND	6.0	"							
Zinc	ND	10	"							

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Metals by EPA 6000/7000 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1102 - EPA 3050B										
LCS (B2A1102-BS1)				Prepared & Analyzed: 01/11/12						
Antimony	105	2.5	mg/kg	100		105	75-125			
Arsenic	104	3.5	"	100		104	78-122			
Barium	107	6.5	"	100		107	80-120			
Beryllium	104	0.50	"	100		104	80-120			
Cadmium	101	0.50	"	100		101	80-120			
Chromium	106	3.0	"	100		106	80-120			
Cobalt	113	2.5	"	100		113	80-120			
Copper	108	2.0	"	100		108	78-122			
Lead	109	3.0	"	100		109	80-120			
Molybdenum	103	1.0	"	100		103	80-120			
Nickel	112	4.0	"	100		112	80-120			
Selenium	96.6	6.0	"	100		96.6	76-124			
Silver	102	1.0	"	100		102	60-140			
Thallium	106	2.5	"	100		106	80-120			
Vanadium	102	6.0	"	100		102	80-120			
Zinc	98.9	10	"	100		98.9	78-122			
LCS Dup (B2A1102-BSD1)				Prepared & Analyzed: 01/11/12						
Antimony	104	2.5	mg/kg	100		104	75-125	0.957	20	
Arsenic	103	3.5	"	100		103	78-122	0.966	20	
Barium	108	6.5	"	100		108	80-120	0.930	20	
Beryllium	103	0.50	"	100		103	80-120	0.966	20	
Cadmium	102	0.50	"	100		102	80-120	0.985	20	
Chromium	106	3.0	"	100		106	80-120	0.00	20	
Cobalt	114	2.5	"	100		114	80-120	0.881	20	
Copper	108	2.0	"	100		108	78-122	0.00	20	
Lead	109	3.0	"	100		109	80-120	0.00	20	
Molybdenum	102	1.0	"	100		102	80-120	0.976	20	
Nickel	112	4.0	"	100		112	80-120	0.00	20	
Selenium	96.4	6.0	"	100		96.4	76-124	0.207	20	
Silver	102	1.0	"	100		102	60-140	0.00	40	
Thallium	107	2.5	"	100		107	80-120	0.939	20	
Vanadium	103	6.0	"	100		103	80-120	0.976	20	
Zinc	97.9	10	"	100		97.9	78-122	1.02	20	

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Metals by EPA 6000/7000 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1102 - EPA 3050B										
Matrix Spike (B2A1102-MS1)	**Source: 1201110-01**			Prepared & Analyzed: 01/11/12						
Antimony	77.1	2.5	mg/kg	96.2	0.75	79.4	47.8-140			
Arsenic	90.3	3.5	"	96.2	ND	93.9	70-130			
Barium	177	6.5	"	96.2	62	120	70-130			
Beryllium	96.1	0.50	"	96.2	ND	99.9	70-130			
Cadmium	93.3	0.50	"	96.2	0.071	96.9	70-130			
Chromium	99.2	3.0	"	96.2	5.5	97.4	70-130			
Cobalt	103	2.5	"	96.2	5.4	101	70-130			
Copper	107	2.0	"	96.2	7.3	104	70-130			
Lead	96.1	3.0	"	96.2	1.5	98.3	70-130			
Molybdenum	92.0	1.0	"	96.2	0.32	95.3	70-130			
Nickel	102	4.0	"	96.2	5.5	100	70-130			
Selenium	87.7	6.0	"	96.2	ND	91.2	62.6-130			
Silver	93.3	1.0	"	96.2	ND	97.0	60-140			
Thallium	92.3	2.5	"	96.2	ND	95.9	56.9-130			
Vanadium	111	6.0	"	96.2	15	99.8	70-130			
Zinc	108	10	"	96.2	19	92.5	70-130			
Matrix Spike Dup (B2A1102-MSD1)	**Source: 1201110-01**			Prepared & Analyzed: 01/11/12						
Antimony	75.6	2.5	mg/kg	92.1	0.75	81.3	47.8-140	1.96	20	
Arsenic	89.5	3.5	"	92.1	ND	97.2	70-130	0.890	20	
Barium	160	6.5	"	92.1	62	106	70-130	10.1	20	
Beryllium	95.9	0.50	"	92.1	ND	104	70-130	0.208	20	
Cadmium	91.0	0.50	"	92.1	0.071	98.7	70-130	2.50	20	
Chromium	98.8	3.0	"	92.1	5.5	101	70-130	0.404	20	
Cobalt	102	2.5	"	92.1	5.4	105	70-130	0.976	20	
Copper	105	2.0	"	92.1	7.3	106	70-130	1.89	30	
Lead	94.9	3.0	"	92.1	1.5	101	70-130	1.26	30	
Molybdenum	91.1	1.0	"	92.1	0.32	98.6	70-130	0.983	20	
Nickel	101	4.0	"	92.1	5.5	104	70-130	0.985	20	
Selenium	87.2	6.0	"	92.1	ND	94.7	62.6-130	0.572	20	
Silver	91.6	1.0	"	92.1	ND	99.5	60-140	1.84	40	
Thallium	91.6	2.5	"	92.1	ND	99.5	56.9-130	0.761	20	
Vanadium	109	6.0	"	92.1	15	102	70-130	1.82	20	
Zinc	108	10	"	92.1	19	96.6	70-130	0.00	20	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Organochlorine Pesticides by EPA Method 8081A - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1602 - EPA 3550B Solid Ext										
Blank (B2A1602-BLK1)				Prepared & Analyzed: 01/16/12						
Aldrin	ND	0.0020	mg/kg							
HCH-alpha	ND	0.0020	"							
HCH-beta	ND	0.0040	"							
HCH-delta	ND	0.0020	"							
HCH-gamma (Lindane)	ND	0.0020	"							
Chlordane	ND	0.0040	"							
4,4´-DDD	ND	0.0030	"							
4,4´-DDE	ND	0.0020	"							
4,4´-DDT	ND	0.0030	"							
Dieldrin	ND	0.0020	"							
Endosulfan I	ND	0.0020	"							
Endosulfan II	ND	0.0040	"							
Endosulfan sulfate	ND	0.0020	"							
Endrin	ND	0.0020	"							
Endrin aldehyde	ND	0.0020	"							
Endrin ketone	ND	0.0020	"							
Heptachlor	ND	0.0020	"							
Heptachlor epoxide	ND	0.0020	"							
Methoxychlor	ND	0.010	"							
Toxaphene	ND	0.040	"							
Mirex	ND	0.0040	"							
Kepone	ND	0.0040	"							
Surrogate: Decachlorobiphenyl	*0.00535*		*"*	*0.00833*		*64.2*	*42-147*			
Surrogate: Tetrachloro-meta-xylene	*0.00792*		*"*	*0.00833*		*95.1*	*42-147*			
LCS (B2A1602-BS1)				Prepared & Analyzed: 01/16/12						
Aldrin	0.00282	0.0020	mg/kg	0.00267		106	80-120			
HCH-gamma (Lindane)	0.00245	0.0020	"	0.00267		91.8	80-120			
4,4´-DDT	0.00610	0.0030	"	0.00667		91.5	80-120			
Dieldrin	0.00772	0.0020	"	0.00667		116	80-120			
Heptachlor	0.00249	0.0020	"	0.00267		93.3	80-120			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Organochlorine Pesticides by EPA Method 8081A - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1602 - EPA 3550B Solid Ext										
Matrix Spike (B2A1602-MS1)		**Source: 1201110-01**		Prepared & Analyzed: 01/16/12						
Aldrin	0.00295	0.0020	mg/kg	0.00267	ND	110	50-150			
HCH-gamma (Lindane)	0.00234	0.0020	"	0.00267	ND	87.6	50-150			
4,4´-DDT	0.00640	0.0030	"	0.00667	ND	96.0	50-150			
Dieldrin	0.00540	0.0020	"	0.00667	ND	81.0	50-150			
Heptachlor	0.00235	0.0020	"	0.00267	ND	88.0	50-150			
Matrix Spike Dup (B2A1602-MSD1)		**Source: 1201110-01**		Prepared & Analyzed: 01/16/12						
Aldrin	0.00237	0.0020	mg/kg	0.00267	ND	88.8	50-150	21.8	30	
HCH-gamma (Lindane)	0.00258	0.0020	"	0.00267	ND	96.6	50-150	9.76	30	
4,4´-DDT	0.00630	0.0030	"	0.00667	ND	94.5	50-150	1.57	30	
Dieldrin	0.00570	0.0020	"	0.00667	ND	85.5	50-150	5.41	30	
Heptachlor	0.00253	0.0020	"	0.00267	ND	94.8	50-150	7.38	30	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1602 - EPA 3550B Solid Ext										
Blank (B2A1602-BLK1)				Prepared & Analyzed: 01/16/12						
PCB-1016	ND	0.020	mg/kg							
PCB-1221	ND	0.020	"							
PCB-1232	ND	0.020	"							
PCB-1242	ND	0.020	"							
PCB-1248	ND	0.020	"							
PCB-1254	ND	0.020	"							
PCB-1260	ND	0.020	"							
Surrogate: Decachlorobiphenyl	*0.00535*		*"*	*0.00833*		*64.2*	*42-147*			
Surrogate: Tetrachloro-meta-xylene	*0.00643*		*"*	*0.00833*		*77.2*	*42-147*			
LCS (B2A1602-BS1)				Prepared & Analyzed: 01/16/12						
PCB-1260	0.0595	0.020	mg/kg	0.0667		89.2	80-120			
Matrix Spike (B2A1602-MS1)		**Source: 1201110-01**		Prepared & Analyzed: 01/16/12						
PCB-1260	0.0565	0.020	mg/kg	0.0667	ND	84.7	50-150			
Matrix Spike Dup (B2A1602-MSD1)		**Source: 1201110-01**		Prepared & Analyzed: 01/16/12						
PCB-1260	0.0588	0.020	mg/kg	0.0667	ND	88.2	50-150	3.99	30	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Chlorinated Herbicides by EPA Method 8151A - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1603 - EPA 8151A Herbicides										
Blank (B2A1603-BLK1)				Prepared: 01/16/12 Analyzed: 01/18/12						
2,4,5-T	ND	1.6	µg/kg							
2,4,5-TP (Silvex)	ND	1.6	"							
2,4-D	ND	1.6	"							
2,4-DB	ND	4.0	"							
3,5-Dichlorobenzoic acid	ND	2.0	"							
4-Nitrophenol	ND	2.0	"							
Acifluorfen	ND	1.6	"							
Bentazon	ND	1.6	"							
Chloramben	ND	1.6	"							
Dalapon	ND	20	"							
DCPA diacid	ND	1.6	"							
Dicamba	ND	1.6	"							
Dichlorprop	ND	1.6	"							
Dinoseb	ND	1.6	"							
Pentachlorophenol	ND	1.6	"							
Picloram	ND	1.6	"							
Surrogate: 2,4-Dichlorophenylacetic Acid	*62.5*		*"*	*100*		*62.5*	*35-150*			
LCS (B2A1603-BS1)				Prepared: 01/16/12 Analyzed: 01/18/12						
2,4,5-T	10.4	1.6	µg/kg	10.0		104	20-150			
2,4,5-TP (Silvex)	7.65	1.6	"	10.0		76.5	20-150			
Dichlorprop	5.75	1.6	"	10.0		57.5	20-150			
Dinoseb	8.48	1.6	"	10.0		84.8	20-150			
Matrix Spike (B2A1603-MS1)	**Source: 1201143-03**			Prepared: 01/16/12 Analyzed: 01/18/12						
2,4,5-T	11.3	1.6	µg/kg	10.0	ND	113	20-150			
2,4,5-TP (Silvex)	5.83	1.6	"	10.0	ND	58.3	20-150			
Dichlorprop	11.6	1.6	"	10.0	ND	116	20-150			
Dinoseb	10.2	1.6	"	10.0	ND	102	20-150			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Chlorinated Herbicides by EPA Method 8151A - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1603 - EPA 8151A Herbicides										
Matrix Spike Dup (B2A1603-MSD1)	**Source: 1201143-03**			Prepared: 01/16/12	Analyzed: 01/18/12					
2,4,5-T	10.2	1.6	µg/kg	10.0	ND	102	20-150	10.2	30	
2,4,5-TP (Silvex)	7.42	1.6	"	10.0	ND	74.2	20-150	24.0	30	
Dichlorprop	10.1	1.6	"	10.0	ND	101	20-150	13.8	30	
Dinoseb	9.27	1.6	"	10.0	ND	92.7	20-150	9.55	30	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1601 - EPA 5035 P & T										
Blank (B2A1601-BLK1)				Prepared: 01/16/12 Analyzed: 01/17/12						
Benzene	ND	5.0	µg/kg							
Bromobenzene	ND	5.0	"							
Bromochloromethane	ND	5.0	"							
Bromodichloromethane	ND	5.0	"							
Bromoform	ND	5.0	"							
Bromomethane	ND	5.0	"							
n-Butylbenzene	ND	5.0	"							
sec-Butylbenzene	ND	5.0	"							
tert-Butylbenzene	ND	5.0	"							
Carbon tetrachloride	ND	5.0	"							
Chlorobenzene	ND	5.0	"							
Chloroethane	ND	5.0	"							
Chloroform	ND	5.0	"							
Chloromethane	ND	5.0	"							
2-Chlorotoluene	ND	5.0	"							
4-Chlorotoluene	ND	5.0	"							
Dibromochloromethane	ND	5.0	"							
1,2-Dibromo-3-chloropropane	ND	5.0	"							
1,2-Dibromoethane (EDB)	ND	5.0	"							
Dibromomethane	ND	5.0	"							
1,2-Dichlorobenzene	ND	5.0	"							
1,3-Dichlorobenzene	ND	5.0	"							
1,4-Dichlorobenzene	ND	5.0	"							
Dichlorodifluoromethane	ND	5.0	"							
1,1-Dichloroethane	ND	5.0	"							
1,2-Dichloroethane	ND	5.0	"							
1,1-Dichloroethene	ND	5.0	"							
cis-1,2-Dichloroethene	ND	5.0	"							
trans-1,2-Dichloroethene	ND	5.0	"							
1,2-Dichloropropane	ND	5.0	"							
1,3-Dichloropropane	ND	5.0	"							
2,2-Dichloropropane	ND	5.0	"							
1,1-Dichloropropene	ND	5.0	"							
cis-1,3-Dichloropropene	ND	5.0	"							
trans-1,3-Dichloropropene	ND	5.0	"							
Di-isopropyl ether	ND	5.0	"							
Ethyl tert-butyl ether	ND	5.0	"							

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1601 - EPA 5035 P & T										
Blank (B2A1601-BLK1)				Prepared: 01/16/12 Analyzed: 01/17/12						
Ethylbenzene	ND	5.0	µg/kg							
Hexachlorobutadiene	ND	5.0	"							
Isopropylbenzene	ND	5.0	"							
p-Isopropyltoluene	ND	5.0	"							
Methylene chloride	ND	5.0	"							
Methyl tert-butyl ether	ND	5.0	"							
Naphthalene	ND	5.0	"							
n-Propylbenzene	ND	5.0	"							
Styrene	ND	5.0	"							
Tert-amyl methyl ether	ND	5.0	"							
Tert-butyl alcohol	ND	25	"							
1,1,1,2-Tetrachloroethane	ND	5.0	"							
1,1,2,2-Tetrachloroethane	ND	5.0	"							
Tetrachloroethene	ND	5.0	"							
Toluene	ND	5.0	"							
1,2,3-Trichlorobenzene	ND	5.0	"							
1,2,4-Trichlorobenzene	ND	5.0	"							
1,1,1-Trichloroethane	ND	5.0	"							
1,1,2-Trichloroethane	ND	5.0	"							
Trichloroethene	ND	5.0	"							
Trichlorofluoromethane	ND	5.0	"							
1,2,3-Trichloropropane	ND	5.0	"							
1,2,4-Trimethylbenzene	ND	5.0	"							
1,3,5-Trimethylbenzene	ND	5.0	"							
Vinyl chloride	ND	5.0	"							
m,p-Xylene	ND	5.0	"							
o-Xylene	ND	5.0	"							
Surrogate: Dibromofluoromethane	*52.5*		*"*	*50.0*		*105*	*80-120*			
Surrogate: Toluene-d8	*56.5*		*"*	*50.0*		*113*	*81-117*			
Surrogate: 4-Bromofluorobenzene	*50.1*		*"*	*50.0*		*100*	*74-121*			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1601 - EPA 5035 P & T										
LCS (B2A1601-BS1)				Prepared: 01/16/12 Analyzed: 01/17/12						
Benzene	54.0	5.0	µg/kg	50.0		108	80-120			
Chlorobenzene	47.1	5.0	"	50.0		94.2	80-120			
1,1-Dichloroethene	53.0	5.0	"	50.0		106	80-120			
Toluene	55.9	5.0	"	50.0		112	80-120			
Trichloroethene	55.1	5.0	"	50.0		110	80-120			
Matrix Spike (B2A1601-MS1)		**Source: 1201148-05**		Prepared: 01/16/12 Analyzed: 01/17/12						
Benzene	48.3	5.0	µg/kg	50.0	ND	96.6	37-151			
Chlorobenzene	49.3	5.0	"	50.0	ND	98.6	37-160			
1,1-Dichloroethene	54.6	5.0	"	50.0	ND	109	50-150			
Toluene	49.9	5.0	"	50.0	ND	99.8	47-150			
Trichloroethene	52.7	5.0	"	50.0	ND	105	71-157			
Matrix Spike Dup (B2A1601-MSD1)		**Source: 1201148-05**		Prepared: 01/16/12 Analyzed: 01/17/12						
Benzene	54.8	5.0	µg/kg	50.0	ND	110	37-151	12.6	30	
Chlorobenzene	50.0	5.0	"	50.0	ND	100	37-160	1.41	30	
1,1-Dichloroethene	49.0	5.0	"	50.0	ND	98.0	50-150	10.8	30	
Toluene	52.6	5.0	"	50.0	ND	105	47-150	5.27	30	
Trichloroethene	53.7	5.0	"	50.0	ND	107	71-157	1.88	30	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1914 - EPA 3550B Solid Ext										
Blank (B2A1914-BLK1)				Prepared: 01/11/12 Analyzed: 01/17/12						
Acenaphthene	ND	0.33	mg/kg							
Acenaphthylene	ND	0.33	"							
Anthracene	ND	0.33	"							
Benzidine	ND	0.33	"							
Benzo (a) anthracene	ND	0.33	"							
Benzo (b) fluoranthene	ND	0.33	"							
Benzo (k) fluoranthene	ND	0.33	"							
Benzo (a) pyrene	ND	0.33	"							
Benzo (g,h,i) perylene	ND	0.33	"							
Benzyl alcohol	ND	0.33	"							
Bis(2-chloroethyl)ether	ND	0.33	"							
Bis(2-chloroethoxy)methane	ND	0.33	"							
Bis(2-ethylhexyl)phthalate	ND	0.33	"							
Bis(2-chloroisopropyl)ether	ND	0.33	"							
4-Bromophenyl phenyl ether	ND	0.33	"							
Butyl benzyl phthalate	ND	0.33	"							
4-Chloroaniline	ND	0.33	"							
2-Chlorophenol	ND	0.33	"							
4-Chloro-3-methylphenol	ND	0.33	"							
2-Chloronaphthalene	ND	0.33	"							
4-Chlorophenyl phenyl ether	ND	0.33	"							
Chrysene	ND	0.33	"							
Dibenz (a,h) anthracene	ND	0.33	"							
Dibenzofuran	ND	0.33	"							
1,3-Dichlorobenzene	ND	0.33	"							
1,2-Dichlorobenzene	ND	0.33	"							
1,4-Dichlorobenzene	ND	0.33	"							
3,3´-Dichlorobenzidine	ND	0.33	"							
2,4-Dichlorophenol	ND	0.33	"							
Diethyl phthalate	ND	0.33	"							
2,4-Dimethylphenol	ND	0.33	"							
Dimethyl phthalate	ND	0.33	"							
Di-n-butyl phthalate	ND	0.33	"							
2,4-Dinitrophenol	ND	0.33	"							
4,6-Dinitro-2-methylphenol	ND	0.33	"							
2,4-Dinitrotoluene	ND	0.33	"							
2,6-Dinitrotoluene	ND	0.33	"							

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1914 - EPA 3550B Solid Ext										
Blank (B2A1914-BLK1)				Prepared: 01/11/12 Analyzed: 01/17/12						
Di-n-octyl phthalate	ND	0.33	mg/kg							
1,2-Diphenylhydrazine	ND	0.33	"							
Fluoranthene	ND	0.33	"							
Fluorene	ND	0.33	"							
Hexachlorobenzene	ND	0.33	"							
Hexachlorobutadiene	ND	0.33	"							
Hexachlorocyclopentadiene	ND	0.33	"							
Hexachloroethane	ND	0.33	"							
Indeno (1,2,3-cd) pyrene	ND	0.33	"							
Isophorone	ND	0.33	"							
2-Methylnaphthalene	ND	0.33	"							
2-Methylphenol	ND	0.33	"							
4-Methylphenol	ND	0.33	"							
Naphthalene	ND	0.33	"							
2-Nitroaniline	ND	0.33	"							
3-Nitroaniline	ND	0.33	"							
4-Nitroaniline	ND	0.33	"							
Nitrobenzene	ND	0.33	"							
2-Nitrophenol	ND	0.33	"							
4-Nitrophenol	ND	0.33	"							
N-Nitrosodimethylamine	ND	0.33	"							
Diphenylamine	ND	0.33	"							
N-Nitrosodi-n-propylamine	ND	0.33	"							
Pentachlorophenol	ND	0.33	"							
Phenanthrene	ND	0.33	"							
Phenol	ND	0.33	"							
Pyrene	ND	0.33	"							
1,2,4-Trichlorobenzene	ND	0.33	"							
2,4,5-Trichlorophenol	ND	0.33	"							
2,4,6-Trichlorophenol	ND	0.33	"							
Surrogate: 2-Fluorophenol	*0.342*		*"*	*0.500*		*68.4*	*25-121*			
Surrogate: Phenol-d6	*0.378*		*"*	*0.500*		*75.6*	*24-113*			
Surrogate: Nitrobenzene-d5	*0.317*		*"*	*0.333*		*95.2*	*23-120*			
Surrogate: 2-Fluorobiphenyl	*0.260*		*"*	*0.333*		*78.1*	*30-115*			
Surrogate: 2,4,6-Tribromophenol	*0.333*		*"*	*0.500*		*66.6*	*19-122*			
Surrogate: Terphenyl-d14	*0.287*		*"*	*0.333*		*86.2*	*18-137*			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1914 - EPA 3550B Solid Ext										
LCS (B2A1914-BS1)				Prepared: 01/11/12 Analyzed: 01/17/12						
Acenaphthene	0.319	0.33	mg/kg	0.333		95.8	47-145			
2-Chlorophenol	0.377	0.33	"	0.667		56.5	23-134			
4-Chloro-3-methylphenol	0.396	0.33	"	0.667		59.4	22-147			
1,4-Dichlorobenzene	0.316	0.33	"	0.333		94.9	20-124			
2,4-Dinitrotoluene	0.351	0.33	"	0.333		105	39-139			
4-Nitrophenol	0.242	0.33	"	0.667		36.3	0-132			
N-Nitrosodi-n-propylamine	0.357	0.33	"	0.333		107	0-230			
Pentachlorophenol	0.250	0.33	"	0.667		37.5	14-176			
Phenol	0.393	0.33	"	0.667		58.9	5-112			
Pyrene	0.317	0.33	"	0.333		95.2	52-115			
1,2,4-Trichlorobenzene	0.327	0.33	"	0.333		98.2	44-142			
Matrix Spike (B2A1914-MS1)		**Source: 1201110-01**		Prepared: 01/11/12 Analyzed: 01/17/12						
Acenaphthene	0.293	0.33	mg/kg	0.333	ND	88.0	47-145			
2-Chlorophenol	0.381	0.33	"	0.667	ND	57.1	23-134			
4-Chloro-3-methylphenol	0.397	0.33	"	0.667	ND	59.5	22-147			
1,4-Dichlorobenzene	0.258	0.33	"	0.333	ND	77.5	20-124			
2,4-Dinitrotoluene	0.360	0.33	"	0.333	ND	108	39-139			
4-Nitrophenol	0.251	0.33	"	0.667	ND	37.6	0-132			
N-Nitrosodi-n-propylamine	0.305	0.33	"	0.333	ND	91.6	0-230			
Pentachlorophenol	0.254	0.33	"	0.667	ND	38.1	14-176			
Phenol	0.383	0.33	"	0.667	ND	57.4	5-112			
Pyrene	0.300	0.33	"	0.333	ND	90.1	52-115			
1,2,4-Trichlorobenzene	0.283	0.33	"	0.333	ND	85.0	44-142			
Matrix Spike Dup (B2A1914-MSD1)		**Source: 1201110-01**		Prepared: 01/11/12 Analyzed: 01/17/12						
Acenaphthene	0.289	0.33	mg/kg	0.333	ND	86.8	47-145	1.37	30	
2-Chlorophenol	0.389	0.33	"	0.667	ND	58.3	23-134	2.08	30	
4-Chloro-3-methylphenol	0.405	0.33	"	0.667	ND	60.7	22-147	2.00	30	
1,4-Dichlorobenzene	0.252	0.33	"	0.333	ND	75.7	20-124	2.35	30	
2,4-Dinitrotoluene	0.315	0.33	"	0.333	ND	94.6	39-139	13.3	30	
4-Nitrophenol	0.231	0.33	"	0.667	ND	34.6	0-132	8.30	30	
N-Nitrosodi-n-propylamine	0.327	0.33	"	0.333	ND	98.2	0-230	6.96	30	
Pentachlorophenol	0.226	0.33	"	0.667	ND	33.9	14-176	11.7	30	
Phenol	0.401	0.33	"	0.667	ND	60.1	5-112	4.59	30	
Pyrene	0.322	0.33	"	0.333	ND	96.7	52-115	7.07	30	
1,2,4-Trichlorobenzene	0.284	0.33	"	0.333	ND	85.3	44-142	0.353	30	

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Polynuclear Aromatic Compounds by EPA Method 8310 - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1812 - EPA 3550B Solid Ext										
Blank (B2A1812-BLK1)				Prepared: 01/18/12 Analyzed: 01/20/12						
Naphthalene	ND	40.0	µg/kg							
Acenaphthylene	ND	200	"							
Acenaphthene	ND	50.0	"							
Fluorene	ND	5.00	"							
Phenanthrene	ND	5.00	"							
Anthracene	ND	2.00	"							
Fluoranthene	ND	5.00	"							
Pyrene	ND	5.00	"							
Benzo (a) anthracene	ND	2.00	"							
Chrysene	ND	5.00	"							
Benzo (b) fluoranthene	ND	5.00	"							
Benzo (k) fluoranthene	ND	2.00	"							
Benzo (a) pyrene	ND	2.00	"							
Dibenzo(a,h)anthracene	ND	5.00	"							
Benzo (g,h,i) perylene	ND	5.00	"							
Indeno (1,2,3-cd) pyrene	ND	5.00	"							
Surrogate: Decafluorobiphenyl	*422*		*"*	*500*		*84.4*	*30-140*			
LCS (B2A1812-BS1)				Prepared: 01/18/12 Analyzed: 01/20/12						
Naphthalene	62.2	40.0	µg/kg	50.0		124	60-130			
Fluorene	52.4	5.00	"	50.0		105	60-130			
Pyrene	51.4	5.00	"	50.0		103	60-130			
Benzo (a) pyrene	48.6	2.00	"	50.0		97.2	60-130			
Indeno (1,2,3-cd) pyrene	52.1	5.00	"	50.0		104	60-130			
Surrogate: Decafluorobiphenyl	*346*		*"*	*500*		*69.2*	*30-140*			
Matrix Spike (B2A1812-MS1)	**Source: 1201143-03**			Prepared: 01/18/12 Analyzed: 01/20/12						
Naphthalene	51.4	40.0	µg/kg	50.0	ND	103	60-140			
Fluorene	54.8	5.00	"	50.0	ND	110	60-140			
Pyrene	53.3	5.00	"	50.0	ND	107	60-140			
Benzo (a) pyrene	48.2	2.00	"	50.0	ND	96.4	60-140			
Indeno (1,2,3-cd) pyrene	49.6	5.00	"	50.0	ND	99.2	60-140			
Surrogate: Decafluorobiphenyl	*412*		*"*	*500*		*82.4*	*30-140*			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:36

Polynuclear Aromatic Compounds by EPA Method 8310 - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1812 - EPA 3550B Solid Ext										
Matrix Spike Dup (B2A1812-MSD1)	**Source: 1201143-03**			Prepared: 01/18/12 Analyzed: 01/20/12						
Naphthalene	50.4	40.0	µg/kg	50.0	ND	101	60-140	1.96	20	
Fluorene	53.2	5.00	"	50.0	ND	106	60-140	2.96	20	
Pyrene	49.0	5.00	"	50.0	ND	98.0	60-140	8.41	20	
Benzo (a) pyrene	45.7	2.00	"	50.0	ND	91.4	60-140	5.32	20	
Indeno (1,2,3-cd) pyrene	46.3	5.00	"	50.0	ND	92.6	60-140	6.88	20	
Surrogate: Decafluorobiphenyl	*214*		*"*	*500*		*42.8*	*30-140*			

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Los Angeles County Dept. of Public Works	Project:	Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number:	HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager:	Geir Mathisen	01/23/12 09:36

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CHAIN OF CUSTODY RECORD

SIERRA ANALYTICAL
TEL: 949•348•9389
FAX: 949•348•9115
26052 Merit Circle• Suite 105•Laguna Hills, CA•92653

Date: 1/9/12 Page 1 of 1

Lab Project No.: 1201110

Client: County of Los Angeles Dep. Pub. Wks.
Client Address: 900 S Fremont Ave
Alhambra, CA 91803-1331

Client Tel. No.: 626 458 4923
Client Fax. No.: 626 458 4913
Client Proj. Mgr.: Geir Mathisen

Client Project ID: HF 00710003
ENC. # 12C00000299
Big T Res. Sed. Char. Program

Turn Around Time Requested: ☐ Immediate ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 4 Day ☐ 5 Day ☑ Normal ☐ Mobile

Analysis Requested

Geotracker EDD Info:

Client LOGCODE

Site Global ID

Client Sample ID.	Sierra No.	Date	Time	Matrix	Preservative	Container Type	No. of Containers	6010B/7470 Title 22 Metals + Mercury	8310 / PAHs	8260B / VOCs + OXYs EDB + DBCP	8270C/8321 SVOCs + Carbofurans	8081A Pesticides	8082 / PCBs	8270C 1,4 Dioxane	8280A / Dioxin	8151 / Herbicides	Kepone/Mirex 8270C or 8081			Field Point Names/ Comments
B-1	01	1/9/12	9:30	SOIL	ICE	1JAR/3VOAS	4	X	X	X	X	X	X	X	X	X	X			
B-2	02	↓	9:50	↓	↓	↓	↓	X	X	X	X	X	X	X	X	X	X			
B-3	03	↓	10:40	↓	↓	↓	↓	X	X	X	X	X	X	X	X	X	X			
B-4	04	↓	11:00	↓	↓	↓	↓	X	X	X	X	X	X	X	X	X	X			
B-5	05	↓	11:20	↓	↓	↓	↓	X	X	X	X	X	X	X	X	X	X			

1 Sampler Signature: [signature]		Shipped Via:	
Printed Name: GEIR MATHISEN		(Carrier/Waybill No.)	
2 Relinquished By: GEIR MATHISEN	Date: 1/10/12	Received By: [signature]	Date: 1/10/12
Company: LACDPW	Time: 11:30	Company: Sierra	Time: 11:30
3 Relinquished By:	Date	Received By:	Date:
Company:	Time:	Company:	Time:
4 Relinquished By:	Date	Received By:	Date:
Company:	Time:	Company:	Time:

20 Total Number of Containers Submitted to Laboratory

The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analysis specified above under SIERRA's Terms and Conditions, unless otherwise agreed upon in writing between SIERRA and CLIENT.
* - Samples determined to be hazardous by SIERRA will be returned to CLIENT.

20 Total Number of Containers Received by Laboratory

Sample Disposal:
☐ Return to Client
☑ Lab Disposal*
☐ Archive _____ mos.
☐ Other _____

Special Instructions: *See your bid proposal dated Dec. 5, 2011 including Table 1A and 1B for minimum required analytes to be tested. (attached).

FOR LABORATORY USE ONLY - Sample Receipt Conditions:

☒ Intact ☒ Chilled - Temp. (°C) 6.0
☐ Sample Seals ☐ Preservatives - Verified By
☒ Properly Labelled ☐ Other
☒ Appropriate Sample Container ☒ Storage Location (DELA - A-B Soil)

Rev: 102005

DISTRIBUTION: White - To Accompany Samples, Yellow - Laboratory Copy, Pink - Field Personnel Copy

SIERRA ANALYTICAL

23 January 2012

Geir Mathisen
Los Angeles County Dept. of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803

RE:Big T Res. Sed. Char. Program

Work Order No.: 1201143

Attached are the results of the analyses for samples received by the laboratory on 01/11/12 13:40.

The samples were received by Sierra Analytical Labs, Inc. with a chain of custody record attached or completed at the submittal of the samples.

The analyses were performed according to the prescribed method as outlined by EPA, Standard Methods, and A.S.T.M.

The remaining portions of the samples will be disposed of within 30 days from the date of this report.
If you require any additional retaining time, please advise us.

Sincerely,

Richard K. Forsyth

Richard K. Forsyth

Laboratory Director

Sierra Analytical Labs, Inc. is certified by the California Department of Health Services (DOHS), Environmental Laboratory Accredidation Program (ELAP) No. 2320.

Los Angeles County Dept. of Public Works	Project:	Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number:	HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager:	Geir Mathisen	01/23/12 09:46

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B-6	1201143-01	Soil	01/10/12 09:45	01/11/12 13:40
B-7	1201143-02	Soil	01/10/12 10:10	01/11/12 13:40
B-8	1201143-03	Soil	01/10/12 10:35	01/11/12 13:40

CASE NARRATIVE

SAMPLE RECEIPT: Samples were received intact, at 4°C, and accompanied by chain of custody documentation.
PRESERVATION: Samples requiring preservation were verified prior to sample preparation and analysis.
HOLDING TIMES: All holding times were met, unless otherwises noted in the report with data qualifiers.
QA/QC CRITERIA: All quality objective criteria were met, except as noted in the report with data qualifiers.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

26052 MERIT CIRCLE SUITE 105, LAGUNA HILLS, CALIFORNIA 92653
TELEPHONE: (949) 348-9389 FAX: (949) 348-9115
E-MAIL: SIERRALABS @ SIERRALABS.NET

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Metals by EPA 6000/7000 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-6 (1201143-01) Soil Sampled: 01/10/12 09:45 Received: 01/11/12 13:40									
Silver	ND	1.0	mg/kg	1	B2A1801	01/18/12	01/18/12 17:22	EPA 6010B	
Arsenic	ND	3.0	"	"	"	"	01/18/12 17:23	"	
Barium	**120**	6.5	"	"	"	"	01/18/12 17:22	"	
Beryllium	ND	0.50	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	01/18/12 17:23	"	
Cobalt	**12**	2.5	"	"	"	"	"	"	
Chromium	**22**	3.0	"	"	"	"	"	"	
Copper	**25**	2.0	"	"	"	"	01/18/12 17:22	"	
Mercury	ND	0.15	"	"	B2A1802	01/18/12	01/20/12 11:55	EPA 7471A	
Molybdenum	ND	1.0	"	"	B2A1801	01/18/12	01/18/12 17:23	EPA 6010B	
Nickel	**17**	4.0	"	"	"	"	"	"	
Lead	**8.6**	3.0	"	"	"	"	"	"	
Antimony	ND	2.5	"	"	"	"	"	"	
Selenium	ND	6.0	"	"	"	"	"	"	
Thallium	ND	2.5	"	"	"	"	"	"	
Vanadium	**35**	6.0	"	"	"	"	01/18/12 17:22	"	
Zinc	**42**	10	"	"	"	"	"	"	
B-7 (1201143-02) Soil Sampled: 01/10/12 10:10 Received: 01/11/12 13:40									
Silver	ND	0.90	mg/kg	1	B2A1801	01/18/12	01/18/12 17:38	EPA 6010B	
Arsenic	ND	2.7	"	"	"	"	"	"	
Barium	**130**	5.8	"	"	"	"	01/18/12 17:37	"	
Beryllium	ND	0.45	"	"	"	"	"	"	
Cadmium	ND	0.45	"	"	"	"	01/18/12 17:38	"	
Cobalt	**12**	2.2	"	"	"	"	"	"	
Chromium	**22**	2.7	"	"	"	"	"	"	
Copper	**27**	1.8	"	"	"	"	01/18/12 17:37	"	
Mercury	ND	0.15	"	"	B2A1802	01/18/12	01/20/12 12:01	EPA 7471A	
Molybdenum	ND	0.90	"	"	B2A1801	01/18/12	01/18/12 17:38	EPA 6010B	
Nickel	**18**	3.6	"	"	"	"	"	"	
Lead	**10**	2.7	"	"	"	"	"	"	
Antimony	ND	2.2	"	"	"	"	"	"	
Selenium	ND	5.4	"	"	"	"	"	"	
Thallium	ND	2.2	"	"	"	"	"	"	
Vanadium	**36**	5.4	"	"	"	"	01/18/12 17:37	"	
Zinc	**43**	9.0	"	"	"	"	01/18/12 17:38	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Metals by EPA 6000/7000 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-8 (1201143-03) Soil Sampled: 01/10/12 10:35 Received: 01/11/12 13:40									
Silver	ND	1.0	mg/kg	1	B2A1801	01/18/12	01/18/12 17:42	EPA 6010B	
Arsenic	ND	3.0	"	"	"	"	01/18/12 17:43	"	
Barium	**130**	6.5	"	"	"	"	01/18/12 17:42	"	
Beryllium	ND	0.50	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	01/18/12 17:43	"	
Cobalt	**11**	2.5	"	"	"	"	"	"	
Chromium	**20**	3.0	"	"	"	"	"	"	
Copper	**27**	2.0	"	"	"	"	01/18/12 17:42	"	
Mercury	ND	0.15	"	"	B2A1802	01/18/12	01/20/12 12:03	EPA 7471A	
Molybdenum	ND	1.0	"	"	B2A1801	01/18/12	01/18/12 17:43	EPA 6010B	
Nickel	**17**	4.0	"	"	"	"	"	"	
Lead	**11**	3.0	"	"	"	"	"	"	
Antimony	ND	2.5	"	"	"	"	"	"	
Selenium	ND	6.0	"	"	"	"	"	"	
Thallium	ND	2.5	"	"	"	"	"	"	
Vanadium	**35**	6.0	"	"	"	"	01/18/12 17:42	"	
Zinc	**42**	10	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Organochlorine Pesticides by EPA Method 8081A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-6 (1201143-01) Soil Sampled: 01/10/12 09:45 Received: 01/11/12 13:40									
Aldrin	ND	0.0020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8081A	
HCH-alpha	ND	0.0020	"	"	"	"	"	"	
HCH-beta	ND	0.0040	"	"	"	"	"	"	
HCH-delta	ND	0.0020	"	"	"	"	"	"	
HCH-gamma (Lindane)	ND	0.0020	"	"	"	"	"	"	
Chlordane	ND	0.0040	"	"	"	"	"	"	
4,4´-DDD	ND	0.0030	"	"	"	"	"	"	
4,4´-DDE	ND	0.0020	"	"	"	"	"	"	
4,4´-DDT	ND	0.0030	"	"	"	"	"	"	
Dieldrin	ND	0.0020	"	"	"	"	"	"	
Endosulfan I	ND	0.0020	"	"	"	"	"	"	
Endosulfan II	ND	0.0040	"	"	"	"	"	"	
Endosulfan sulfate	ND	0.0020	"	"	"	"	"	"	
Endrin	ND	0.0020	"	"	"	"	"	"	
Endrin aldehyde	ND	0.0020	"	"	"	"	"	"	
Endrin ketone	ND	0.0020	"	"	"	"	"	"	
Heptachlor	ND	0.0020	"	"	"	"	"	"	
Heptachlor epoxide	ND	0.0020	"	"	"	"	"	"	
Methoxychlor	ND	0.010	"	"	"	"	"	"	
Toxaphene	ND	0.040	"	"	"	"	"	"	
Mirex	ND	0.0040	"	"	"	"	"	"	
Kepone	ND	0.0040	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*98.6 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*61.3 %*		*42-147*	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Organochlorine Pesticides by EPA Method 8081A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-7 (1201143-02) Soil Sampled: 01/10/12 10:10 Received: 01/11/12 13:40									
Aldrin	ND	0.0020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8081A	
HCH-alpha	ND	0.0020	"	"	"	"	"	"	
HCH-beta	ND	0.0040	"	"	"	"	"	"	
HCH-delta	ND	0.0020	"	"	"	"	"	"	
HCH-gamma (Lindane)	ND	0.0020	"	"	"	"	"	"	
Chlordane	ND	0.0040	"	"	"	"	"	"	
4,4´-DDD	ND	0.0030	"	"	"	"	"	"	
4,4´-DDE	ND	0.0020	"	"	"	"	"	"	
4,4´-DDT	ND	0.0030	"	"	"	"	"	"	
Dieldrin	ND	0.0020	"	"	"	"	"	"	
Endosulfan I	ND	0.0020	"	"	"	"	"	"	
Endosulfan II	ND	0.0040	"	"	"	"	"	"	
Endosulfan sulfate	ND	0.0020	"	"	"	"	"	"	
Endrin	ND	0.0020	"	"	"	"	"	"	
Endrin aldehyde	ND	0.0020	"	"	"	"	"	"	
Endrin ketone	ND	0.0020	"	"	"	"	"	"	
Heptachlor	ND	0.0020	"	"	"	"	"	"	
Heptachlor epoxide	ND	0.0020	"	"	"	"	"	"	
Methoxychlor	ND	0.010	"	"	"	"	"	"	
Toxaphene	ND	0.040	"	"	"	"	"	"	
Mirex	ND	0.0040	"	"	"	"	"	"	
Kepone	ND	0.0040	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*77.0 %*	*42-147*		*"*	*"*	*"*	*"*	
Surrogate: Tetrachloro-meta-xylene		*47.1 %*	*42-147*		*"*	*"*	*"*	*"*	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Organochlorine Pesticides by EPA Method 8081A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-8 (1201143-03) Soil Sampled: 01/10/12 10:35 Received: 01/11/12 13:40									
Aldrin	ND	0.0020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8081A	
HCH-alpha	ND	0.0020	"	"	"	"	"	"	
HCH-beta	ND	0.0040	"	"	"	"	"	"	
HCH-delta	ND	0.0020	"	"	"	"	"	"	
HCH-gamma (Lindane)	ND	0.0020	"	"	"	"	"	"	
Chlordane	ND	0.0040	"	"	"	"	"	"	
4,4´-DDD	ND	0.0030	"	"	"	"	"	"	
4,4´-DDE	ND	0.0020	"	"	"	"	"	"	
4,4´-DDT	ND	0.0030	"	"	"	"	"	"	
Dieldrin	ND	0.0020	"	"	"	"	"	"	
Endosulfan I	ND	0.0020	"	"	"	"	"	"	
Endosulfan II	ND	0.0040	"	"	"	"	"	"	
Endosulfan sulfate	ND	0.0020	"	"	"	"	"	"	
Endrin	ND	0.0020	"	"	"	"	"	"	
Endrin aldehyde	ND	0.0020	"	"	"	"	"	"	
Endrin ketone	ND	0.0020	"	"	"	"	"	"	
Heptachlor	ND	0.0020	"	"	"	"	"	"	
Heptachlor epoxide	ND	0.0020	"	"	"	"	"	"	
Methoxychlor	ND	0.010	"	"	"	"	"	"	
Toxaphene	ND	0.040	"	"	"	"	"	"	
Mirex	ND	0.0040	"	"	"	"	"	"	
Kepone	ND	0.0040	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*63.5 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*48.0 %*		*42-147*	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Polychlorinated Biphenyls by EPA Method 8082

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-6 (1201143-01) Soil Sampled: 01/10/12 09:45 Received: 01/11/12 13:40									
PCB-1016	ND	0.020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8082	
PCB-1221	ND	0.020	"	"	"	"	"	"	
PCB-1232	ND	0.020	"	"	"	"	"	"	
PCB-1242	ND	0.020	"	"	"	"	"	"	
PCB-1248	ND	0.020	"	"	"	"	"	"	
PCB-1254	ND	0.020	"	"	"	"	"	"	
PCB-1260	ND	0.020	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*98.6 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*61.3 %*		*42-147*	"	"	"	"	
B-7 (1201143-02) Soil Sampled: 01/10/12 10:10 Received: 01/11/12 13:40									
PCB-1016	ND	0.020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8082	
PCB-1221	ND	0.020	"	"	"	"	"	"	
PCB-1232	ND	0.020	"	"	"	"	"	"	
PCB-1242	ND	0.020	"	"	"	"	"	"	
PCB-1248	ND	0.020	"	"	"	"	"	"	
PCB-1254	ND	0.020	"	"	"	"	"	"	
PCB-1260	ND	0.020	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*77.0 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*47.1 %*		*42-147*	"	"	"	"	
B-8 (1201143-03) Soil Sampled: 01/10/12 10:35 Received: 01/11/12 13:40									
PCB-1016	ND	0.020	mg/kg	1	B2A1602	01/16/12	01/16/12 13:44	EPA 8082	
PCB-1221	ND	0.020	"	"	"	"	"	"	
PCB-1232	ND	0.020	"	"	"	"	"	"	
PCB-1242	ND	0.020	"	"	"	"	"	"	
PCB-1248	ND	0.020	"	"	"	"	"	"	
PCB-1254	ND	0.020	"	"	"	"	"	"	
PCB-1260	ND	0.020	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*63.5 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*48.0 %*		*42-147*	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Chlorinated Herbicides by EPA Method 8151A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-6 (1201143-01) Soil Sampled: 01/10/12 09:45 Received: 01/11/12 13:40									
2,4,5-T	ND	1.6	µg/kg	1	B2A1603	01/16/12	01/18/12 10:18	EPA 8151A	
2,4,5-TP (Silvex)	ND	1.6	"	"	"	"	"	"	
2,4-D	ND	1.6	"	"	"	"	"	"	
2,4-DB	ND	4.0	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	2.0	"	"	"	"	"	"	
4-Nitrophenol	ND	2.0	"	"	"	"	"	"	
Acifluorfen	ND	1.6	"	"	"	"	"	"	
Bentazon	ND	1.6	"	"	"	"	"	"	
Chloramben	ND	1.6	"	"	"	"	"	"	
Dalapon	ND	20	"	"	"	"	"	"	
DCPA diacid	ND	1.6	"	"	"	"	"	"	
Dicamba	ND	1.6	"	"	"	"	"	"	
Dichlorprop	ND	1.6	"	"	"	"	"	"	
Dinoseb	ND	1.6	"	"	"	"	"	"	
Pentachlorophenol	ND	1.6	"	"	"	"	"	"	
Picloram	ND	1.6	"	"	"	"	"	"	
Surrogate: 2,4-Dichlorophenylacetic Acid		*143 %*		*35-150*	"	"	"	"	
B-7 (1201143-02) Soil Sampled: 01/10/12 10:10 Received: 01/11/12 13:40									
2,4,5-T	ND	1.6	µg/kg	1	B2A1603	01/16/12	01/18/12 10:18	EPA 8151A	
2,4,5-TP (Silvex)	ND	1.6	"	"	"	"	"	"	
2,4-D	ND	1.6	"	"	"	"	"	"	
2,4-DB	ND	4.0	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	2.0	"	"	"	"	"	"	
4-Nitrophenol	ND	2.0	"	"	"	"	"	"	
Acifluorfen	ND	1.6	"	"	"	"	"	"	
Bentazon	ND	1.6	"	"	"	"	"	"	
Chloramben	ND	1.6	"	"	"	"	"	"	
Dalapon	ND	20	"	"	"	"	"	"	
DCPA diacid	ND	1.6	"	"	"	"	"	"	
Dicamba	ND	1.6	"	"	"	"	"	"	
Dichlorprop	ND	1.6	"	"	"	"	"	"	
Dinoseb	ND	1.6	"	"	"	"	"	"	
Pentachlorophenol	ND	1.6	"	"	"	"	"	"	
Picloram	ND	1.6	"	"	"	"	"	"	
Surrogate: 2,4-Dichlorophenylacetic Acid		*126 %*		*35-150*	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Chlorinated Herbicides by EPA Method 8151A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-8 (1201143-03) Soil Sampled: 01/10/12 10:35 Received: 01/11/12 13:40									
2,4,5-T	ND	1.6	µg/kg	1	B2A1603	01/16/12	01/18/12 10:18	EPA 8151A	
2,4,5-TP (Silvex)	ND	1.6	"	"	"	"	"	"	
2,4-D	ND	1.6	"	"	"	"	"	"	
2,4-DB	ND	4.0	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	2.0	"	"	"	"	"	"	
4-Nitrophenol	ND	2.0	"	"	"	"	"	"	
Acifluorfen	ND	1.6	"	"	"	"	"	"	
Bentazon	ND	1.6	"	"	"	"	"	"	
Chloramben	ND	1.6	"	"	"	"	"	"	
Dalapon	ND	20	"	"	"	"	"	"	
DCPA diacid	ND	1.6	"	"	"	"	"	"	
Dicamba	ND	1.6	"	"	"	"	"	"	
Dichlorprop	ND	1.6	"	"	"	"	"	"	
Dinoseb	ND	1.6	"	"	"	"	"	"	
Pentachlorophenol	ND	1.6	"	"	"	"	"	"	
Picloram	ND	1.6	"	"	"	"	"	"	
Surrogate: 2,4-Dichlorophenylacetic Acid		*94.6 %*		*35-150*	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-6 (1201143-01) Soil Sampled: 01/10/12 09:45 Received: 01/11/12 13:40									
Benzene	**16**	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Bromobenzene	ND	5.0	"	"	"	"	"	"	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Di-isopropyl ether	ND	5.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-6 (1201143-01) Soil Sampled: 01/10/12 09:45 Received: 01/11/12 13:40									
Methylene chloride	ND	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Methyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	5.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	25	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
Toluene	**35**	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*103 %*	*80-120*		"	"	"	"	
Surrogate: Toluene-d8		*113 %*	*81-117*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*97.8 %*	*74-121*		"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-7 (1201143-02) Soil Sampled: 01/10/12 10:10 Received: 01/11/12 13:40									
Benzene	**21**	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Bromobenzene	ND	5.0	"	"	"	"	"	"	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Di-isopropyl ether	ND	5.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-7 (1201143-02) Soil Sampled: 01/10/12 10:10 Received: 01/11/12 13:40									
Methylene chloride	ND	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Methyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	5.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	25	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
Toluene	**59**	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*102 %*	*80-120*		*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*111 %*	*81-117*		*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*98.2 %*	*74-121*		*"*	*"*	*"*	*"*	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-8 (1201143-03) Soil Sampled: 01/10/12 10:35 Received: 01/11/12 13:40									
Benzene	**19**	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Bromobenzene	ND	5.0	"	"	"	"	"	"	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Di-isopropyl ether	ND	5.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-8 (1201143-03) Soil Sampled: 01/10/12 10:35 Received: 01/11/12 13:40									
Methylene chloride	ND	5.0	µg/kg	1	B2A1601	01/16/12	01/17/12 10:36	EPA 8260B	
Methyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	5.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	25	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
Toluene	**28**	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*101 %*	*80-120*		*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*114 %*	*81-117*		*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*97.4 %*	*74-121*		*"*	*"*	*"*	*"*	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-6 (1201143-01) Soil Sampled: 01/10/12 09:45 Received: 01/11/12 13:40									
Acenaphthene	ND	0.33	mg/kg	1	B2A1914	01/13/12	01/17/12 20:57	EPA 8270C	
Acenaphthylene	ND	0.33	"	"	"	"	"	"	
Anthracene	ND	0.33	"	"	"	"	"	"	
Benzidine	ND	0.33	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.33	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.33	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	0.33	"	"	"	"	"	"	
Benzyl alcohol	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	0.33	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	0.33	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	0.33	"	"	"	"	"	"	
4-Chloroaniline	ND	0.33	"	"	"	"	"	"	
2-Chlorophenol	ND	0.33	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	0.33	"	"	"	"	"	"	
2-Chloronaphthalene	ND	0.33	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Chrysene	ND	0.33	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.33	"	"	"	"	"	"	
Dibenzofuran	ND	0.33	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
3,3´-Dichlorobenzidine	ND	0.33	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	0.33	"	"	"	"	"	"	
Diethyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	0.33	"	"	"	"	"	"	
Dimethyl phthalate	ND	0.33	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	0.33	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	0.33	"	"	"	"	"	"	
1,2-Diphenylhydrazine	ND	0.33	"	"	"	"	"	"	
Fluoranthene	ND	0.33	"	"	"	"	"	"	
Fluorene	ND	0.33	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-6 (1201143-01) Soil Sampled: 01/10/12 09:45 Received: 01/11/12 13:40									
Hexachlorobenzene	ND	0.33	mg/kg	1	B2A1914	01/13/12	01/17/12 20:57	EPA 8270C	
Hexachlorobutadiene	ND	0.33	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	0.33	"	"	"	"	"	"	
Hexachloroethane	ND	0.33	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.33	"	"	"	"	"	"	
Isophorone	ND	0.33	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.33	"	"	"	"	"	"	
2-Methylphenol	ND	0.33	"	"	"	"	"	"	
4-Methylphenol	ND	0.33	"	"	"	"	"	"	
Naphthalene	ND	0.33	"	"	"	"	"	"	
2-Nitroaniline	ND	0.33	"	"	"	"	"	"	
3-Nitroaniline	ND	0.33	"	"	"	"	"	"	
4-Nitroaniline	ND	0.33	"	"	"	"	"	"	
Nitrobenzene	ND	0.33	"	"	"	"	"	"	
2-Nitrophenol	ND	0.33	"	"	"	"	"	"	
4-Nitrophenol	ND	0.33	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	0.33	"	"	"	"	"	"	
Diphenylamine	ND	0.33	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	0.33	"	"	"	"	"	"	
Pentachlorophenol	ND	0.33	"	"	"	"	"	"	
Phenanthrene	ND	0.33	"	"	"	"	"	"	
Phenol	ND	0.33	"	"	"	"	"	"	
Pyrene	ND	0.33	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.33	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*73.4 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*74.0 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*97.0 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*89.5 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*65.4 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-d14		*93.1 %*	*18-137*		"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-7 (1201143-02) Soil Sampled: 01/10/12 10:10 Received: 01/11/12 13:40									
Acenaphthene	ND	0.33	mg/kg	1	B2A1914	01/13/12	01/17/12 21:36	EPA 8270C	
Acenaphthylene	ND	0.33	"	"	"	"	"	"	
Anthracene	ND	0.33	"	"	"	"	"	"	
Benzidine	ND	0.33	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.33	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.33	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	0.33	"	"	"	"	"	"	
Benzyl alcohol	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	0.33	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	0.33	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	0.33	"	"	"	"	"	"	
4-Chloroaniline	ND	0.33	"	"	"	"	"	"	
2-Chlorophenol	ND	0.33	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	0.33	"	"	"	"	"	"	
2-Chloronaphthalene	ND	0.33	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Chrysene	ND	0.33	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.33	"	"	"	"	"	"	
Dibenzofuran	ND	0.33	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
3,3´-Dichlorobenzidine	ND	0.33	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	0.33	"	"	"	"	"	"	
Diethyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	0.33	"	"	"	"	"	"	
Dimethyl phthalate	ND	0.33	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	0.33	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	0.33	"	"	"	"	"	"	
1,2-Diphenylhydrazine	ND	0.33	"	"	"	"	"	"	
Fluoranthene	ND	0.33	"	"	"	"	"	"	
Fluorene	ND	0.33	"	"	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-7 (1201143-02) Soil Sampled: 01/10/12 10:10 Received: 01/11/12 13:40									
Hexachlorobenzene	ND	0.33	mg/kg	1	B2A1914	01/13/12	01/17/12 21:36	EPA 8270C	
Hexachlorobutadiene	ND	0.33	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	0.33	"	"	"	"	"	"	
Hexachloroethane	ND	0.33	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.33	"	"	"	"	"	"	
Isophorone	ND	0.33	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.33	"	"	"	"	"	"	
2-Methylphenol	ND	0.33	"	"	"	"	"	"	
4-Methylphenol	ND	0.33	"	"	"	"	"	"	
Naphthalene	ND	0.33	"	"	"	"	"	"	
2-Nitroaniline	ND	0.33	"	"	"	"	"	"	
3-Nitroaniline	ND	0.33	"	"	"	"	"	"	
4-Nitroaniline	ND	0.33	"	"	"	"	"	"	
Nitrobenzene	ND	0.33	"	"	"	"	"	"	
2-Nitrophenol	ND	0.33	"	"	"	"	"	"	
4-Nitrophenol	ND	0.33	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	0.33	"	"	"	"	"	"	
Diphenylamine	ND	0.33	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	0.33	"	"	"	"	"	"	
Pentachlorophenol	ND	0.33	"	"	"	"	"	"	
Phenanthrene	ND	0.33	"	"	"	"	"	"	
Phenol	ND	0.33	"	"	"	"	"	"	
Pyrene	ND	0.33	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.33	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*72.6 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*81.2 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*82.9 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*100 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*71.2 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-d14		*97.3 %*	*18-137*		"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-8 (1201143-03) Soil Sampled: 01/10/12 10:35 Received: 01/11/12 13:40									
Acenaphthene	ND	0.33	mg/kg	1	B2A1914	01/13/12	01/17/12 22:15	EPA 8270C	
Acenaphthylene	ND	0.33	"	"	"	"	"	"	
Anthracene	ND	0.33	"	"	"	"	"	"	
Benzidine	ND	0.33	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.33	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.33	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	0.33	"	"	"	"	"	"	
Benzyl alcohol	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	0.33	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	0.33	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	0.33	"	"	"	"	"	"	
4-Chloroaniline	ND	0.33	"	"	"	"	"	"	
2-Chlorophenol	ND	0.33	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	0.33	"	"	"	"	"	"	
2-Chloronaphthalene	ND	0.33	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Chrysene	ND	0.33	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.33	"	"	"	"	"	"	
Dibenzofuran	ND	0.33	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
3,3´-Dichlorobenzidine	ND	0.33	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	0.33	"	"	"	"	"	"	
Diethyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	0.33	"	"	"	"	"	"	
Dimethyl phthalate	ND	0.33	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	0.33	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	0.33	"	"	"	"	"	"	
1,2-Diphenylhydrazine	ND	0.33	"	"	"	"	"	"	
Fluoranthene	ND	0.33	"	"	"	"	"	"	
Fluorene	ND	0.33	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-8 (1201143-03) Soil Sampled: 01/10/12 10:35 Received: 01/11/12 13:40									
Hexachlorobenzene	ND	0.33	mg/kg	1	B2A1914	01/13/12	01/17/12 22:15	EPA 8270C	
Hexachlorobutadiene	ND	0.33	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	0.33	"	"	"	"	"	"	
Hexachloroethane	ND	0.33	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.33	"	"	"	"	"	"	
Isophorone	ND	0.33	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.33	"	"	"	"	"	"	
2-Methylphenol	ND	0.33	"	"	"	"	"	"	
4-Methylphenol	ND	0.33	"	"	"	"	"	"	
Naphthalene	ND	0.33	"	"	"	"	"	"	
2-Nitroaniline	ND	0.33	"	"	"	"	"	"	
3-Nitroaniline	ND	0.33	"	"	"	"	"	"	
4-Nitroaniline	ND	0.33	"	"	"	"	"	"	
Nitrobenzene	ND	0.33	"	"	"	"	"	"	
2-Nitrophenol	ND	0.33	"	"	"	"	"	"	
4-Nitrophenol	ND	0.33	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	0.33	"	"	"	"	"	"	
Diphenylamine	ND	0.33	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	0.33	"	"	"	"	"	"	
Pentachlorophenol	ND	0.33	"	"	"	"	"	"	
Phenanthrene	ND	0.33	"	"	"	"	"	"	
Phenol	ND	0.33	"	"	"	"	"	"	
Pyrene	ND	0.33	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.33	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*76.0 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*83.8 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*90.4 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*94.3 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*57.6 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-d14		*97.0 %*	*18-137*		"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Polynuclear Aromatic Compounds by EPA Method 8310

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-6 (1201143-01) Soil Sampled: 01/10/12 09:45 Received: 01/11/12 13:40									
Naphthalene	ND	40.0	µg/kg	1	B2A1812	01/18/12	01/20/12 11:06	EPA 8310	
Acenaphthylene	ND	200	"	"	"	"	"	"	
Acenaphthene	ND	50.0	"	"	"	"	"	"	
Fluorene	ND	5.00	"	"	"	"	"	"	
Phenanthrene	ND	5.00	"	"	"	"	"	"	
Anthracene	ND	2.00	"	"	"	"	"	"	
Fluoranthene	ND	5.00	"	"	"	"	"	"	
Pyrene	ND	5.00	"	"	"	"	"	"	
Benzo (a) anthracene	ND	2.00	"	"	"	"	"	"	
Chrysene	ND	5.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	2.00	"	"	"	"	"	"	
Benzo (a) pyrene	ND	2.00	"	"	"	"	"	"	
Dibenzo(a,h)anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	5.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	5.00	"	"	"	"	"	"	
Surrogate: Decafluorobiphenyl		*73.0 %*	*30-140*		"	"	"	"	
B-7 (1201143-02) Soil Sampled: 01/10/12 10:10 Received: 01/11/12 13:40									
Naphthalene	ND	40.0	µg/kg	1	B2A1812	01/18/12	01/20/12 11:06	EPA 8310	
Acenaphthylene	ND	200	"	"	"	"	"	"	
Acenaphthene	ND	50.0	"	"	"	"	"	"	
Fluorene	ND	5.00	"	"	"	"	"	"	
Phenanthrene	ND	5.00	"	"	"	"	"	"	
Anthracene	ND	2.00	"	"	"	"	"	"	
Fluoranthene	ND	5.00	"	"	"	"	"	"	
Pyrene	ND	5.00	"	"	"	"	"	"	
Benzo (a) anthracene	ND	2.00	"	"	"	"	"	"	
Chrysene	ND	5.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	2.00	"	"	"	"	"	"	
Benzo (a) pyrene	ND	2.00	"	"	"	"	"	"	
Dibenzo(a,h)anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	5.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	5.00	"	"	"	"	"	"	
Surrogate: Decafluorobiphenyl		*53.2 %*	*30-140*		"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Polynuclear Aromatic Compounds by EPA Method 8310

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-8 (1201143-03) Soil Sampled: 01/10/12 10:35 Received: 01/11/12 13:40									
Naphthalene	ND	40.0	µg/kg	1	B2A1812	01/18/12	01/20/12 11:06	EPA 8310	
Acenaphthylene	ND	200	"	"	"	"	"	"	
Acenaphthene	ND	50.0	"	"	"	"	"	"	
Fluorene	ND	5.00	"	"	"	"	"	"	
Phenanthrene	ND	5.00	"	"	"	"	"	"	
Anthracene	ND	2.00	"	"	"	"	"	"	
Fluoranthene	ND	5.00	"	"	"	"	"	"	
Pyrene	ND	5.00	"	"	"	"	"	"	
Benzo (a) anthracene	ND	2.00	"	"	"	"	"	"	
Chrysene	ND	5.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	2.00	"	"	"	"	"	"	
Benzo (a) pyrene	ND	2.00	"	"	"	"	"	"	
Dibenzo(a,h)anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	5.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	5.00	"	"	"	"	"	"	
Surrogate: Decafluorobiphenyl		*39.8 %*	*30-140*		*"*	*"*	*"*	*"*	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Metals by EPA 6000/7000 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1801 - EPA 3050B										
Blank (B2A1801-BLK1)				Prepared & Analyzed: 01/18/12						
Antimony	ND	2.5	mg/kg							
Arsenic	ND	3.0	"							
Barium	ND	6.5	"							
Beryllium	ND	0.50	"							
Cadmium	ND	0.50	"							
Chromium	ND	3.0	"							
Cobalt	ND	2.5	"							
Copper	ND	2.0	"							
Lead	ND	3.0	"							
Molybdenum	ND	1.0	"							
Nickel	ND	4.0	"							
Selenium	ND	6.0	"							
Silver	ND	1.0	"							
Thallium	ND	2.5	"							
Vanadium	ND	6.0	"							
Zinc	ND	10	"							
LCS (B2A1801-BS1)				Prepared & Analyzed: 01/18/12						
Antimony	103	2.5	mg/kg	100		103	75-125			
Arsenic	102	3.0	"	100		102	78-122			
Barium	106	6.5	"	100		106	80-120			
Beryllium	100	0.50	"	100		100	80-120			
Cadmium	99.8	0.50	"	100		99.8	80-120			
Chromium	103	3.0	"	100		103	80-120			
Cobalt	110	2.5	"	100		110	80-120			
Copper	106	2.0	"	100		106	78-122			
Lead	107	3.0	"	100		107	80-120			
Molybdenum	101	1.0	"	100		101	80-120			
Nickel	109	4.0	"	100		109	80-120			
Selenium	93.8	6.0	"	100		93.8	76-124			
Silver	101	1.0	"	100		101	60-140			
Thallium	103	2.5	"	100		103	80-120			
Vanadium	98.1	6.0	"	100		98.1	80-120			
Zinc	97.2	10	"	100		97.2	78-122			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Metals by EPA 6000/7000 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1801 - EPA 3050B										
LCS Dup (B2A1801-BSD1)				Prepared & Analyzed: 01/18/12						
Antimony	105	2.5	mg/kg	100		105	75-125	1.92	20	
Arsenic	104	3.0	"	100		104	78-122	1.94	20	
Barium	109	6.5	"	100		109	80-120	2.79	20	
Beryllium	103	0.50	"	100		103	80-120	2.96	20	
Cadmium	102	0.50	"	100		102	80-120	2.18	20	
Chromium	106	3.0	"	100		106	80-120	2.87	20	
Cobalt	112	2.5	"	100		112	80-120	1.80	20	
Copper	109	2.0	"	100		109	78-122	2.79	20	
Lead	109	3.0	"	100		109	80-120	1.85	20	
Molybdenum	105	1.0	"	100		105	80-120	3.88	20	
Nickel	112	4.0	"	100		112	80-120	2.71	20	
Selenium	96.5	6.0	"	100		96.5	76-124	2.84	20	
Silver	103	1.0	"	100		103	60-140	1.96	40	
Thallium	106	2.5	"	100		106	80-120	2.87	20	
Vanadium	100	6.0	"	100		100	80-120	1.92	20	
Zinc	101	10	"	100		101	78-122	3.83	20	
Matrix Spike (B2A1801-MS1)	**Source: 1201143-01**			Prepared & Analyzed: 01/18/12						
Antimony	41.4	2.5	mg/kg	96.4	0.84	42.1	47.8-140			QM-07
Arsenic	86.8	3.0	"	96.4	ND	90.0	70-130			
Barium	220	6.5	"	96.4	120	104	70-130			
Beryllium	93.9	0.50	"	96.4	ND	97.4	70-130			
Cadmium	90.6	0.50	"	96.4	0.073	93.9	70-130			
Chromium	115	3.0	"	96.4	22	96.5	70-130			
Cobalt	106	2.5	"	96.4	12	97.5	70-130			
Copper	126	2.0	"	96.4	25	105	70-130			
Lead	103	3.0	"	96.4	8.6	97.9	70-130			
Molybdenum	91.1	1.0	"	96.4	0.94	93.5	70-130			
Nickel	111	4.0	"	96.4	17	97.5	70-130			
Selenium	87.2	6.0	"	96.4	0.80	89.6	62.6-130			
Silver	94.1	1.0	"	96.4	ND	97.6	60-140			
Thallium	84.4	2.5	"	96.4	ND	87.6	56.9-130			
Vanadium	126	6.0	"	96.4	35	94.4	70-130			
Zinc	130	10	"	96.4	42	91.3	70-130			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Metals by EPA 6000/7000 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1801 - EPA 3050B										
Matrix Spike Dup (B2A1801-MSD1)	**Source: 1201143-01**			Prepared & Analyzed: 01/18/12						
Antimony	38.6	2.5	mg/kg	91.2	0.84	41.4	47.8-140	7.00	20	QM-07
Arsenic	82.3	3.0	"	91.2	ND	90.2	70-130	5.32	20	
Barium	212	6.5	"	91.2	120	101	70-130	3.70	20	
Beryllium	88.6	0.50	"	91.2	ND	97.1	70-130	5.81	20	
Cadmium	86.2	0.50	"	91.2	0.073	94.4	70-130	4.98	20	
Chromium	109	3.0	"	91.2	22	95.4	70-130	5.36	20	
Cobalt	101	2.5	"	91.2	12	97.6	70-130	4.83	20	
Copper	120	2.0	"	91.2	25	104	70-130	4.88	30	
Lead	98.0	3.0	"	91.2	8.6	98.0	70-130	4.98	30	
Molybdenum	85.7	1.0	"	91.2	0.94	92.9	70-130	6.11	20	
Nickel	106	4.0	"	91.2	17	97.6	70-130	4.61	20	
Selenium	82.7	6.0	"	91.2	0.80	89.8	62.6-130	5.30	20	
Silver	88.8	1.0	"	91.2	ND	97.4	60-140	5.80	40	
Thallium	79.6	2.5	"	91.2	ND	87.3	56.9-130	5.85	20	
Vanadium	120	6.0	"	91.2	35	93.2	70-130	4.88	20	
Zinc	127	10	"	91.2	42	93.2	70-130	2.33	20	
Batch B2A1802 - EPA 7471A										
Blank (B2A1802-BLK1)				Prepared: 01/18/12 Analyzed: 01/20/12						
Mercury	ND	0.15	mg/kg							
LCS (B2A1802-BS1)				Prepared: 01/18/12 Analyzed: 01/20/12						
Mercury	0.16	0.15	mg/kg	0.167		95.8	70-130			
Matrix Spike (B2A1802-MS1)	**Source: 1201143-01**			Prepared: 01/18/12 Analyzed: 01/20/12						
Mercury	0.19	0.15	mg/kg	0.164	0.03	97.6	70-130			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Metals by EPA 6000/7000 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1802 - EPA 7471A										
Matrix Spike Dup (B2A1802-MSD1)	**Source: 1201143-01**			Prepared: 01/18/12 Analyzed: 01/20/12						
Mercury	0.19	0.15	mg/kg	0.159	0.03	101	70-130	0.00	30	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Organochlorine Pesticides by EPA Method 8081A - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1602 - EPA 3550B Solid Ext										
Blank (B2A1602-BLK1)				Prepared & Analyzed: 01/16/12						
Aldrin	ND	0.0020	mg/kg							
HCH-alpha	ND	0.0020	"							
HCH-beta	ND	0.0040	"							
HCH-delta	ND	0.0020	"							
HCH-gamma (Lindane)	ND	0.0020	"							
Chlordane	ND	0.0040	"							
4,4´-DDD	ND	0.0030	"							
4,4´-DDE	ND	0.0020	"							
4,4´-DDT	ND	0.0030	"							
Dieldrin	ND	0.0020	"							
Endosulfan I	ND	0.0020	"							
Endosulfan II	ND	0.0040	"							
Endosulfan sulfate	ND	0.0020	"							
Endrin	ND	0.0020	"							
Endrin aldehyde	ND	0.0020	"							
Endrin ketone	ND	0.0020	"							
Heptachlor	ND	0.0020	"							
Heptachlor epoxide	ND	0.0020	"							
Methoxychlor	ND	0.010	"							
Toxaphene	ND	0.040	"							
Mirex	ND	0.0040	"							
Kepone	ND	0.0040	"							
Surrogate: Decachlorobiphenyl	*0.00535*		*"*	*0.00833*		*64.2*	*42-147*			
Surrogate: Tetrachloro-meta-xylene	*0.00792*		*"*	*0.00833*		*95.1*	*42-147*			
LCS (B2A1602-BS1)				Prepared & Analyzed: 01/16/12						
Aldrin	0.00282	0.0020	mg/kg	0.00267		106	80-120			
HCH-gamma (Lindane)	0.00245	0.0020	"	0.00267		91.8	80-120			
4,4´-DDT	0.00610	0.0030	"	0.00667		91.5	80-120			
Dieldrin	0.00772	0.0020	"	0.00667		116	80-120			
Heptachlor	0.00249	0.0020	"	0.00267		93.3	80-120			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Organochlorine Pesticides by EPA Method 8081A - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1602 - EPA 3550B Solid Ext										
Matrix Spike (B2A1602-MS1)		**Source: 1201110-01**		Prepared & Analyzed: 01/16/12						
Aldrin	0.00295	0.0020	mg/kg	0.00267	ND	110	50-150			
HCH-gamma (Lindane)	0.00234	0.0020	"	0.00267	ND	87.6	50-150			
4,4´-DDT	0.00640	0.0030	"	0.00667	ND	96.0	50-150			
Dieldrin	0.00540	0.0020	"	0.00667	ND	81.0	50-150			
Heptachlor	0.00235	0.0020	"	0.00267	ND	88.0	50-150			
Matrix Spike Dup (B2A1602-MSD1)		**Source: 1201110-01**		Prepared & Analyzed: 01/16/12						
Aldrin	0.00237	0.0020	mg/kg	0.00267	ND	88.8	50-150	21.8	30	
HCH-gamma (Lindane)	0.00258	0.0020	"	0.00267	ND	96.6	50-150	9.76	30	
4,4´-DDT	0.00630	0.0030	"	0.00667	ND	94.5	50-150	1.57	30	
Dieldrin	0.00570	0.0020	"	0.00667	ND	85.5	50-150	5.41	30	
Heptachlor	0.00253	0.0020	"	0.00267	ND	94.8	50-150	7.38	30	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1602 - EPA 3550B Solid Ext										
Blank (B2A1602-BLK1)				Prepared & Analyzed: 01/16/12						
PCB-1016	ND	0.020	mg/kg							
PCB-1221	ND	0.020	"							
PCB-1232	ND	0.020	"							
PCB-1242	ND	0.020	"							
PCB-1248	ND	0.020	"							
PCB-1254	ND	0.020	"							
PCB-1260	ND	0.020	"							
Surrogate: Decachlorobiphenyl	*0.00535*		*"*	*0.00833*		*64.2*	*42-147*			
Surrogate: Tetrachloro-meta-xylene	*0.00643*		*"*	*0.00833*		*77.2*	*42-147*			
LCS (B2A1602-BS1)				Prepared & Analyzed: 01/16/12						
PCB-1260	0.0595	0.020	mg/kg	0.0667		89.2	80-120			
Matrix Spike (B2A1602-MS1)		**Source: 1201110-01**		Prepared & Analyzed: 01/16/12						
PCB-1260	0.0565	0.020	mg/kg	0.0667	ND	84.7	50-150			
Matrix Spike Dup (B2A1602-MSD1)		**Source: 1201110-01**		Prepared & Analyzed: 01/16/12						
PCB-1260	0.0588	0.020	mg/kg	0.0667	ND	88.2	50-150	3.99	30	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Chlorinated Herbicides by EPA Method 8151A - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1603 - EPA 8151A Herbicides										
Blank (B2A1603-BLK1)				Prepared: 01/16/12 Analyzed: 01/18/12						
2,4,5-T	ND	1.6	µg/kg							
2,4,5-TP (Silvex)	ND	1.6	"							
2,4-D	ND	1.6	"							
2,4-DB	ND	4.0	"							
3,5-Dichlorobenzoic acid	ND	2.0	"							
4-Nitrophenol	ND	2.0	"							
Acifluorfen	ND	1.6	"							
Bentazon	ND	1.6	"							
Chloramben	ND	1.6	"							
Dalapon	ND	20	"							
DCPA diacid	ND	1.6	"							
Dicamba	ND	1.6	"							
Dichlorprop	ND	1.6	"							
Dinoseb	ND	1.6	"							
Pentachlorophenol	ND	1.6	"							
Picloram	ND	1.6	"							
Surrogate: 2,4-Dichlorophenylacetic Acid	*62.5*		*"*	*100*		*62.5*	*35-150*			
LCS (B2A1603-BS1)				Prepared: 01/16/12 Analyzed: 01/18/12						
2,4,5-T	10.4	1.6	µg/kg	10.0		104	20-150			
2,4,5-TP (Silvex)	7.65	1.6	"	10.0		76.5	20-150			
Dichlorprop	5.75	1.6	"	10.0		57.5	20-150			
Dinoseb	8.48	1.6	"	10.0		84.8	20-150			
Matrix Spike (B2A1603-MS1)	**Source: 1201143-03**			Prepared: 01/16/12 Analyzed: 01/18/12						
2,4,5-T	11.3	1.6	µg/kg	10.0	ND	113	20-150			
2,4,5-TP (Silvex)	5.83	1.6	"	10.0	ND	58.3	20-150			
Dichlorprop	11.6	1.6	"	10.0	ND	116	20-150			
Dinoseb	10.2	1.6	"	10.0	ND	102	20-150			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Chlorinated Herbicides by EPA Method 8151A - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1603 - EPA 8151A Herbicides										
Matrix Spike Dup (B2A1603-MSD1)	**Source: 1201143-03**			Prepared: 01/16/12	Analyzed: 01/18/12					
2,4,5-T	10.2	1.6	µg/kg	10.0	ND	102	20-150	10.2	30	
2,4,5-TP (Silvex)	7.42	1.6	"	10.0	ND	74.2	20-150	24.0	30	
Dichlorprop	10.1	1.6	"	10.0	ND	101	20-150	13.8	30	
Dinoseb	9.27	1.6	"	10.0	ND	92.7	20-150	9.55	30	

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26052 MERIT CIRCLE SUITE 105, LAGUNA HILLS, CALIFORNIA 92653
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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1601 - EPA 5035 P & T										
Blank (B2A1601-BLK1)				Prepared: 01/16/12 Analyzed: 01/17/12						
Benzene	ND	5.0	µg/kg							
Bromobenzene	ND	5.0	"							
Bromochloromethane	ND	5.0	"							
Bromodichloromethane	ND	5.0	"							
Bromoform	ND	5.0	"							
Bromomethane	ND	5.0	"							
n-Butylbenzene	ND	5.0	"							
sec-Butylbenzene	ND	5.0	"							
tert-Butylbenzene	ND	5.0	"							
Carbon tetrachloride	ND	5.0	"							
Chlorobenzene	ND	5.0	"							
Chloroethane	ND	5.0	"							
Chloroform	ND	5.0	"							
Chloromethane	ND	5.0	"							
2-Chlorotoluene	ND	5.0	"							
4-Chlorotoluene	ND	5.0	"							
Dibromochloromethane	ND	5.0	"							
1,2-Dibromo-3-chloropropane	ND	5.0	"							
1,2-Dibromoethane (EDB)	ND	5.0	"							
Dibromomethane	ND	5.0	"							
1,2-Dichlorobenzene	ND	5.0	"							
1,3-Dichlorobenzene	ND	5.0	"							
1,4-Dichlorobenzene	ND	5.0	"							
Dichlorodifluoromethane	ND	5.0	"							
1,1-Dichloroethane	ND	5.0	"							
1,2-Dichloroethane	ND	5.0	"							
1,1-Dichloroethene	ND	5.0	"							
cis-1,2-Dichloroethene	ND	5.0	"							
trans-1,2-Dichloroethene	ND	5.0	"							
1,2-Dichloropropane	ND	5.0	"							
1,3-Dichloropropane	ND	5.0	"							
2,2-Dichloropropane	ND	5.0	"							
1,1-Dichloropropene	ND	5.0	"							
cis-1,3-Dichloropropene	ND	5.0	"							
trans-1,3-Dichloropropene	ND	5.0	"							
Di-isopropyl ether	ND	5.0	"							
Ethyl tert-butyl ether	ND	5.0	"							

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1601 - EPA 5035 P & T										
Blank (B2A1601-BLK1)				Prepared: 01/16/12 Analyzed: 01/17/12						
Ethylbenzene	ND	5.0	µg/kg							
Hexachlorobutadiene	ND	5.0	"							
Isopropylbenzene	ND	5.0	"							
p-Isopropyltoluene	ND	5.0	"							
Methylene chloride	ND	5.0	"							
Methyl tert-butyl ether	ND	5.0	"							
Naphthalene	ND	5.0	"							
n-Propylbenzene	ND	5.0	"							
Styrene	ND	5.0	"							
Tert-amyl methyl ether	ND	5.0	"							
Tert-butyl alcohol	ND	25	"							
1,1,1,2-Tetrachloroethane	ND	5.0	"							
1,1,2,2-Tetrachloroethane	ND	5.0	"							
Tetrachloroethene	ND	5.0	"							
Toluene	ND	5.0	"							
1,2,3-Trichlorobenzene	ND	5.0	"							
1,2,4-Trichlorobenzene	ND	5.0	"							
1,1,1-Trichloroethane	ND	5.0	"							
1,1,2-Trichloroethane	ND	5.0	"							
Trichloroethene	ND	5.0	"							
Trichlorofluoromethane	ND	5.0	"							
1,2,3-Trichloropropane	ND	5.0	"							
1,2,4-Trimethylbenzene	ND	5.0	"							
1,3,5-Trimethylbenzene	ND	5.0	"							
Vinyl chloride	ND	5.0	"							
m,p-Xylene	ND	5.0	"							
o-Xylene	ND	5.0	"							
Surrogate: Dibromofluoromethane	*52.5*		*"*	*50.0*		*105*	*80-120*			
Surrogate: Toluene-d8	*56.5*		*"*	*50.0*		*113*	*81-117*			
Surrogate: 4-Bromofluorobenzene	*50.1*		*"*	*50.0*		*100*	*74-121*			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1601 - EPA 5035 P & T										
LCS (B2A1601-BS1)				Prepared: 01/16/12 Analyzed: 01/17/12						
Benzene	54.0	5.0	µg/kg	50.0		108	80-120			
Chlorobenzene	47.1	5.0	"	50.0		94.2	80-120			
1,1-Dichloroethene	53.0	5.0	"	50.0		106	80-120			
Toluene	55.9	5.0	"	50.0		112	80-120			
Trichloroethene	55.1	5.0	"	50.0		110	80-120			
Matrix Spike (B2A1601-MS1)	**Source: 1201148-05**			Prepared: 01/16/12 Analyzed: 01/17/12						
Benzene	48.3	5.0	µg/kg	50.0	ND	96.6	37-151			
Chlorobenzene	49.3	5.0	"	50.0	ND	98.6	37-160			
1,1-Dichloroethene	54.6	5.0	"	50.0	ND	109	50-150			
Toluene	49.9	5.0	"	50.0	ND	99.8	47-150			
Trichloroethene	52.7	5.0	"	50.0	ND	105	71-157			
Matrix Spike Dup (B2A1601-MSD1)	**Source: 1201148-05**			Prepared: 01/16/12 Analyzed: 01/17/12						
Benzene	54.8	5.0	µg/kg	50.0	ND	110	37-151	12.6	30	
Chlorobenzene	50.0	5.0	"	50.0	ND	100	37-160	1.41	30	
1,1-Dichloroethene	49.0	5.0	"	50.0	ND	98.0	50-150	10.8	30	
Toluene	52.6	5.0	"	50.0	ND	105	47-150	5.27	30	
Trichloroethene	53.7	5.0	"	50.0	ND	107	71-157	1.88	30	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1914 - EPA 3550B Solid Ext										
Blank (B2A1914-BLK1)				Prepared: 01/11/12 Analyzed: 01/17/12						
Acenaphthene	ND	0.33	mg/kg							
Acenaphthylene	ND	0.33	"							
Anthracene	ND	0.33	"							
Benzidine	ND	0.33	"							
Benzo (a) anthracene	ND	0.33	"							
Benzo (b) fluoranthene	ND	0.33	"							
Benzo (k) fluoranthene	ND	0.33	"							
Benzo (a) pyrene	ND	0.33	"							
Benzo (g,h,i) perylene	ND	0.33	"							
Benzyl alcohol	ND	0.33	"							
Bis(2-chloroethyl)ether	ND	0.33	"							
Bis(2-chloroethoxy)methane	ND	0.33	"							
Bis(2-ethylhexyl)phthalate	ND	0.33	"							
Bis(2-chloroisopropyl)ether	ND	0.33	"							
4-Bromophenyl phenyl ether	ND	0.33	"							
Butyl benzyl phthalate	ND	0.33	"							
4-Chloroaniline	ND	0.33	"							
2-Chlorophenol	ND	0.33	"							
4-Chloro-3-methylphenol	ND	0.33	"							
2-Chloronaphthalene	ND	0.33	"							
4-Chlorophenyl phenyl ether	ND	0.33	"							
Chrysene	ND	0.33	"							
Dibenz (a,h) anthracene	ND	0.33	"							
Dibenzofuran	ND	0.33	"							
1,3-Dichlorobenzene	ND	0.33	"							
1,2-Dichlorobenzene	ND	0.33	"							
1,4-Dichlorobenzene	ND	0.33	"							
3,3´-Dichlorobenzidine	ND	0.33	"							
2,4-Dichlorophenol	ND	0.33	"							
Diethyl phthalate	ND	0.33	"							
2,4-Dimethylphenol	ND	0.33	"							
Dimethyl phthalate	ND	0.33	"							
Di-n-butyl phthalate	ND	0.33	"							
2,4-Dinitrophenol	ND	0.33	"							
4,6-Dinitro-2-methylphenol	ND	0.33	"							
2,4-Dinitrotoluene	ND	0.33	"							
2,6-Dinitrotoluene	ND	0.33	"							

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1914 - EPA 3550B Solid Ext										
Blank (B2A1914-BLK1)				Prepared: 01/11/12 Analyzed: 01/17/12						
Di-n-octyl phthalate	ND	0.33	mg/kg							
1,2-Diphenylhydrazine	ND	0.33	"							
Fluoranthene	ND	0.33	"							
Fluorene	ND	0.33	"							
Hexachlorobenzene	ND	0.33	"							
Hexachlorobutadiene	ND	0.33	"							
Hexachlorocyclopentadiene	ND	0.33	"							
Hexachloroethane	ND	0.33	"							
Indeno (1,2,3-cd) pyrene	ND	0.33	"							
Isophorone	ND	0.33	"							
2-Methylnaphthalene	ND	0.33	"							
2-Methylphenol	ND	0.33	"							
4-Methylphenol	ND	0.33	"							
Naphthalene	ND	0.33	"							
2-Nitroaniline	ND	0.33	"							
3-Nitroaniline	ND	0.33	"							
4-Nitroaniline	ND	0.33	"							
Nitrobenzene	ND	0.33	"							
2-Nitrophenol	ND	0.33	"							
4-Nitrophenol	ND	0.33	"							
N-Nitrosodimethylamine	ND	0.33	"							
Diphenylamine	ND	0.33	"							
N-Nitrosodi-n-propylamine	ND	0.33	"							
Pentachlorophenol	ND	0.33	"							
Phenanthrene	ND	0.33	"							
Phenol	ND	0.33	"							
Pyrene	ND	0.33	"							
1,2,4-Trichlorobenzene	ND	0.33	"							
2,4,5-Trichlorophenol	ND	0.33	"							
2,4,6-Trichlorophenol	ND	0.33	"							
Surrogate: 2-Fluorophenol	*0.342*		*"*	*0.500*		*68.4*	*25-121*			
Surrogate: Phenol-d6	*0.378*		*"*	*0.500*		*75.6*	*24-113*			
Surrogate: Nitrobenzene-d5	*0.317*		*"*	*0.333*		*95.2*	*23-120*			
Surrogate: 2-Fluorobiphenyl	*0.260*		*"*	*0.333*		*78.1*	*30-115*			
Surrogate: 2,4,6-Tribromophenol	*0.333*		*"*	*0.500*		*66.6*	*19-122*			
Surrogate: Terphenyl-d14	*0.287*		*"*	*0.333*		*86.2*	*18-137*			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1914 - EPA 3550B Solid Ext										
LCS (B2A1914-BS1)				Prepared: 01/11/12 Analyzed: 01/17/12						
Acenaphthene	0.319	0.33	mg/kg	0.333		95.8	47-145			
2-Chlorophenol	0.377	0.33	"	0.667		56.5	23-134			
4-Chloro-3-methylphenol	0.396	0.33	"	0.667		59.4	22-147			
1,4-Dichlorobenzene	0.316	0.33	"	0.333		94.9	20-124			
2,4-Dinitrotoluene	0.351	0.33	"	0.333		105	39-139			
4-Nitrophenol	0.242	0.33	"	0.667		36.3	0-132			
N-Nitrosodi-n-propylamine	0.357	0.33	"	0.333		107	0-230			
Pentachlorophenol	0.250	0.33	"	0.667		37.5	14-176			
Phenol	0.393	0.33	"	0.667		58.9	5-112			
Pyrene	0.317	0.33	"	0.333		95.2	52-115			
1,2,4-Trichlorobenzene	0.327	0.33	"	0.333		98.2	44-142			
Matrix Spike (B2A1914-MS1)		**Source: 1201110-01**		Prepared: 01/11/12 Analyzed: 01/17/12						
Acenaphthene	0.293	0.33	mg/kg	0.333	ND	88.0	47-145			
2-Chlorophenol	0.381	0.33	"	0.667	ND	57.1	23-134			
4-Chloro-3-methylphenol	0.397	0.33	"	0.667	ND	59.5	22-147			
1,4-Dichlorobenzene	0.258	0.33	"	0.333	ND	77.5	20-124			
2,4-Dinitrotoluene	0.360	0.33	"	0.333	ND	108	39-139			
4-Nitrophenol	0.251	0.33	"	0.667	ND	37.6	0-132			
N-Nitrosodi-n-propylamine	0.305	0.33	"	0.333	ND	91.6	0-230			
Pentachlorophenol	0.254	0.33	"	0.667	ND	38.1	14-176			
Phenol	0.383	0.33	"	0.667	ND	57.4	5-112			
Pyrene	0.300	0.33	"	0.333	ND	90.1	52-115			
1,2,4-Trichlorobenzene	0.283	0.33	"	0.333	ND	85.0	44-142			
Matrix Spike Dup (B2A1914-MSD1)		**Source: 1201110-01**		Prepared: 01/11/12 Analyzed: 01/17/12						
Acenaphthene	0.289	0.33	mg/kg	0.333	ND	86.8	47-145	1.37	30	
2-Chlorophenol	0.389	0.33	"	0.667	ND	58.3	23-134	2.08	30	
4-Chloro-3-methylphenol	0.405	0.33	"	0.667	ND	60.7	22-147	2.00	30	
1,4-Dichlorobenzene	0.252	0.33	"	0.333	ND	75.7	20-124	2.35	30	
2,4-Dinitrotoluene	0.315	0.33	"	0.333	ND	94.6	39-139	13.3	30	
4-Nitrophenol	0.231	0.33	"	0.667	ND	34.6	0-132	8.30	30	
N-Nitrosodi-n-propylamine	0.327	0.33	"	0.333	ND	98.2	0-230	6.96	30	
Pentachlorophenol	0.226	0.33	"	0.667	ND	33.9	14-176	11.7	30	
Phenol	0.401	0.33	"	0.667	ND	60.1	5-112	4.59	30	
Pyrene	0.322	0.33	"	0.333	ND	96.7	52-115	7.07	30	
1,2,4-Trichlorobenzene	0.284	0.33	"	0.333	ND	85.3	44-142	0.353	30	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Polynuclear Aromatic Compounds by EPA Method 8310 - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1812 - EPA 3550B Solid Ext										
Blank (B2A1812-BLK1)				Prepared: 01/18/12 Analyzed: 01/20/12						
Naphthalene	ND	40.0	µg/kg							
Acenaphthylene	ND	200	"							
Acenaphthene	ND	50.0	"							
Fluorene	ND	5.00	"							
Phenanthrene	ND	5.00	"							
Anthracene	ND	2.00	"							
Fluoranthene	ND	5.00	"							
Pyrene	ND	5.00	"							
Benzo (a) anthracene	ND	2.00	"							
Chrysene	ND	5.00	"							
Benzo (b) fluoranthene	ND	5.00	"							
Benzo (k) fluoranthene	ND	2.00	"							
Benzo (a) pyrene	ND	2.00	"							
Dibenzo(a,h)anthracene	ND	5.00	"							
Benzo (g,h,i) perylene	ND	5.00	"							
Indeno (1,2,3-cd) pyrene	ND	5.00	"							
Surrogate: Decafluorobiphenyl	*422*		*"*	*500*		*84.4*	*30-140*			
LCS (B2A1812-BS1)				Prepared: 01/18/12 Analyzed: 01/20/12						
Naphthalene	62.2	40.0	µg/kg	50.0		124	60-130			
Fluorene	52.4	5.00	"	50.0		105	60-130			
Pyrene	51.4	5.00	"	50.0		103	60-130			
Benzo (a) pyrene	48.6	2.00	"	50.0		97.2	60-130			
Indeno (1,2,3-cd) pyrene	52.1	5.00	"	50.0		104	60-130			
Surrogate: Decafluorobiphenyl	*346*		*"*	*500*		*69.2*	*30-140*			
Matrix Spike (B2A1812-MS1)	**Source: 1201143-03**			Prepared: 01/18/12 Analyzed: 01/20/12						
Naphthalene	51.4	40.0	µg/kg	50.0	ND	103	60-140			
Fluorene	54.8	5.00	"	50.0	ND	110	60-140			
Pyrene	53.3	5.00	"	50.0	ND	107	60-140			
Benzo (a) pyrene	48.2	2.00	"	50.0	ND	96.4	60-140			
Indeno (1,2,3-cd) pyrene	49.6	5.00	"	50.0	ND	99.2	60-140			
Surrogate: Decafluorobiphenyl	*412*		*"*	*500*		*82.4*	*30-140*			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Polynuclear Aromatic Compounds by EPA Method 8310 - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2A1812 - EPA 3550B Solid Ext										
Matrix Spike Dup (B2A1812-MSD1)	**Source: 1201143-03**			Prepared: 01/18/12 Analyzed: 01/20/12						
Naphthalene	50.4	40.0	µg/kg	50.0	ND	101	60-140	1.96	20	
Fluorene	53.2	5.00	"	50.0	ND	106	60-140	2.96	20	
Pyrene	49.0	5.00	"	50.0	ND	98.0	60-140	8.41	20	
Benzo (a) pyrene	45.7	2.00	"	50.0	ND	91.4	60-140	5.32	20	
Indeno (1,2,3-cd) pyrene	46.3	5.00	"	50.0	ND	92.6	60-140	6.88	20	
Surrogate: Decafluorobiphenyl	*214*		*"*	*500*		*42.8*	*30-140*			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

26052 MERIT CIRCLE SUITE 105, LAGUNA HILLS, CALIFORNIA 92653
TELEPHONE: (949) 348-9389 FAX: (949) 348-9115
E-MAIL: SIERRALABS @ SIERRALABS.NET

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF20710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	01/23/12 09:46

Notes and Definitions

QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CHAIN OF CUSTODY RECORD

SIERRA ANALYTICAL
TEL: 949•348•9389
FAX: 949•348•9115
26052 Merit Circle• Suite 105•Laguna Hills, CA•92653

Date: 1/10/12 Page 1 of 1

Lab Project No.: 1201143

Client: County of Los Angeles Dep Pub. Wks.
Client Address: 900 S Fremont Ave
Alhambra, CA 91803-1331

Client Tel. No.: 626 458 4923
Client Fax. No.: 626 458 4913
Client Proj. Mgr.: Geir Mathisen

Client Project ID: HF00710003
ENCM 12C00000299
Big T Res. Sed. Char. Program

Turn Around Time Requested: ☐ Immediate ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 4 Day ☐ 5 Day ☑ Normal ☐ Mobile

Analysis Requested

Client Sample ID.	Sierra No.	Date	Time	Matrix	Preservative	Container Type	No. of Containers	6010B/7470 Title 22 Metals + Mercury	8310 / PAHs	8260B / VOCs + OXYs + EDB DBCP	8270C/8321 SVOCs + carbonhydrates	8081A Pesticides	8082 / PCBs	8270C 1,4 Dioxane	8250A / Dioxin	8151 / Herbicides	8270C or Kepone/Mirex 8081	Geotracker EDD Info: Client LOGCODE / Site Global ID / Field Point Names/ Comments
B-6	01	1/10/12	9:45	SOIL	ICE	3VOAs/1JAR	4	X	X	X	X	X	X	X	X	X	X	
B-7	02	"	10:10	"	"	"	"	X	X	X	X	X	X	X	X	X	X	
B-8	03	"	10:35	"	"	"	"	X	X	X	X	X	X	X	X	X	X	

1 Sampler Signature: [signature] Printed Name: GEIR MATHISEN

Shipped Via: (Carrier/Waybill No.)

12 Total Number of Containers Submitted to Laboratory

2 Relinquished By: GEIR MATHISEN Date: 1-11-12 Time: 1340 Company: — Received By: [signature] Date: 1-11-12 Time: 1340 Company: Sierra

The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analysis specified above under SIERRA's Terms and Conditions, unless otherwise agreed upon in writing between SIERRA and CLIENT. * - Samples determined to be hazardous by SIERRA will be returned to CLIENT.

3 Relinquished By: Date: Time: Company: Received By: Date: Time: Company:

12 Total Number of Containers Received by Laboratory

4 Relinquished By: Date: Time: Company: Received By: Date: Time: Company:

Sample Disposal:
☐ Return to Client
☑ Lab Disposal*
☐ Archive ____ mos.
☐ Other ____

FOR LABORATORY USE ONLY - Sample Receipt Conditions:

☑ Intact ☑ Chilled - Temp. (°C) 4.0
☐ Sample Seals ☐ Preservatives - Verified By
☐ Properly Labelled ☐ Other
☑ Appropriate Sample Container ☑ Storage Location A-5 SOIC / V25A

Special Instructions: See your bid proposal dated Dec. 5, 2011 including Table 1A and 1B for minimum required analytes to be tested. (attached).

Rev: 102005

DISTRIBUTION: White - To Accompany Samples, Yellow - Laboratory Copy, Pink - Field Personnel Copy

FRONTIER
ANALYTICAL LABORATORY

February 17, 2012

FAL Project ID: 7209

Ms. Marcheal Brady
Sierra Analytical Labs, Inc.
26052 Merit Circle, Suite 104
Laguna Hills, CA 92653

Dear Ms. Brady,

Attached are the results for Frontier Analytical Laboratory project **7209**. This corresponds to your subcontract order number **1202005**. Four soil samples were received at Frontier Analytical Laboratory on 2/2/2012 in good condition. These samples were extracted and analyzed by EPA Method 8280 for 2,3,7,8 TCDD only. Sierra Analytical Labs, Inc. requested a turnaround time of fifteen business days for project **7209**.

The following report consists of an Analytical Data section and a Sample Receipt section. The Analytical Data section contains our project-sample tracking log and the analytical results. The Sample Receipt section contains your chain of custody, our sample login form and a sample photo. The attached results are specifically for the samples referenced in this report only. These results meet all NELAC requirements and shall not be reproduced except in full. This report has been emailed to you as a PDF file. A hardcopy will not be sent to you unless specifically requested.

If you have any questions regarding project **7209**, please contact me at (916) 934-0900. Thank you for choosing Frontier Analytical Laboratory for your analytical testing needs.

Sincerely,

Tom Crabtree
Director

Frontier Analytical Laboratory

Sample Tracking Log

FAL Project ID: **7209**

Received on: **02/02/2012** Project Due: **02/24/2012** Storage: **R1**

FAL Sample ID	Dup	Client Project ID	Client Sample ID	Requested Method	Matrix	Sampling Date	Sampling Time	Hold Time Due Date
7209-001-SA	0	1202005	1202005-01	EPA 8280 TCDD	Soil	01/09/2012	09:30 am	02/08/2012
7209-002-SA	0	1202005	1202005-02	EPA 8280 TCDD	Soil	01/09/2012	09:50 am	02/08/2012
7209-003-SA	0	1202005	1202005-03	EPA 8280 TCDD	Soil	01/09/2012	11:00 am	02/08/2012
7209-004-SA	0	1202005	1202005-04	EPA 8280 TCDD	Soil	01/10/2012	10:35 am	02/09/2012

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EPA Method 8280
TCDD

FRONTIER ANALYTICAL LABORATORY

FAL ID: 7209-001-MB
Client ID: Method Blank
Matrix: Soil
Batch No: X2516

Date Extracted: 02-07-2012
Date Received: NA
Amount: 5.00 g

ICal: 8280fal3-1-12-12
GC Column: DB5
Units: pg/g

Acquired: 02-09-2012
WHO TEQ: NA

Compound	Conc	DL	Qual	MDL
2,3,7,8-TCDD	ND	1.58		0.0676

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	92.5	25.0 - 150	

Cleanup Surrogate			
37Cl-2,3,7,8-TCDD	101	25.0 - 150	

A	Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
B	Analyte is present in Method Blank
C	Chemical Interference
D	Presence of Diphenyl Ethers
E	Analyte concentration is above calibration range
F	Analyte confirmation on secondary column
J	Analyte concentration is below calibration range
M	Maximum possible concentration
ND	Analyte Not Detected
NP	Not Provided
P	Pre-filtered through a Whatman 0.7um GF/F filter
S	Sample acceptance criteria not met
X	Matrix interferences
*	Result taken from dilution or reinjection

Analyst: _____
Date: 2/9/12

Reviewed By: _____
Date: 2/14/12

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EPA Method 8280
TCDD

FRONTIER ANALYTICAL LABORATORY

FAL ID: 7209-001-OPR
Client ID: OPR
Matrix: Soil
Batch No: X2516

Date Extracted: 02-07-2012
Date Received: NA
Amount: 5.00 g

ICal: 8280fal3-1-12-12
GC Column: DB5
Units: ng/ml

Acquired: 02-08-2012
WHO TEQ: NA

Compound	Conc	QC Limits
2,3,7,8-TCDD	52.0	35.0 - 65.0

Internal Standards	% Rec	QC Limits
13C-2,3,7,8-TCDD	84.7	25.0 - 150

Cleanup Surrogate		
37Cl-2,3,7,8-TCDD	90.0	25.0 - 150

A	Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
B	Analyte is present in Method Blank
C	Chemical Interference
D	Presence of Diphenyl Ethers
E	Analyte concentration is above calibration range
F	Analyte confirmation on secondary column
J	Analyte concentration is below calibration range
M	Maximum possible concentration
ND	Analyte Not Detected
NP	Not Provided
P	Pre-filtered through a Whatman 0.7um GF/F filter
S	Sample acceptance criteria not met
X	Matrix interferences
*	Result taken from dilution or reinjection

Analyst: _____
Date: 2/9/12

Reviewed By: _____
Date: 2/14/12

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EPA Method 8280
TCDD

FRONTIER ANALYTICAL LABORATORY

FAL ID: 7209-001-SA
Client ID: 1202005-01
Matrix: Soil
Batch No: X2516

Date Extracted: 02-07-2012
Date Received: 02-02-2012
Amount: 5.06 g
% Solids: 91.59

ICal: 8280fal3-1-12-12
GC Column: DB5
Units: pg/g

Acquired: 02-09-2012
WHO TEQ: NA

Compound	Conc	DL	Qual	MDL
2,3,7,8-TCDD	ND	2.02		0.0676

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	87.5	25.0 - 150	

Cleanup Surrogate			
37Cl-2,3,7,8-TCDD	91.8	25.0 - 150	

A	Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
B	Analyte is present in Method Blank
C	Chemical Interference
D	Presence of Diphenyl Ethers
E	Analyte concentration is above calibration range
F	Analyte confirmation on secondary column
J	Analyte concentration is below calibration range
M	Maximum possible concentration
ND	Analyte Not Detected
NP	Not Provided
P	Pre-filtered through a Whatman 0.7um GF/F filter
S	Sample acceptance criteria not met
X	Matrix interferences
*	Result taken from dilution or reinjection

Analyst: _____
Date: 2/9/12

Reviewed By: _____
Date: 2/14/12

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EPA Method 8280
TCDD

FRONTIER ANALYTICAL LABORATORY

FAL ID: 7209-002-SA
Client ID: 1202005-02
Matrix: Soil
Batch No: X2516

Date Extracted: 02-07-2012
Date Received: 02-02-2012
Amount: 5.08 g
% Solids: 88.42

ICal: 8280fal3-1-12-12
GC Column: DB5
Units: pg/g

Acquired: 02-09-2012
WHO TEQ: NA

Compound	Conc	DL	Qual	MDL
2,3,7,8-TCDD	ND	1.65		0.0676

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	97.6	25.0 - 150	

Cleanup Surrogate			
37Cl-2,3,7,8-TCDD	100	25.0 - 150	

A	Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
B	Analyte is present in Method Blank
C	Chemical Interference
D	Presence of Diphenyl Ethers
E	Analyte concentration is above calibration range
F	Analyte confirmation on secondary column
J	Analyte concentration is below calibration range
M	Maximum possible concentration
ND	Analyte Not Detected
NP	Not Provided
P	Pre-filtered through a Whatman 0.7um GF/F filter
S	Sample acceptance criteria not met
X	Matrix interferences
*	Result taken from dilution or reinjection

Analyst: _____
Date: 2/9/12

Reviewed By: _____
Date: 2/14/12

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EPA Method 8280
TCDD

FRONTIER ANALYTICAL LABORATORY

FAL ID: 7209-003-SA
Client ID: 1202005-03
Matrix: Soil
Batch No: X2516

Date Extracted: 02-07-2012
Date Received: 02-02-2012
Amount: 5.01 g
% Solids: 81.66

ICal: 8280fal3-1-12-12
GC Column: DB5
Units: pg/g

Acquired: 02-09-2012
WHO TEQ: NA

Compound	Conc	DL	Qual	MDL
2,3,7,8-TCDD	ND	2.55		0.0676

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	92.7	25.0 - 150	

Cleanup Surrogate			
37Cl-2,3,7,8-TCDD	94.5	25.0 - 150	

A	Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
B	Analyte is present in Method Blank
C	Chemical Interference
D	Presence of Diphenyl Ethers
E	Analyte concentration is above calibration range
F	Analyte confirmation on secondary column
J	Analyte concentration is below calibration range
M	Maximum possible concentration
ND	Analyte Not Detected
NP	Not Provided
P	Pre-filtered through a Whatman 0.7um GF/F filter
S	Sample acceptance criteria not met
X	Matrix interferences
*	Result taken from dilution or reinjection

Analyst: _____
Date: 2/9/12

Reviewed By: _____
Date: 2/14/12

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EPA Method 8280
TCDD

FRONTIER ANALYTICAL LABORATORY

FAL ID: 7209-004-SA
Client ID: 1202005-04
Matrix: Soil
Batch No: X2516

Date Extracted: 02-07-2012
Date Received: 02-02-2012
Amount: 5.04 g
% Solids: 84.08

ICal: 8280fal3-1-12-12
GC Column: DB5
Units: pg/g

Acquired: 02-09-2012
WHO TEQ: NA

Compound	Conc	DL	Qual	MDL
2,3,7,8-TCDD	ND	2.15		0.0676

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	92.0	25.0 - 150	

Cleanup Surrogate			
37Cl-2,3,7,8-TCDD	90.1	25.0 - 150	

A	Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
B	Analyte is present in Method Blank
C	Chemical Interference
D	Presence of Diphenyl Ethers
E	Analyte concentration is above calibration range
F	Analyte confirmation on secondary column
J	Analyte concentration is below calibration range
M	Maximum possible concentration
ND	Analyte Not Detected
NP	Not Provided
P	Pre-filtered through a Whatman 0.7um GF/F filter
S	Sample acceptance criteria not met
X	Matrix interferences
*	Result taken from dilution or reinjection

Analyst: _____
Date: 2/9/12

Reviewed By: _____
Date: 2/14/12

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SUBCONTRACT ORDER

Sierra Analytical Labs, Inc.

Sierra Project #: 1202005

7209 20c

Comments

SENDING LABORATORY:

Sierra Analytical Labs, Inc.
26052 Merit Circle, Suite 104
Laguna Hills, CA 92653
Phone: (949) 348-9389
Fax: (949) 348-9115
Laboratory Contact: Nick Forsyth

Turn Around Time Requested: ■ Normal ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 4 Day ☐ 5 Day

RECEIVING LABORATORY:

Frontier Analytical Labs
5172 Hillsdale Circle
Eldorado Hills, CA 95762
Phone :
Fax:

Analysis	Expires	Sampled:	Laboratory ID	Comments
Sample ID: B-1 (1202005-01)	**Soil**	**01/09/12 09:30**		
Dioxin 8280 (2378-TCDD)	02/08/12 09:30			
Containers Supplied: 8 oz. Jar (A)				
Sample ID: B-2 (1202005-02)	**Soil**	**01/09/12 09:50**		
Dioxin 8280 (2378-TCDD)	02/08/12 09:50			
Containers Supplied: 8 oz. Jar (A)				
Sample ID: B-4 (1202005-03)	**Soil**	**01/09/12 11:00**		
Dioxin 8280 (2378-TCDD)	02/08/12 11:00			
Containers Supplied: 8 oz. Jar (A)				
Sample ID: B-8 (1202005-04)	**Soil**	**01/10/12 10:35**		
Dioxin 8280 (2378-TCDD)	02/09/12 10:35			
Containers Supplied: 8 oz. Jar (A)				

Special Instructions :
PLEASE SHIP TRACE ICE CHEST! THANK YOU

☐ Intact ☐ Sample Seals
☐ Properly Labeled ☐ Chilled TEMP (°C) ____
☐ Appropriate Container ☐ Preservatives - Verified By

Relinquished By	Date / Time	Received By	Date / Time
	2/4/12 1530		2-2-12 1042
Relinquished By	Date / Time	Received By	Date / Time
Relinquished By	Date / Time	Received By	Date / Time

Frontier Analytical Laboratory

Sample Login Form

FAL Project ID: **7209**

Client:	Sierra Analytical Laboratories
Client Project ID:	1202005
Date Received:	02/02/2012
Time Received:	10:42 am
Received By:	KZ
Logged In By:	KZ
# of Samples Received:	4
Duplicates:	0
Storage Location:	R1

Method of Delivery:	UPS
Tracking Number:	1Z693W100143959111
Shipping Container Received Intact	Yes
Custody seals(s) present?	No
Custody seals(s) intact?	No
Sample Arrival Temperature (C)	2
Cooling Method	Blue Ice
Chain Of Custody Present?	Yes
Return Shipping Container To Client	Yes
Test for residual Chlorine	No
Thiosulfate Added	No
Earliest Sample Hold Time Expiration	02/08/2012
Adequate Sample Volume	Yes
pH Range	N/A
Anomalies or additional comments:	

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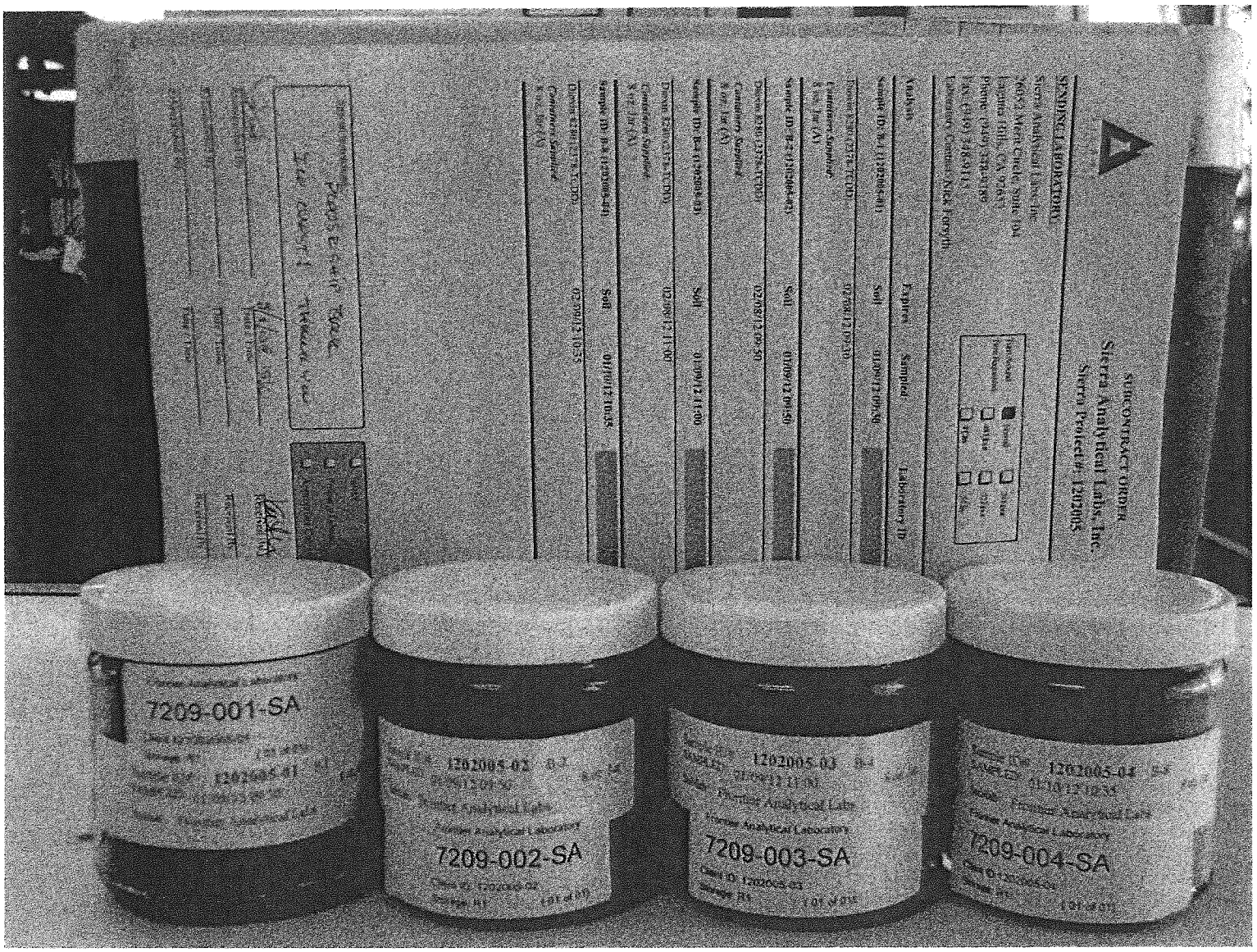

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Certificate of Analysis

Report Date: Tuesday, March 13, 2012
Received Date: Friday, February 10, 2012
Received Time: 10:00 am
Turnaround Time: Normal

Client: Sierra Analytical
26052 Merit Circle, Suite 105
Laguna Hills, CA 92653

Phones: (949) 348-9389
Fax: (949) 348-9115

Attn: Nick Forsyth
Project: 1202005

P.O. #:

Lab Sample ID: 2B10027-01 **Sample ID: B-1 (1202005-01)** **Matrix:** Soil
Sampled by: Client **Sampled: 01/09/12 09:30**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
1,4-Dioxane	ND		230	ug/kg	1	EPA 8270M	2/13/12	2/15/12 14:49	W2B0498	O-09
3-Hydroxycarbofuran	ND	11	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Aldicarb	ND	5.0	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Aldicarb sulfone	ND	3.7	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Carbaryl	ND	13	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Carbofuran	ND	5.4	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Methiocarb	ND	5.0	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Methomyl	ND	3.8	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Oxamyl	ND	16	50	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Propoxur (Baygon)	ND	5.1	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05

Lab Sample ID: 2B10027-02 **Sample ID: B-2 (1202005-02)** **Matrix:** Soil
Sampled by: Client **Sampled: 01/09/12 09:50**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
1,4-Dioxane	ND		250	ug/kg	1	EPA 8270M	2/13/12	2/15/12 15:08	W2B0498	O-09
3-Hydroxycarbofuran	ND	11	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Aldicarb	ND	5.0	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Aldicarb sulfone	ND	3.7	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Carbaryl	ND	13	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Carbofuran	ND	5.4	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Methiocarb	ND	5.0	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Methomyl	ND	3.8	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Oxamyl	ND	16	50	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Propoxur (Baygon)	ND	5.1	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05

Lab Sample ID: 2B10027-03 **Sample ID: B-4 (1202005-03)** **Matrix:** Soil
Sampled by: Client **Sampled: 01/09/12 11:00**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
1,4-Dioxane	ND		250	ug/kg	1	EPA 8270M	2/13/12	2/15/12 15:27	W2B0498	O-09
3-Hydroxycarbofuran	ND	11	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Aldicarb	ND	5.0	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05

Certificate of Analysis

Lab Sample ID: 2B10027-03 **Sample ID:** B-4 (1202005-03) **Matrix:** Soil
Sampled by: Client **Sampled:** 01/09/12 11:00

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
Aldicarb sulfone	ND	3.7	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Carbaryl	ND	13	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Carbofuran	ND	5.4	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Methiocarb	ND	5.0	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Methomyl	ND	3.8	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Oxamyl	ND	16	50	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Propoxur (Baygon)	ND	5.1	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05

Lab Sample ID: 2B10027-04 **Sample ID:** B-8 (1202005-04) **Matrix:** Soil
Sampled by: Client **Sampled:** 01/10/12 10:35

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
1,4-Dioxane	ND		250	ug/kg	1	EPA 8270M	2/13/12	2/15/12 15:46	W2B0498	O-09
3-Hydroxycarbofuran	ND	11	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Aldicarb	ND	5.0	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Aldicarb sulfone	ND	3.7	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Carbaryl	ND	13	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Carbofuran	ND	5.4	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Methiocarb	ND	5.0	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Methomyl	ND	3.8	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Oxamyl	ND	16	50	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05
Propoxur (Baygon)	ND	5.1	25	ug/kg	1	EPA 8318	3/9/12	3/12/12 19:00	W2B0499	O-05

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Quality Control Section

1,4-Dioxane Low Level by isotopic dilution GC/MS - Quality Control

Batch W2B0498 - EPA 8270M

Blank (W2B0498-BLK1) — **Prepared: 02/13/12 Analyzed: 02/15/12 13:33**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
1,4-Dioxane		ND		ug/kg					

LCS (W2B0498-BS1) — **Prepared: 02/13/12 Analyzed: 02/15/12 13:52**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
1,4-Dioxane		512		ug/kg	500	102	67-130		

Matrix Spike (W2B0498-MS1) — **Source: 2B10027-01** — **Prepared: 02/13/12 Analyzed: 02/15/12 14:11**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
1,4-Dioxane	0.00	5130		ug/kg	4850	106	55-143		

Matrix Spike Dup (W2B0498-MSD1) — **Source: 2B10027-01** — **Prepared: 02/13/12 Analyzed: 02/15/12 14:30**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
1,4-Dioxane	0.00	5240		ug/kg	4980	105	55-143	2	30

Carbamates and Urea Pesticides - Quality Control

Batch W2B0499 - EPA 8318

Blank (W2B0499-BLK1) — **Prepared: 03/09/12 Analyzed: 03/12/12 19:00**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Aldicarb sulfone		ND		ug/kg					
Methomyl		ND		ug/kg					
3-Hydroxycarbofuran		ND		ug/kg					
Aldicarb		ND		ug/kg					
Propoxur (Baygon)		ND		ug/kg					
Carbofuran		ND		ug/kg					
Carbaryl		ND		ug/kg					
Methiocarb		ND		ug/kg					
Oxamyl		ND		ug/kg					

LCS (W2B0499-BS1) — **Prepared: 03/09/12 Analyzed: 03/12/12 19:00**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Aldicarb sulfone		50.1		ug/kg	50.0	100	52-137		
Methomyl		43.1		ug/kg	50.0	86	45-153		
3-Hydroxycarbofuran		50.4		ug/kg	50.0	101	47-130		
Aldicarb		18.7	BS-03	ug/kg	50.0	37	47-142		
Propoxur (Baygon)		43.5		ug/kg	50.0	87	58-127		
Carbofuran		39.2		ug/kg	50.0	78	64-128		
Carbaryl		23.2		ug/kg	50.0	46	34-130		
Methiocarb		ND	BS-03	ug/kg	50.0	NR	17-153		

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Carbamates and Urea Pesticides - Quality Control

Batch W2B0499 - EPA 8318

Matrix Spike (W2B0499-MS1) **Source: 2B10027-02** **Prepared: 03/09/12** **Analyzed: 03/12/12 19:00**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Aldicarb sulfone	ND	47.0		ug/kg	50.0	94	45-147		
Methomyl	ND	39.8		ug/kg	50.0	80	28-156		
3-Hydroxycarbofuran	ND	43.5		ug/kg	50.0	87	47-130		
Aldicarb	ND	34.1		ug/kg	50.0	68	46-119		
Propoxur (Baygon)	ND	40.5		ug/kg	50.0	81	45-144		
Carbofuran	ND	35.8		ug/kg	50.0	72	66-139		
Carbaryl	ND	21.6		ug/kg	50.0	43	34-130		
Methiocarb	ND	ND		ug/kg	50.0	NR	17-153		

Matrix Spike Dup (W2B0499-MSD1) **Source: 2B10027-02** **Prepared: 03/09/12** **Analyzed: 03/12/12 19:00**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Aldicarb sulfone	ND	47.9		ug/kg	50.0	96	45-147	2	20
Methomyl	ND	40.5		ug/kg	50.0	81	28-156	2	20
3-Hydroxycarbofuran	ND	47.0		ug/kg	50.0	94	47-130	8	20
Aldicarb	ND	32.6		ug/kg	50.0	65	46-119	4	20
Propoxur (Baygon)	ND	42.7		ug/kg	50.0	85	45-144	5	20
Carbofuran	ND	39.4		ug/kg	50.0	79	66-139	10	20
Carbaryl	ND	25.5		ug/kg	50.0	51	34-130	16	20
Methiocarb	ND	ND	QR-04	ug/kg	50.0	NR	17-153	200	20

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Certificate of Analysis

Notes:
The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless otherwise specified.

An Absence of Total Coliform meets the drinking water standards as established by the State of California Department of Health Services.
The Reporting Limit (RL) is referenced as laboratory's Practical Quantitation Limit (PQL).
For Potable water analysis, the Reporting Limit (RL) is referenced as Detection Limit for reporting purposes (DLRs) defined by EPA.

If sample collected by Weck Laboratories, sampled in accordance to lab SOP MIS002

Authorized Signature

Contact: Kim G Tu (Project Manager)

ELAP # 1132
LACSD # 10143
NELAC # 04229CA

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Weck Laboratories certifies that the test results meet all requirements of NELAC unless noted in the Case Narrative. This analytical report must be reproduced in its entirety.

Flags for Data Qualifiers:

BS-03	The recovery of this analyte in the BS/LCS was outside the control limits. The sample result was accepted based on another acceptable BS/LCS and/or MS and MSD that meet BS criteria.
O-05	The extraction for this analyte was performed outside of the EPA recommended holding time.
O-09	This sample was received with the EPA recommended holding time expired.
QR-04	The RPD value for the MS/MSD was outside of QC acceptance limits however both recoveries were acceptable. The QC batch was accepted based on acceptable results for the recoveries and RPD for the LCS and LCSD.
ND	NOT DETECTED at or above the Reporting Limit. If J-value reported, then NOT DETECTED at or above the Method Detection Limit (MDL).
Sub	Subcontracted analysis, original report enclosed.
DL	Method Detection Limit
RL	Method Reporting Limit
MDA	Minimum Detectable Activity
NR	Not Reportable

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CHAIN OF CUSTODY RECORD

SIERRA ANALYTICAL
TEL: 949•348•9389
FAX: 949•348•9115
26052 Merit Circle• Suite 105•Laguna Hills, CA•92653

Date: 2/1/12 Page 1 of 1

Lab Project No.: 1202005

Client: County of LA, Dep. Public Works
Client Address: 900 S Fremont Ave, Alhambra, CA 91803-1331
Client Tel. No.: 626 458 4923
Client Fax. No.: 626 458 4913
Client Proj. Mgr.: Geir Mathisen

Client Project ID: HF00710003
ENC#: 12C00000299
BIGT. Res. Sed. Char. Program

Turn Around Time Requested: ☐ Immediate ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 4 Day ☐ 5 Day ☑ Normal ☐ Mobile

Analysis Requested

Geotracker EDD Info:
Client LOGCODE
Site Global ID

Client Sample ID.	Sierra No.	Date	Time	Matrix	Preservative	Container Type	No. of Containers	1,4-DIOXANE	DIOXIN	Carbamate Pesticide	Field Point Names/ Comments
B-1	01	1/9/12	9:30	SOIL	ICE	JAR 802	1	X	X	X	
B-2	02	1/9/12	9:50	↓	↓	↓	1	X	X	X	
B-4	03	1/9/12	11:00	↓	↓	↓	1	X	X	X	
B-8	04	1/10/12	10:35	↓	↓	↓	1	X	X	X	

1 Sampler Signature: [signature]
Printed Name: GEIR MATHISEN
Shipped Via:
(Carrier/Waybill No.)

4 Total Number of Containers Submitted to Laboratory

2 Relinquished By: Geir Mathisen Date: 2/1/12 Received By: [signature] Date: 2/1/12
Company: LACDPW Time: 11:00 Company: Sierra Time: 11:00

The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analysis specified above under SIERRA's Terms and Conditions, unless otherwise agreed upon in writing between SIERRA and CLIENT.
* - Samples determined to be hazardous by SIERRA will be returned to CLIENT.

3 Relinquished By: Date Received By: Date:
Company: Time: Company: Time:

4 Total Number of Containers Received by Laboratory

Sample Disposal:
☐ Return to Client
☑ Lab Disposal*
☐ Archive _____ mos.
☐ Other _____

4 Relinquished By: Date Received By: Date:
Company: Time: Company: Time:

Special Instructions: Test for remainder analytes according to attached quote and tables.

FOR LABORATORY USE ONLY - Sample Receipt Conditions:
☑ Intact ☑ Chilled - Temp. (°C) 4.0
☐ Sample Seals ☐ Preservatives - Verified By
☑ Properly Labelled ☐ Other
☑ Appropriate Sample Container ☑ Storage Location Wall Lab / Frontier Lab

Rev: 102005

DISTRIBUTION: White - To Accompany Samples, Yellow - Laboratory Copy, Pink - Field Personnel Copy

SIERRA ANALYTICAL

25 April 2012

Geir Mathisen
Los Angeles County Dept. of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803

RE:Big T Res. Sed. Char. Program

Work Order No.: 1204233

Attached are the results of the analyses for samples received by the laboratory on 04/19/12 11:00.

The samples were received by Sierra Analytical Labs, Inc. with a chain of custody record attached or completed at the submittal of the samples.

The analyses were performed according to the prescribed method as outlined by EPA, Standard Methods, and A.S.T.M.

The remaining portions of the samples will be disposed of within 30 days from the date of this report.
If you require any additional retaining time, please advise us.

Sincerely,

Richard K. Forsyth

Richard K. Forsyth

Laboratory Director

Sierra Analytical Labs, Inc. is certified by the California Department of Health Services (DOHS),
Environmental Laboratory Accredidation Program (ELAP) No. 2320.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B-10-2	1204233-01	Soil	04/18/12 11:50	04/19/12 11:00

CASE NARRATIVE

SAMPLE RECEIPT: Samples were received intact, at 4°C, and accompanied by chain of custody documentation.
PRESERVATION: Samples requiring preservation were verified prior to sample preparation and analysis.
HOLDING TIMES: All holding times were met, unless otherwises noted in the report with data qualifiers.
QA/QC CRITERIA: All quality objective criteria were met, except as noted in the report with data qualifiers.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

26052 MERIT CIRCLE SUITE 105, LAGUNA HILLS, CALIFORNIA 92653
TELEPHONE: (949) 348-9389 FAX: (949) 348-9115
E-MAIL: SIERRALABS @ SIERRALABS.NET

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Metals by EPA 6000/7000 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-10-2 (1204233-01) Soil Sampled: 04/18/12 11:50 Received: 04/19/12 11:00									
Silver	ND	1.0	mg/kg	1	B2D2002	04/20/12	04/23/12 15:42	EPA 6010B	
Arsenic	ND	3.5	"	"	"	"	04/23/12 15:43	"	
Barium	**37**	6.5	"	"	"	"	04/23/12 15:42	"	
Beryllium	ND	0.50	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	04/23/12 15:43	"	
Cobalt	**7.3**	2.5	"	"	"	"	"	"	
Chromium	**4.8**	3.0	"	"	"	"	"	"	
Copper	**12**	2.0	"	"	"	"	04/23/12 15:42	"	
Mercury	ND	0.15	"	"	B2D2004	04/20/12	04/20/12 18:47	EPA 7471A	
Molybdenum	ND	1.0	"	"	B2D2002	04/20/12	04/23/12 15:43	EPA 6010B	
Nickel	**6.5**	4.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Antimony	ND	2.5	"	"	"	"	"	"	
Selenium	ND	6.0	"	"	"	"	"	"	
Thallium	ND	2.5	"	"	"	"	"	"	
Vanadium	**9.1**	6.0	"	"	"	"	04/23/12 15:42	"	
Zinc	**11**	10	"	"	"	"	04/23/12 15:43	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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E-MAIL: SIERRALABS @ SIERRALABS.NET

Los Angeles County Dept. of Public Works	Project:	Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number:	HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager:	Geir Mathisen	04/25/12 13:42

Organochlorine Pesticides by EPA Method 8081A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-10-2 (1204233-01) Soil Sampled: 04/18/12 11:50 Received: 04/19/12 11:00									
Aldrin	ND	0.0020	mg/kg	1	B2D2104	04/21/12	04/23/12 08:09	EPA 8081A	
HCH-alpha	ND	0.0020	"	"	"	"	"	"	
HCH-beta	ND	0.0040	"	"	"	"	"	"	
HCH-delta	ND	0.0020	"	"	"	"	"	"	
HCH-gamma (Lindane)	ND	0.0020	"	"	"	"	"	"	
Chlordane	ND	0.0040	"	"	"	"	"	"	
4,4´-DDD	ND	0.0030	"	"	"	"	"	"	
4,4´-DDE	ND	0.0020	"	"	"	"	"	"	
4,4´-DDT	ND	0.0030	"	"	"	"	"	"	
Dieldrin	ND	0.0020	"	"	"	"	"	"	
Endosulfan I	ND	0.0020	"	"	"	"	"	"	
Endosulfan II	ND	0.0040	"	"	"	"	"	"	
Endosulfan sulfate	ND	0.0020	"	"	"	"	"	"	
Endrin	ND	0.0020	"	"	"	"	"	"	
Endrin aldehyde	ND	0.0020	"	"	"	"	"	"	
Endrin ketone	ND	0.0020	"	"	"	"	"	"	
Heptachlor	ND	0.0020	"	"	"	"	"	"	
Heptachlor epoxide	ND	0.0020	"	"	"	"	"	"	
Methoxychlor	ND	0.010	"	"	"	"	"	"	
Toxaphene	ND	0.040	"	"	"	"	"	"	
Mirex	ND	0.0040	"	"	"	"	"	"	
Kepone	ND	0.0040	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*139 %*	*42-147*		*"*	*"*	*"*	*"*	
Surrogate: Tetrachloro-meta-xylene		*76.8 %*	*42-147*		*"*	*"*	*"*	*"*	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project:	Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number:	HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager:	Geir Mathisen	04/25/12 13:42

Polychlorinated Biphenyls by EPA Method 8082

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-10-2 (1204233-01) Soil Sampled: 04/18/12 11:50 Received: 04/19/12 11:00									
PCB-1016	ND	0.020	mg/kg	1	B2D2104	04/21/12	04/23/12 08:09	EPA 8082	
PCB-1221	ND	0.020	"	"	"	"	"	"	
PCB-1232	ND	0.020	"	"	"	"	"	"	
PCB-1242	ND	0.020	"	"	"	"	"	"	
PCB-1248	ND	0.020	"	"	"	"	"	"	
PCB-1254	ND	0.020	"	"	"	"	"	"	
PCB-1260	ND	0.020	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*139 %*		*42-147*	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*76.8 %*		*42-147*	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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E-MAIL: SIERRALABS @ SIERRALABS.NET

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Chlorinated Herbicides by EPA Method 8151A

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-10-2 (1204233-01) Soil Sampled: 04/18/12 11:50 Received: 04/19/12 11:00									
2,4,5-T	ND	1.6	µg/kg	1	B2D2302	04/23/12	04/23/12 08:40	EPA 8151A	
2,4,5-TP (Silvex)	ND	1.6	"	"	"	"	"	"	
2,4-D	ND	1.6	"	"	"	"	"	"	
2,4-DB	ND	4.0	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	2.0	"	"	"	"	"	"	
4-Nitrophenol	ND	2.0	"	"	"	"	"	"	
Acifluorfen	ND	1.6	"	"	"	"	"	"	
Bentazon	ND	1.6	"	"	"	"	"	"	
Chloramben	ND	1.6	"	"	"	"	"	"	
Dalapon	ND	20	"	"	"	"	"	"	
DCPA diacid	ND	1.6	"	"	"	"	"	"	
Dicamba	ND	1.6	"	"	"	"	"	"	
Dichlorprop	ND	1.6	"	"	"	"	"	"	
Dinoseb	ND	1.6	"	"	"	"	"	"	
Pentachlorophenol	ND	1.6	"	"	"	"	"	"	
Picloram	ND	1.6	"	"	"	"	"	"	
Surrogate: 2,4-Dichlorophenylacetic Acid		*124 %*		*35-150*	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-10-2 (1204233-01) Soil Sampled: 04/18/12 11:50 Received: 04/19/12 11:00									
Benzene	**58**	5.0	µg/kg	1	B2D2102	04/21/12	04/21/12 10:25	EPA 8260B	
Bromobenzene	ND	5.0	"	"	"	"	"	"	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	5.0	"	"	"	"	"	"	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	5.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.0	"	"	"	"	"	"	
Dibromomethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Di-isopropyl ether	ND	5.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	5.0	"	"	"	"	"	"	
Isopropylbenzene	ND	5.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	5.0	"	"	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-10-2 (1204233-01) Soil Sampled: 04/18/12 11:50 Received: 04/19/12 11:00									
Methylene chloride	ND	5.0	µg/kg	1	B2D2102	04/21/12	04/21/12 10:25	EPA 8260B	
Methyl tert-butyl ether	ND	5.0	"	"	"	"	"	"	
Naphthalene	ND	5.0	"	"	"	"	"	"	
n-Propylbenzene	ND	5.0	"	"	"	"	"	"	
Styrene	ND	5.0	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	5.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	25	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
Toluene	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
m,p-Xylene	ND	5.0	"	"	"	"	"	"	
o-Xylene	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*102 %*		*80-120*	"	"	"	"	
Surrogate: Toluene-d8		*94.4 %*		*81-117*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*100 %*		*74-121*	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-10-2 (1204233-01) Soil Sampled: 04/18/12 11:50 Received: 04/19/12 11:00									
Acenaphthene	ND	0.33	mg/kg	1	B2D1107	04/20/12	04/20/12 19:09	EPA 8270C	
Acenaphthylene	ND	0.33	"	"	"	"	"	"	
Anthracene	ND	0.33	"	"	"	"	"	"	
Benzidine	ND	0.33	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.33	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.33	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.33	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	0.33	"	"	"	"	"	"	
Benzyl alcohol	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	0.33	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	0.33	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	0.33	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	0.33	"	"	"	"	"	"	
4-Chloroaniline	ND	0.33	"	"	"	"	"	"	
2-Chlorophenol	ND	0.33	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	0.33	"	"	"	"	"	"	
2-Chloronaphthalene	ND	0.33	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	0.33	"	"	"	"	"	"	
Chrysene	ND	0.33	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.33	"	"	"	"	"	"	
Dibenzofuran	ND	0.33	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.33	"	"	"	"	"	"	
3,3´-Dichlorobenzidine	ND	0.33	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	0.33	"	"	"	"	"	"	
Diethyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	0.33	"	"	"	"	"	"	
Dimethyl phthalate	ND	0.33	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	0.33	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	0.33	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	0.33	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	0.33	"	"	"	"	"	"	
1,2-Diphenylhydrazine	ND	0.33	"	"	"	"	"	"	
Fluoranthene	ND	0.33	"	"	"	"	"	"	
Fluorene	ND	0.33	"	"	"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Semivolatile Organic Compounds by EPA Method 8270C

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-10-2 (1204233-01) Soil Sampled: 04/18/12 11:50 Received: 04/19/12 11:00									
Hexachlorobenzene	ND	0.33	mg/kg	1	B2D1107	04/20/12	04/20/12 19:09	EPA 8270C	
Hexachlorobutadiene	ND	0.33	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	0.33	"	"	"	"	"	"	
Hexachloroethane	ND	0.33	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.33	"	"	"	"	"	"	
Isophorone	ND	0.33	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.33	"	"	"	"	"	"	
2-Methylphenol	ND	0.33	"	"	"	"	"	"	
4-Methylphenol	ND	0.33	"	"	"	"	"	"	
Naphthalene	ND	0.33	"	"	"	"	"	"	
2-Nitroaniline	ND	0.33	"	"	"	"	"	"	
3-Nitroaniline	ND	0.33	"	"	"	"	"	"	
4-Nitroaniline	ND	0.33	"	"	"	"	"	"	
Nitrobenzene	ND	0.33	"	"	"	"	"	"	
2-Nitrophenol	ND	0.33	"	"	"	"	"	"	
4-Nitrophenol	ND	0.33	"	"	"	"	"	"	
N-Nitrosodimethylamine	ND	0.33	"	"	"	"	"	"	
Diphenylamine	ND	0.33	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	0.33	"	"	"	"	"	"	
Pentachlorophenol	ND	0.33	"	"	"	"	"	"	
Phenanthrene	ND	0.33	"	"	"	"	"	"	
Phenol	ND	0.33	"	"	"	"	"	"	
Pyrene	ND	0.33	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.33	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	0.33	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*80.4 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*79.0 %*	*24-113*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*95.2 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*91.3 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*69.8 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-d14		*96.7 %*	*18-137*		"	"	"	"	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Polynuclear Aromatic Compounds by EPA Method 8310

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-10-2 (1204233-01) Soil Sampled: 04/18/12 11:50 Received: 04/19/12 11:00									
Naphthalene	ND	40.0	µg/kg	1	B2D2408	04/24/12	04/25/12 10:19	EPA 8310	
Acenaphthylene	ND	200	"	"	"	"	"	"	
Acenaphthene	ND	50.0	"	"	"	"	"	"	
Fluorene	ND	5.00	"	"	"	"	"	"	
Phenanthrene	ND	5.00	"	"	"	"	"	"	
Anthracene	ND	2.00	"	"	"	"	"	"	
Fluoranthene	ND	5.00	"	"	"	"	"	"	
Pyrene	ND	5.00	"	"	"	"	"	"	
Benzo (a) anthracene	ND	2.00	"	"	"	"	"	"	
Chrysene	ND	5.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	2.00	"	"	"	"	"	"	
Benzo (a) pyrene	ND	2.00	"	"	"	"	"	"	
Dibenzo(a,h)anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	5.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	5.00	"	"	"	"	"	"	
Surrogate: Decafluorobiphenyl		*59.2 %*	*30-140*		*"*	*"*	*"*	*"*	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Metals by EPA 6000/7000 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2002 - EPA 3050B										
Blank (B2D2002-BLK1)				Prepared: 04/20/12 Analyzed: 04/23/12						
Antimony	ND	2.5	mg/kg							
Arsenic	ND	3.5	"							
Barium	ND	6.5	"							
Beryllium	ND	0.50	"							
Cadmium	ND	0.50	"							
Chromium	ND	3.0	"							
Cobalt	ND	2.5	"							
Copper	ND	2.0	"							
Lead	ND	3.0	"							
Molybdenum	ND	1.0	"							
Nickel	ND	4.0	"							
Selenium	ND	6.0	"							
Silver	ND	1.0	"							
Thallium	ND	2.5	"							
Vanadium	ND	6.0	"							
Zinc	ND	10	"							
LCS (B2D2002-BS1)				Prepared: 04/20/12 Analyzed: 04/23/12						
Antimony	97.8	2.5	mg/kg	100		97.8	75-125			
Arsenic	97.2	3.5	"	100		97.2	78-122			
Barium	102	6.5	"	100		102	80-120			
Beryllium	95.8	0.50	"	100		95.8	80-120			
Cadmium	96.4	0.50	"	100		96.4	80-120			
Chromium	101	3.0	"	100		101	80-120			
Cobalt	104	2.5	"	100		104	80-120			
Copper	99.9	2.0	"	100		99.9	78-122			
Lead	99.8	3.0	"	100		99.8	80-120			
Molybdenum	99.5	1.0	"	100		99.5	80-120			
Nickel	105	4.0	"	100		105	80-120			
Selenium	90.5	6.0	"	100		90.5	76-124			
Silver	96.1	1.0	"	100		96.1	60-140			
Thallium	98.6	2.5	"	100		98.6	80-120			
Vanadium	96.7	6.0	"	100		96.7	80-120			
Zinc	94.7	10	"	100		94.7	80-120			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Metals by EPA 6000/7000 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2002 - EPA 3050B										
LCS Dup (B2D2002-BSD1)				Prepared: 04/20/12 Analyzed: 04/23/12						
Antimony	101	2.5	mg/kg	100		101	75-125	3.22	20	
Arsenic	99.9	3.5	"	100		99.9	78-122	2.74	20	
Barium	104	6.5	"	100		104	80-120	1.94	20	
Beryllium	98.1	0.50	"	100		98.1	80-120	2.37	20	
Cadmium	97.9	0.50	"	100		97.9	80-120	1.54	20	
Chromium	102	3.0	"	100		102	80-120	0.985	20	
Cobalt	106	2.5	"	100		106	80-120	1.90	20	
Copper	104	2.0	"	100		104	78-122	4.02	20	
Lead	103	3.0	"	100		103	80-120	3.16	20	
Molybdenum	101	1.0	"	100		101	80-120	1.50	20	
Nickel	106	4.0	"	100		106	80-120	0.948	20	
Selenium	92.9	6.0	"	100		92.9	76-124	2.62	20	
Silver	98.7	1.0	"	100		98.7	60-140	2.67	40	
Thallium	103	2.5	"	100		103	80-120	4.37	20	
Vanadium	98.2	6.0	"	100		98.2	80-120	1.54	20	
Zinc	96.9	10	"	100		96.9	80-120	2.30	20	
Matrix Spike (B2D2002-MS1)		**Source: 1204233-01**		Prepared: 04/20/12 Analyzed: 04/23/12						
Antimony	79.6	2.5	mg/kg	97.0	0.41	81.6	47.8-140			
Arsenic	93.1	3.5	"	97.0	ND	96.0	70-130			
Barium	151	6.5	"	97.0	37	118	70-130			
Beryllium	95.0	0.50	"	97.0	ND	97.9	70-130			
Cadmium	93.0	0.50	"	97.0	ND	95.9	70-130			
Chromium	98.7	3.0	"	97.0	4.8	96.8	70-130			
Cobalt	102	2.5	"	97.0	7.3	97.6	70-130			
Copper	106	2.0	"	97.0	12	96.9	70-130			
Lead	96.5	3.0	"	97.0	1.1	98.4	70-130			
Molybdenum	94.2	1.0	"	97.0	0.52	96.6	70-130			
Nickel	105	4.0	"	97.0	6.5	102	70-130			
Selenium	89.5	6.0	"	97.0	ND	92.3	62.6-130			
Silver	92.8	1.0	"	97.0	ND	95.7	60-140			
Thallium	94.3	2.5	"	97.0	ND	97.2	56.9-130			
Vanadium	100	6.0	"	97.0	9.1	93.7	70-130			
Zinc	101	10	"	97.0	11	92.8	70-130			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Metals by EPA 6000/7000 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2002 - EPA 3050B										
Matrix Spike Dup (B2D2002-MSD1)	**Source: 1204233-01**			Prepared: 04/20/12 Analyzed: 04/23/12						
Antimony	81.6	2.5	mg/kg	94.7	0.41	85.7	47.8-140	2.48	20	
Arsenic	93.8	3.5	"	94.7	ND	99.0	70-130	0.749	20	
Barium	137	6.5	"	94.7	37	106	70-130	9.72	20	
Beryllium	94.4	0.50	"	94.7	ND	99.7	70-130	0.634	20	
Cadmium	92.6	0.50	"	94.7	ND	97.8	70-130	0.431	20	
Chromium	98.6	3.0	"	94.7	4.8	99.0	70-130	0.101	20	
Cobalt	104	2.5	"	94.7	7.3	102	70-130	1.94	20	
Copper	105	2.0	"	94.7	12	98.2	70-130	0.948	30	
Lead	97.9	3.0	"	94.7	1.1	102	70-130	1.44	30	
Molybdenum	94.0	1.0	"	94.7	0.52	98.7	70-130	0.213	20	
Nickel	103	4.0	"	94.7	6.5	102	70-130	1.92	20	
Selenium	90.4	6.0	"	94.7	ND	95.5	62.6-130	1.00	20	
Silver	92.6	1.0	"	94.7	ND	97.8	60-140	0.216	40	
Thallium	95.0	2.5	"	94.7	ND	100	56.9-130	0.740	20	
Vanadium	102	6.0	"	94.7	9.1	98.1	70-130	1.98	20	
Zinc	102	10	"	94.7	11	96.1	70-130	0.985	20	
Batch B2D2004 - EPA 7471A										
Blank (B2D2004-BLK1)				Prepared & Analyzed: 04/20/12						
Mercury	ND	0.15	mg/kg							
LCS (B2D2004-BS1)				Prepared & Analyzed: 04/20/12						
Mercury	0.17	0.15	mg/kg	0.167		102	70-130			
Matrix Spike (B2D2004-MS1)	**Source: 1204233-01**			Prepared & Analyzed: 04/20/12						
Mercury	0.20	0.15	mg/kg	0.166	ND	120	70-130			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Metals by EPA 6000/7000 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2004 - EPA 7471A										
Matrix Spike Dup (B2D2004-MSD1)	**Source: 1204233-01**			Prepared & Analyzed: 04/20/12						
Mercury	0.18	0.15	mg/kg	0.156	ND	115	70-130	10.5	30	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Organochlorine Pesticides by EPA Method 8081A - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2104 - EPA 3550B Solid Ext										
Blank (B2D2104-BLK1)				Prepared: 04/21/12 Analyzed: 04/23/12						
Aldrin	ND	0.0020	mg/kg							
HCH-alpha	ND	0.0020	"							
HCH-beta	ND	0.0040	"							
HCH-delta	ND	0.0020	"							
HCH-gamma (Lindane)	ND	0.0020	"							
Chlordane	ND	0.0040	"							
4,4´-DDD	ND	0.0030	"							
4,4´-DDE	ND	0.0020	"							
4,4´-DDT	ND	0.0030	"							
Dieldrin	ND	0.0020	"							
Endosulfan I	ND	0.0020	"							
Endosulfan II	ND	0.0040	"							
Endosulfan sulfate	ND	0.0020	"							
Endrin	ND	0.0020	"							
Endrin aldehyde	ND	0.0020	"							
Endrin ketone	ND	0.0020	"							
Heptachlor	ND	0.0020	"							
Heptachlor epoxide	ND	0.0020	"							
Methoxychlor	ND	0.010	"							
Toxaphene	ND	0.040	"							
Mirex	ND	0.0040	"							
Kepone	ND	0.0040	"							
Surrogate: Decachlorobiphenyl	*0.0106*		*"*	*0.00833*		*127*	*42-147*			
Surrogate: Tetrachloro-meta-xylene	*0.00759*		*"*	*0.00833*		*91.1*	*42-147*			
LCS (B2D2104-BS1)				Prepared: 04/21/12 Analyzed: 04/23/12						
Aldrin	0.00290	0.0020	mg/kg	0.00267		109	80-120			
HCH-gamma (Lindane)	0.00302	0.0020	"	0.00267		113	80-120			
4,4´-DDT	0.00739	0.0030	"	0.00667		111	80-120			
Dieldrin	0.00592	0.0020	"	0.00667		88.8	80-120			
Heptachlor	0.00282	0.0020	"	0.00267		106	80-120			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Organochlorine Pesticides by EPA Method 8081A - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2104 - EPA 3550B Solid Ext										
Matrix Spike (B2D2104-MS1)		**Source: 1204233-01**		Prepared: 04/21/12		Analyzed: 04/23/12				
Aldrin	0.00249	0.0020	mg/kg	0.00267	ND	93.3	50-150			
HCH-gamma (Lindane)	0.00314	0.0020	"	0.00267	ND	118	50-150			
4,4´-DDT	0.00530	0.0030	"	0.00667	ND	79.5	50-150			
Dieldrin	0.00622	0.0020	"	0.00667	ND	93.3	50-150			
Heptachlor	0.00215	0.0020	"	0.00267	ND	80.5	50-150			
Matrix Spike Dup (B2D2104-MSD1)		**Source: 1204233-01**		Prepared: 04/21/12		Analyzed: 04/23/12				
Aldrin	0.00273	0.0020	mg/kg	0.00267	ND	102	50-150	9.20	30	
HCH-gamma (Lindane)	0.00293	0.0020	"	0.00267	ND	110	50-150	6.92	30	
4,4´-DDT	0.00666	0.0030	"	0.00667	ND	99.9	50-150	22.7	30	
Dieldrin	0.00772	0.0020	"	0.00667	ND	116	50-150	21.5	30	
Heptachlor	0.00261	0.0020	"	0.00267	ND	97.8	50-150	19.3	30	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2104 - EPA 3550B Solid Ext										
Blank (B2D2104-BLK1)				Prepared: 04/21/12 Analyzed: 04/23/12						
PCB-1016	ND	0.020	mg/kg							
PCB-1221	ND	0.020	"							
PCB-1232	ND	0.020	"							
PCB-1242	ND	0.020	"							
PCB-1248	ND	0.020	"							
PCB-1254	ND	0.020	"							
PCB-1260	ND	0.020	"							
Surrogate: Decachlorobiphenyl	*0.0111*		*"*	*0.00833*		*133*	*42-147*			
Surrogate: Tetrachloro-meta-xylene	*0.0111*		*"*	*0.00833*		*133*	*42-147*			
LCS (B2D2104-BS1)				Prepared: 04/21/12 Analyzed: 04/23/12						
PCB-1260	0.0662	0.020	mg/kg	0.0667		99.3	80-120			
Matrix Spike (B2D2104-MS1)		**Source: 1204233-01**		Prepared: 04/21/12 Analyzed: 04/23/12						
PCB-1260	0.0683	0.020	mg/kg	0.0667	ND	102	50-150			
Matrix Spike Dup (B2D2104-MSD1)		**Source: 1204233-01**		Prepared: 04/21/12 Analyzed: 04/23/12						
PCB-1260	0.0692	0.020	mg/kg	0.0667	ND	104	50-150	1.31	30	

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Chlorinated Herbicides by EPA Method 8151A - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2302 - EPA 8151A Herbicides										
Blank (B2D2302-BLK1)				Prepared & Analyzed: 04/23/12						
2,4,5-T	ND	1.6	µg/kg							
2,4,5-TP (Silvex)	ND	1.6	"							
2,4-D	ND	1.6	"							
2,4-DB	ND	4.0	"							
3,5-Dichlorobenzoic acid	ND	2.0	"							
4-Nitrophenol	ND	2.0	"							
Acifluorfen	ND	1.6	"							
Bentazon	ND	1.6	"							
Chloramben	ND	1.6	"							
Dalapon	ND	20	"							
DCPA diacid	ND	1.6	"							
Dicamba	ND	1.6	"							
Dichlorprop	ND	1.6	"							
Dinoseb	ND	1.6	"							
Pentachlorophenol	ND	1.6	"							
Picloram	ND	1.6	"							
Surrogate: 2,4-Dichlorophenylacetic Acid	*106*		*"*	*100*		*106*	*35-150*			
LCS (B2D2302-BS1)				Prepared & Analyzed: 04/23/12						
2,4,5-T	10.1	1.6	µg/kg	10.0		101	20-150			
2,4,5-TP (Silvex)	8.96	1.6	"	10.0		89.6	20-150			
Dichlorprop	9.63	1.6	"	10.0		96.3	20-150			
Dinoseb	6.48	1.6	"	10.0		64.8	20-150			
Matrix Spike (B2D2302-MS1)	**Source: 1204233-01**			Prepared & Analyzed: 04/23/12						
2,4,5-T	4.78	1.6	µg/kg	10.0	ND	47.8	20-150			
2,4,5-TP (Silvex)	9.65	1.6	"	10.0	ND	96.5	20-150			
Dichlorprop	13.5	1.6	"	10.0	ND	135	20-150			
Dinoseb	3.43	1.6	"	10.0	ND	34.3	20-150			

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Chlorinated Herbicides by EPA Method 8151A - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2302 - EPA 8151A Herbicides										
Matrix Spike Dup (B2D2302-MSD1)	**Source: 1204233-01**			Prepared & Analyzed: 04/23/12						
2,4,5-T	4.67	1.6	µg/kg	10.0	ND	46.7	20-150	2.33	30	
2,4,5-TP (Silvex)	8.40	1.6	"	10.0	ND	84.0	20-150	13.9	30	
Dichlorprop	10.4	1.6	"	10.0	ND	104	20-150	25.9	30	
Dinoseb	3.46	1.6	"	10.0	ND	34.6	20-150	0.871	30	

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Los Angeles County Dept. of Public Works	Project:	Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number:	HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager:	Geir Mathisen	04/25/12 13:42

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2102 - EPA 5035 P & T										
Blank (B2D2102-BLK1)				Prepared: 04/20/12 Analyzed: 04/21/12						
Benzene	ND	5.0	µg/kg							
Bromobenzene	ND	5.0	"							
Bromochloromethane	ND	5.0	"							
Bromodichloromethane	ND	5.0	"							
Bromoform	ND	5.0	"							
Bromomethane	ND	5.0	"							
n-Butylbenzene	ND	5.0	"							
sec-Butylbenzene	ND	5.0	"							
tert-Butylbenzene	ND	5.0	"							
Carbon tetrachloride	ND	5.0	"							
Chlorobenzene	ND	5.0	"							
Chloroethane	ND	5.0	"							
Chloroform	ND	5.0	"							
Chloromethane	ND	5.0	"							
2-Chlorotoluene	ND	5.0	"							
4-Chlorotoluene	ND	5.0	"							
Dibromochloromethane	ND	5.0	"							
1,2-Dibromo-3-chloropropane	ND	5.0	"							
1,2-Dibromoethane (EDB)	ND	5.0	"							
Dibromomethane	ND	5.0	"							
1,2-Dichlorobenzene	ND	5.0	"							
1,3-Dichlorobenzene	ND	5.0	"							
1,4-Dichlorobenzene	ND	5.0	"							
Dichlorodifluoromethane	ND	5.0	"							
1,1-Dichloroethane	ND	5.0	"							
1,2-Dichloroethane	ND	5.0	"							
1,1-Dichloroethene	ND	5.0	"							
cis-1,2-Dichloroethene	ND	5.0	"							
trans-1,2-Dichloroethene	ND	5.0	"							
1,2-Dichloropropane	ND	5.0	"							
1,3-Dichloropropane	ND	5.0	"							
2,2-Dichloropropane	ND	5.0	"							
1,1-Dichloropropene	ND	5.0	"							
cis-1,3-Dichloropropene	ND	5.0	"							
trans-1,3-Dichloropropene	ND	5.0	"							
Di-isopropyl ether	ND	5.0	"							
Ethyl tert-butyl ether	ND	5.0	"							

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2102 - EPA 5035 P & T										
Blank (B2D2102-BLK1)				Prepared: 04/20/12 Analyzed: 04/21/12						
Ethylbenzene	ND	5.0	µg/kg							
Hexachlorobutadiene	ND	5.0	"							
Isopropylbenzene	ND	5.0	"							
p-Isopropyltoluene	ND	5.0	"							
Methylene chloride	ND	5.0	"							
Methyl tert-butyl ether	ND	5.0	"							
Naphthalene	ND	5.0	"							
n-Propylbenzene	ND	5.0	"							
Styrene	ND	5.0	"							
Tert-amyl methyl ether	ND	5.0	"							
Tert-butyl alcohol	ND	25	"							
1,1,1,2-Tetrachloroethane	ND	5.0	"							
1,1,2,2-Tetrachloroethane	ND	5.0	"							
Tetrachloroethene	ND	5.0	"							
Toluene	ND	5.0	"							
1,2,3-Trichlorobenzene	ND	5.0	"							
1,2,4-Trichlorobenzene	ND	5.0	"							
1,1,1-Trichloroethane	ND	5.0	"							
1,1,2-Trichloroethane	ND	5.0	"							
Trichloroethene	ND	5.0	"							
Trichlorofluoromethane	ND	5.0	"							
1,2,3-Trichloropropane	ND	5.0	"							
1,2,4-Trimethylbenzene	ND	5.0	"							
1,3,5-Trimethylbenzene	ND	5.0	"							
Vinyl chloride	ND	5.0	"							
m,p-Xylene	ND	5.0	"							
o-Xylene	ND	5.0	"							
Surrogate: Dibromofluoromethane	*49.1*		*"*	*50.0*		*98.2*	*80-120*			
Surrogate: Toluene-d8	*49.0*		*"*	*50.0*		*98.0*	*81-117*			
Surrogate: 4-Bromofluorobenzene	*46.0*		*"*	*50.0*		*92.0*	*74-121*			

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900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Volatile Organics & Fuel Oxygenates (GC/MS) by EPA Method 8260B - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2102 - EPA 5035 P & T										
LCS (B2D2102-BS1)				Prepared: 04/20/12 Analyzed: 04/21/12						
Benzene	55.6	5.0	µg/kg	50.0		111	80-120			
Chlorobenzene	54.4	5.0	"	50.0		109	80-120			
1,1-Dichloroethene	52.1	5.0	"	50.0		104	80-120			
Toluene	48.8	5.0	"	50.0		97.6	80-120			
Trichloroethene	53.9	5.0	"	50.0		108	80-120			
Matrix Spike (B2D2102-MS1)	**Source: 1204246-01**			Prepared: 04/20/12 Analyzed: 04/21/12						
Benzene	51.5	5.0	µg/kg	50.0	ND	103	37-151			
Chlorobenzene	56.0	5.0	"	50.0	ND	112	37-160			
1,1-Dichloroethene	59.0	5.0	"	50.0	ND	118	50-150			
Toluene	52.8	5.0	"	50.0	ND	106	47-150			
Trichloroethene	55.6	5.0	"	50.0	ND	111	71-157			
Matrix Spike Dup (B2D2102-MSD1)	**Source: 1204246-01**			Prepared: 04/20/12 Analyzed: 04/21/12						
Benzene	57.3	5.0	µg/kg	50.0	ND	115	37-151	10.7	30	
Chlorobenzene	55.1	5.0	"	50.0	ND	110	37-160	1.62	30	
1,1-Dichloroethene	44.3	5.0	"	50.0	ND	88.6	50-150	28.5	30	
Toluene	51.8	5.0	"	50.0	ND	104	47-150	1.91	30	
Trichloroethene	48.7	5.0	"	50.0	ND	97.4	71-157	13.2	30	

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900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D1107 - EPA 3550B Solid Ext										
Blank (B2D1107-BLK1)				Prepared: 04/09/12 Analyzed: 04/10/12						
Acenaphthene	ND	0.33	mg/kg							
Acenaphthylene	ND	0.33	"							
Anthracene	ND	0.33	"							
Benzidine	ND	0.33	"							
Benzo (a) anthracene	ND	0.33	"							
Benzo (b) fluoranthene	ND	0.33	"							
Benzo (k) fluoranthene	ND	0.33	"							
Benzo (a) pyrene	ND	0.33	"							
Benzo (g,h,i) perylene	ND	0.33	"							
Benzyl alcohol	ND	0.33	"							
Bis(2-chloroethyl)ether	ND	0.33	"							
Bis(2-chloroethoxy)methane	ND	0.33	"							
Bis(2-ethylhexyl)phthalate	ND	0.33	"							
Bis(2-chloroisopropyl)ether	ND	0.33	"							
4-Bromophenyl phenyl ether	ND	0.33	"							
Butyl benzyl phthalate	ND	0.33	"							
4-Chloroaniline	ND	0.33	"							
2-Chlorophenol	ND	0.33	"							
4-Chloro-3-methylphenol	ND	0.33	"							
2-Chloronaphthalene	ND	0.33	"							
4-Chlorophenyl phenyl ether	ND	0.33	"							
Chrysene	ND	0.33	"							
Dibenz (a,h) anthracene	ND	0.33	"							
Dibenzofuran	ND	0.33	"							
1,3-Dichlorobenzene	ND	0.33	"							
1,2-Dichlorobenzene	ND	0.33	"							
1,4-Dichlorobenzene	ND	0.33	"							
3,3´-Dichlorobenzidine	ND	0.33	"							
2,4-Dichlorophenol	ND	0.33	"							
Diethyl phthalate	ND	0.33	"							
2,4-Dimethylphenol	ND	0.33	"							
Dimethyl phthalate	ND	0.33	"							
Di-n-butyl phthalate	ND	0.33	"							
2,4-Dinitrophenol	ND	0.33	"							
4,6-Dinitro-2-methylphenol	ND	0.33	"							
2,4-Dinitrotoluene	ND	0.33	"							
2,6-Dinitrotoluene	ND	0.33	"							

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Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D1107 - EPA 3550B Solid Ext										
Blank (B2D1107-BLK1)				Prepared: 04/09/12 Analyzed: 04/10/12						
Di-n-octyl phthalate	ND	0.33	mg/kg							
1,2-Diphenylhydrazine	ND	0.33	"							
Fluoranthene	ND	0.33	"							
Fluorene	ND	0.33	"							
Hexachlorobenzene	ND	0.33	"							
Hexachlorobutadiene	ND	0.33	"							
Hexachlorocyclopentadiene	ND	0.33	"							
Hexachloroethane	ND	0.33	"							
Indeno (1,2,3-cd) pyrene	ND	0.33	"							
Isophorone	ND	0.33	"							
2-Methylnaphthalene	ND	0.33	"							
2-Methylphenol	ND	0.33	"							
4-Methylphenol	ND	0.33	"							
Naphthalene	ND	0.33	"							
2-Nitroaniline	ND	0.33	"							
3-Nitroaniline	ND	0.33	"							
4-Nitroaniline	ND	0.33	"							
Nitrobenzene	ND	0.33	"							
2-Nitrophenol	ND	0.33	"							
4-Nitrophenol	ND	0.33	"							
N-Nitrosodimethylamine	ND	0.33	"							
Diphenylamine	ND	0.33	"							
N-Nitrosodi-n-propylamine	ND	0.33	"							
Pentachlorophenol	ND	0.33	"							
Phenanthrene	ND	0.33	"							
Phenol	ND	0.33	"							
Pyrene	ND	0.33	"							
1,2,4-Trichlorobenzene	ND	0.33	"							
2,4,5-Trichlorophenol	ND	0.33	"							
2,4,6-Trichlorophenol	ND	0.33	"							
Surrogate: 2-Fluorophenol	*0.411*		*"*	*0.500*		*82.2*	*25-121*			
Surrogate: Phenol-d6	*0.427*		*"*	*0.500*		*85.4*	*24-113*			
Surrogate: Nitrobenzene-d5	*0.283*		*"*	*0.333*		*85.0*	*23-120*			
Surrogate: 2-Fluorobiphenyl	*0.311*		*"*	*0.333*		*93.4*	*30-115*			
Surrogate: 2,4,6-Tribromophenol	*0.369*		*"*	*0.500*		*73.8*	*19-122*			
Surrogate: Terphenyl-d14	*0.291*		*"*	*0.333*		*87.4*	*18-137*			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D1107 - EPA 3550B Solid Ext										
LCS (B2D1107-BS1)				Prepared: 04/09/12 Analyzed: 04/10/12						
Acenaphthene	0.318	0.33	mg/kg	0.333		95.5	47-145			
2-Chlorophenol	0.407	0.33	"	0.667		61.0	23-134			
4-Chloro-3-methylphenol	0.411	0.33	"	0.667		61.6	22-147			
1,4-Dichlorobenzene	0.278	0.33	"	0.333		83.5	20-124			
2,4-Dinitrotoluene	0.311	0.33	"	0.333		93.4	39-139			
4-Nitrophenol	0.242	0.33	"	0.667		36.3	0-132			
N-Nitrosodi-n-propylamine	0.322	0.33	"	0.333		96.7	0-230			
Pentachlorophenol	0.230	0.33	"	0.667		34.5	14-176			
Phenol	0.417	0.33	"	0.667		62.5	5-112			
Pyrene	0.330	0.33	"	0.333		99.1	52-115			
1,2,4-Trichlorobenzene	0.308	0.33	"	0.333		92.5	44-142			
Matrix Spike (B2D1107-MS1)		**Source: 1204096-02**		Prepared: 04/09/12 Analyzed: 04/10/12						
Acenaphthene	0.325	0.33	mg/kg	0.333	ND	97.6	47-145			
2-Chlorophenol	0.395	0.33	"	0.667	ND	59.2	23-134			
4-Chloro-3-methylphenol	0.425	0.33	"	0.667	ND	63.7	22-147			
1,4-Dichlorobenzene	0.293	0.33	"	0.333	ND	88.0	20-124			
2,4-Dinitrotoluene	0.322	0.33	"	0.333	ND	96.7	39-139			
4-Nitrophenol	0.237	0.33	"	0.667	ND	35.5	0-132			
N-Nitrosodi-n-propylamine	0.297	0.33	"	0.333	ND	89.2	0-230			
Pentachlorophenol	0.237	0.33	"	0.667	ND	35.5	14-176			
Phenol	0.406	0.33	"	0.667	ND	60.9	5-112			
Pyrene	0.322	0.33	"	0.333	ND	96.7	52-115			
1,2,4-Trichlorobenzene	0.319	0.33	"	0.333	ND	95.8	44-142			
Matrix Spike Dup (B2D1107-MSD1)		**Source: 1204096-02**		Prepared: 04/09/12 Analyzed: 04/10/12						
Acenaphthene	0.311	0.33	mg/kg	0.333	ND	93.4	47-145	4.40	30	
2-Chlorophenol	0.393	0.33	"	0.667	ND	58.9	23-134	0.508	30	
4-Chloro-3-methylphenol	0.417	0.33	"	0.667	ND	62.5	22-147	1.90	30	
1,4-Dichlorobenzene	0.285	0.33	"	0.333	ND	85.6	20-124	2.77	30	
2,4-Dinitrotoluene	0.306	0.33	"	0.333	ND	91.9	39-139	5.10	30	
4-Nitrophenol	0.255	0.33	"	0.667	ND	38.2	0-132	7.32	30	
N-Nitrosodi-n-propylamine	0.308	0.33	"	0.333	ND	92.5	0-230	3.64	30	
Pentachlorophenol	0.236	0.33	"	0.667	ND	35.4	14-176	0.423	30	
Phenol	0.398	0.33	"	0.667	ND	59.7	5-112	1.99	30	
Pyrene	0.324	0.33	"	0.333	ND	97.3	52-115	0.619	30	
1,2,4-Trichlorobenzene	0.316	0.33	"	0.333	ND	94.9	44-142	0.945	30	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

26052 MERIT CIRCLE SUITE 105, LAGUNA HILLS, CALIFORNIA 92653
TELEPHONE: (949) 348-9389 FAX: (949) 348-9115
E-MAIL: SIERRALABS @ SIERRALABS.NET

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Polynuclear Aromatic Compounds by EPA Method 8310 - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2408 - EPA 3550B Solid Ext										
Blank (B2D2408-BLK1)				Prepared: 04/24/12 Analyzed: 04/25/12						
Naphthalene	ND	40.0	µg/kg							
Acenaphthylene	ND	200	"							
Acenaphthene	ND	50.0	"							
Fluorene	ND	5.00	"							
Phenanthrene	ND	5.00	"							
Anthracene	ND	2.00	"							
Fluoranthene	ND	5.00	"							
Pyrene	ND	5.00	"							
Benzo (a) anthracene	ND	2.00	"							
Chrysene	ND	5.00	"							
Benzo (b) fluoranthene	ND	5.00	"							
Benzo (k) fluoranthene	ND	2.00	"							
Benzo (a) pyrene	ND	2.00	"							
Dibenzo(a,h)anthracene	ND	5.00	"							
Benzo (g,h,i) perylene	ND	5.00	"							
Indeno (1,2,3-cd) pyrene	ND	5.00	"							
Surrogate: Decafluorobiphenyl	*323*		*"*	*500*		*64.6*	*30-140*			
LCS (B2D2408-BS1)				Prepared: 04/24/12 Analyzed: 04/25/12						
Naphthalene	53.0	40.0	µg/kg	50.0		106	60-130			
Fluorene	49.8	5.00	"	50.0		99.6	60-130			
Pyrene	51.1	5.00	"	50.0		102	60-130			
Benzo (a) pyrene	57.7	2.00	"	50.0		115	60-130			
Indeno (1,2,3-cd) pyrene	46.7	5.00	"	50.0		93.4	60-130			
Surrogate: Decafluorobiphenyl	*507*		*"*	*500*		*101*	*30-140*			
Matrix Spike (B2D2408-MS1)	**Source: 1204233-01**			Prepared: 04/24/12 Analyzed: 04/25/12						
Naphthalene	58.9	40.0	µg/kg	50.0	ND	118	60-140			
Fluorene	55.6	5.00	"	50.0	ND	111	60-140			
Pyrene	57.5	5.00	"	50.0	ND	115	60-140			
Benzo (a) pyrene	32.4	2.00	"	50.0	ND	64.8	60-140			
Indeno (1,2,3-cd) pyrene	32.1	5.00	"	50.0	ND	64.2	60-140			
Surrogate: Decafluorobiphenyl	*199*		*"*	*500*		*39.8*	*30-140*			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project: Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number: HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager: Geir Mathisen	04/25/12 13:42

Polynuclear Aromatic Compounds by EPA Method 8310 - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2D2408 - EPA 3550B Solid Ext										
Matrix Spike Dup (B2D2408-MSD1)	**Source: 1204233-01**			Prepared: 04/24/12 Analyzed: 04/25/12						
Naphthalene	54.2	40.0	µg/kg	50.0	ND	108	60-140	8.31	20	
Fluorene	57.1	5.00	"	50.0	ND	114	60-140	2.66	20	
Pyrene	49.9	5.00	"	50.0	ND	99.8	60-140	14.2	20	
Benzo (a) pyrene	30.7	2.00	"	50.0	ND	61.4	60-140	5.39	20	
Indeno (1,2,3-cd) pyrene	34.2	5.00	"	50.0	ND	68.4	60-140	6.33	20	
Surrogate: Decafluorobiphenyl	*383*		*"*	*500*		*76.6*	*30-140*			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Los Angeles County Dept. of Public Works	Project:	Big T Res. Sed. Char. Program	
900 S. Fremont Ave.	Project Number:	HF00710003	**Reported:**
Alhambra CA, 91803	Project Manager:	Geir Mathisen	04/25/12 13:42

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Client: Sierra Analytical
26052 Merit Circle, Suite 105
Laguna Hills, CA 92653

Report Date: 05/08/12 16:07
Received Date: 04/23/12 12:50
Turnaround Time: Normal

Phones: (949) 348-9389
Fax: (949) 348-9115

Attn: Nick Forsyth
Project: 1204233

P.O. #:

Dear Nick Forsyth :

Enclosed are the results of analyses for samples received 4/23/2012 with the Chain of Custody document. The samples were received in good condition, at 3.3 °C and on ice. All analysis met the method criteria except as noted below or in the report with data qualifiers.

Lab Sample ID: 2D23040-01 **Sample ID:** B-10-2 (1204233-01) **Matrix:** Soil
Sampled by: Client **Sampled:** 04/18/12 11:50

Analyte	Result	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
1,4-Dioxane	ND	61	ug/kg	1	EPA 8270M	4/23/12	4/25/12 19:14	W2D0993	
3-Hydroxycarbofuran	ND	25	ug/kg	1	EPA 8318	4/24/12	5/7/12 12:54	W2D0999	
Aldicarb	ND	25	ug/kg	1	EPA 8318	4/24/12	5/7/12 12:54	W2D0999	
Aldicarb sulfone	ND	25	ug/kg	1	EPA 8318	4/24/12	5/7/12 12:54	W2D0999	
Carbaryl	ND	25	ug/kg	1	EPA 8318	4/24/12	5/7/12 12:54	W2D0999	
Carbofuran	ND	25	ug/kg	1	EPA 8318	4/24/12	5/7/12 12:54	W2D0999	
Methiocarb	ND	25	ug/kg	1	EPA 8318	4/24/12	5/7/12 12:54	W2D0999	
Methomyl	ND	25	ug/kg	1	EPA 8318	4/24/12	5/7/12 12:54	W2D0999	
Oxamyl	ND	50	ug/kg	1	EPA 8318	4/24/12	5/7/12 12:54	W2D0999	
Propoxur (Baygon)	ND	25	ug/kg	1	EPA 8318	4/24/12	5/7/12 12:54	W2D0999	

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Certificate of Analysis

Quality Control Section

1,4-Dioxane Low Level by isotopic dilution GC/MS - Quality Control

Batch W2D0993 - EPA 8270M

Blank (W2D0993-BLK1) — Prepared: 04/23/12 — Analyzed: 04/25/12 18:01

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
1,4-Dioxane		ND		ug/kg					

LCS (W2D0993-BS1) — Prepared: 04/23/12 — Analyzed: 04/25/12 18:19

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
1,4-Dioxane		492		ug/kg	500	98	67-130		

Matrix Spike (W2D0993-MS1) — Source: 2D23040-01 — Prepared: 04/23/12 — Analyzed: 04/25/12 18:37

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
1,4-Dioxane	0.00	1500		ug/kg	1470	102	55-143		

Matrix Spike Dup (W2D0993-MSD1) — Source: 2D23040-01 — Prepared: 04/23/12 — Analyzed: 04/25/12 18:55

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
1,4-Dioxane	0.00	1480		ug/kg	1460	101	55-143	1	30

Carbamates and Urea Pesticides - Quality Control

Batch W2D0999 - EPA 8318

Blank (W2D0999-BLK1) — Prepared: 04/24/12 — Analyzed: 05/06/12 23:59

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Aldicarb sulfone		ND		ug/kg					
Methomyl		ND		ug/kg					
3-Hydroxycarbofuran		ND		ug/kg					
Aldicarb		ND		ug/kg					
Propoxur (Baygon)		ND		ug/kg					
Carbofuran		ND		ug/kg					
Carbaryl		ND		ug/kg					
Methiocarb		ND		ug/kg					
Oxamyl		ND		ug/kg					

LCS (W2D0999-BS1) — Prepared: 04/24/12 — Analyzed: 05/06/12 23:59

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Aldicarb sulfone		48.7		ug/kg	50.0	97	52-137		
Methomyl		41.3		ug/kg	50.0	83	45-153		
3-Hydroxycarbofuran		44.5		ug/kg	50.0	89	47-130		
Aldicarb		28.7		ug/kg	50.0	57	47-142		
Propoxur (Baygon)		44.7		ug/kg	50.0	89	58-127		
Carbofuran		41.4		ug/kg	50.0	83	64-128		
Carbaryl		18.9		ug/kg	50.0	38	34-130		
Methiocarb		7.20	BS-03	ug/kg	50.0	14	17-153		

Matrix Spike (W2D0999-MS1) — Source: 2D23040-01 — Prepared: 04/24/12 — Analyzed: 05/07/12 15:00

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Aldicarb sulfone	ND	52.3		ug/kg	50.0	105	45-147		

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Certificate of Analysis

Carbamates and Urea Pesticides - Quality Control

Batch W2D0999 - EPA 8318

Matrix Spike (W2D0999-MS1) **Source: 2D23040-01** **Prepared: 04/24/12** **Analyzed: 05/07/12 15:00**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Methomyl	ND	46.0		ug/kg	50.0	92	28-156		
3-Hydroxycarbofuran	ND	51.2		ug/kg	50.0	102	47-130		
Aldicarb	ND	31.1		ug/kg	50.0	62	46-119		
Propoxur (Baygon)	ND	45.7		ug/kg	50.0	91	45-144		
Carbofuran	ND	42.3		ug/kg	50.0	85	66-139		
Carbaryl	ND	21.4		ug/kg	50.0	43	34-130		
Methiocarb	ND	8.68		ug/kg	50.0	17	17-153		

Matrix Spike Dup (W2D0999-MSD1) **Source: 2D23040-01** **Prepared: 04/24/12** **Analyzed: 05/07/12 15:00**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Aldicarb sulfone	ND	51.5		ug/kg	50.0	103	45-147	2	20
Methomyl	ND	45.1		ug/kg	50.0	90	28-156	2	20
3-Hydroxycarbofuran	ND	48.1		ug/kg	50.0	96	47-130	6	20
Aldicarb	ND	31.6		ug/kg	50.0	63	46-119	2	20
Propoxur (Baygon)	ND	44.9		ug/kg	50.0	90	45-144	2	20
Carbofuran	ND	41.1		ug/kg	50.0	82	66-139	3	20
Carbaryl	ND	20.1		ug/kg	50.0	40	34-130	6	20
Methiocarb	ND	9.32		ug/kg	50.0	19	17-153	200	20

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Certificate of Analysis

Notes:
The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless otherwise specified.

An Absence of Total Coliform meets the drinking water standards as established by the State of California Department of Health Services.
The Reporting Limit (RL) is referenced as laboratory's Practical Quantitation Limit (PQL).
For Potable water analysis, the Reporting Limit (RL) is referenced as Detection Limit for reporting purposes (DLRs) defined by EPA.

If sample collected by Weck Laboratories, sampled in accordance to lab SOP MIS002

Authorized Signature
Contact: Kim G Tu (Project Manager)

ELAP # 1132
LACSD # 10143
NELAC # 04229CA

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Weck Laboratories certifies that the test results meet all requirements of NELAC unless noted in the Case Narrative. This analytical report must be reproduced in its entirety.

Flags for Data Qualifiers:

BS-03	The recovery of this analyte in the BS/LCS was outside the control limits. The sample result was accepted based on another acceptable BS/LCS and/or MS and MSD that meet BS criteria.
ND	NOT DETECTED at or above the Reporting Limit. If J-value reported, then NOT DETECTED at or above the Method Detection Limit (MDL).
Sub	Subcontracted analysis, original report enclosed.
DL	Method Detection Limit
RL	Method Reporting Limit
MDA	Minimum Detectable Activity
NR	Not Reportable

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www.wecklabs.com

SUBCONTRACT ORDER

Sierra Analytical Labs, Inc.

Sierra Project #: 1204233

Comments 2d23040

SENDING LABORATORY:

Sierra Analytical Labs, Inc.
26052 Merit Circle, Suite 104
Laguna Hills, CA 92653
Phone: (949) 348-9389
Fax: (949) 348-9115
Laboratory Contact: Nick Forsyth

Turn Around Time Requested: ☒ Normal ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 4 Day ☐ 5 Day

RECEIVING LABORATORY:

Weck Laboratories
14859 E. Clark Ave.
City of Industry, CA 91745
Phone : (626) 336-2139
Fax: (626) 336-2634

Analysis	Expires	Sampled:	Laboratory ID	Comments
Sample ID: B-10-2 (1204233-01)	**Soil**	**04/18/12 11:50**		
8270C 14-Dioxane (Low Level)	04/25/12 11:50			
~~8321~~ Carbamate Pesticides 8318 (W 4/23/12	05/02/12 11:50			
Containers Supplied:				
8 oz. Jar (C)	~~8 oz. Jar (D)~~			

Special Instructions :

☐ Intact ☐ Sample Seals
☐ Properly Labeled ☐ Chilled TEMP (°C) 3.3 °C
☐ Appropriate Container ☐ Preservatives - Verified By

Relinquished By	Date / Time	Received By	Date / Time
[signature]	4/23/12 @ 12:50	Stephanie [signature]	4-23-12 12:50

4C04 24/12

Weck Laboratories, Inc.
Environmental and Analytical Services - Since 1964

Sample Receipt Acknowledgement

WORK ORDER: 2D23040

Printed: 4/24/2012 11:53:42AM

Client: Sierra Analytical
Project: 1,4-Dioxane, RSK-175

Project Manager: Kim G Tu
Project Number: 1204233

Report To:
Sierra Analytical
Nick Forsyth
26052 Merit Circle, Suite 105
Laguna Hills, CA 92653
Phone: (949) 348-9389
Fax: (949) 348-9115

Invoice To:
Sierra Analytical
Andrew Kim
26052 Merit Circle, Suite 105
Laguna Hills, CA 92653
Phone :(949) 348-9389
Fax: (949) 348-9115

Date Due: **05/07/12 15:00 (10 day TAT)**

Received By: Stephanie J Gochez
Logged In By: Jaime Gomez

Date Received: 04/23/12 12:50
Date Logged In: 04/23/12 13:35

Samples Received at:	**3.3°C**	All containers intact:	**Yes**	Chain of custody completed:	**Yes**
Number of Ice chests/packages:	**1**	Custody seals preser	**NA**	Sample labels & COC agree:	**Yes**
		Custody seals intact:	**NA**	Samples preserved properly:	**Yes**
Appropriate Sample Containers:	**Yes**	Samples received on ic	**Yes**	Sample volume sufficient:	**Yes**
		Custody Seals	**No**	Sufficient holding time for all tests:	**Yes**

Analysis	TAT	Expires	Comments
2D23040-01 B-10-2 (1204233-01) [Soil] Sampled 04/18/12 11:50 Pacific			
8318 Solid	10	04/25/12 11:50	
1,4-Dioxane_s	10	04/25/12 11:50	

Comments:

Authorized Signature

4/24/2012
Date

Note:
If any of the information included in this sample receipt acknowledgement is incorrect (sample information, analysis, etc), please contact the lab at (626) 336-2139. Thank you.

14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

May 09, 2012 Service Request No: E1200403

Richard Forsyth
Sierra Analytical Laboratory, Inc
26052 Merit Circle, Suite 104
Laguna Hills, CA 92653

Laboratory Results for: 1204233

Dear Richard:

Enclosed are the results of the sample(s) submitted to our laboratory on April 25, 2012. For your reference, these analyses have been assigned our service request number **E1200403**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the final complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. In accordance to the TNI 2009 Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Please contact me if you have any questions. My extension is 2962. You may also contact me via email at MCosson@caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc. dba ALS Environmental

Digitally signed by
Michael Cosson
Date: 2012.05.11
10:52:57 -05'00'

Michael Cosson
Project Manager

Page 1 of _____

For a specific list of NELAP-accredited analytes, refer to the certifications section at www.caslab.com.

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Certificate of Analysis

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COLUMBIA ANALYTICAL SERVICES, INC
dba ALS Environmental

Client:	Sierra Analytical Laboratory, Inc	**Service Request No.:**	E1200403
Project:	1204233	**Date Received:**	04/25/12
Sample Matrix:	Soil		

CASE NARRATIVE

All analyses were performed in adherence to the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

One soil sample was received for analysis at Columbia Analytical Services on 04/25/12.

The following discrepancies were noted upon initial sample inspection: no custody seals on cooler. The exceptions are also noted on the cooler receipt and preservation form included in this data package.

The sample was received at 4°C in good condition and is consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4°C upon receipt at the laboratory.

Data Validation Notes and Discussion

MS/MSD

EQ1200231: A Laboratory Control Spike (LCS) sample was analyzed and reported in addition to an MS/MSD for this extraction batch. The batch quality control criteria were met.

Detection Limits

Detection limits are calculated for each analyte in each sample by measuring the height of the noise level for each quantitation ion for the associated labeled standard. The concentration equivalent to 2.5 times the height of the noise is then calculated using the appropriate response factor and the weight of the sample. The calculated concentration equals the detection limit.

Use of Columbia Analytical Services, Inc. (CAS) Name. Client shall not use CAS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to CAS any test result, tolerance or specification derived from CAS's data ("Attribution") without CAS's prior written consent, which may be withheld by CAS for any reason in its sole discretion. To request CAS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If CAS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use CAS's name or trademark in any Materials or Attribution shall be deemed denied. CAS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of CAS's name or trademark may cause CAS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

Client: Sierra Analytical Laboratory, Inc **Service Request:** E1200403
Project: 1204233

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
E1200403-001	B-10-2 (1204233-01)	4/18/12	11:50

Laboratory Certifications
2012-2013

STATE/PROGRAM	AGENCY	CERT#	EXP DATE	CERTIFIED?
DoD ELAP	A2LA	2897.01	11/30/12	Yes
ISO 17025	A2LA	2897.01	11/30/12	Yes
ARIZONA	AZ-DHS	AZ0725	05/27/12	Yes
ARKANSAS	ADEQ	10-035-0	06/16/12	Yes
CALIFORNIA	CA-ELAP	2452	02/28/13	Yes
FLORIDA/NELAP	FL-DOHS	E87611	06/30/12	Yes
HAWAII	HI-DOH	N/A	06/30/12	Yes
ILLINOIS/NELAP	IL-EPA	002611	10/26/12	Yes
LOUISIANA/NELAP	LELAP	03048	06/30/12	Yes
LOUISIANA/NELAP	LDHH	LA100032	12/31/12	Yes
MAINE	ME-DOHS	2010041	06/05/12	Yes
MICHIGAN	MIDEQ	9971	06/30/12	Yes
MINNESOTA	MDH	048-999-427	12/31/12	Yes
NEVADA	NDEP	TX014112010A	07/31/12	Yes (Extension)
NEW JERSEY	NJDEP	TX008	06/30/12	Yes
NEW MEXICO	NMED-DWB	N/A	06/30/12	Yes
NEW YORK/NELAP	NY-DOH	11707	04/1/12	Yes
OKLAHOMA	OKDEQ	2010-022	08/31/12	Yes
OREGON/NELAP	ORELAP	TX200002-006	03/24/12	Yes
PENNSYLVANIA/NELAP	PLAP	002	06/30/12	Yes
TENNESSEE	TNDEC	04016	06/30/12	Yes
TEXAS/NELAP	TCEQ	T104704216-10-1	06/30/12	Yes
UTAH/NELAP	UTELCP	COLU2	06/30/12	Yes
SOIL IMPORT PERMIT	USDA	P330-12-00002	01/13/15	Yes
WASHINGTON/NELAP	WA-Ecology	C819-10	11/14/12	Yes
WEST VIRGINIA	WVDEP	347	06/30/12	Yes

Abbreviations, Acronyms & Definitions

Cal	Calibration
Conc	CONCentration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
MRL	Method Reporting Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent Recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
RRT	Relative Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-Noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient

Data Qualifier Flags – Dioxin/Furans

- **B** Indicates the associated analyte is found in the method blank, as well as in the sample.

- **C** Confirmation of the TCDF compound: When 2378-TCDF is detected on the DB-5 column, confirmation analyses are performed on a second column (DB-225). The results from both the DB-5 column and the DB-225 column are included in this data package. The results from the DB-225 analyses should be used to evaluate the 2378-TCDF in the samples. The confirmed result should be used in determining the TEQ value for TCDF.

- **E** Indicates an estimated value – used when the analyte concentration exceeds the upper end of the linear calibration range.

- **J** Indicates an estimated value – used when the analyte concentration is below the method reporting limit (MRL) and above the estimated detection limit (EDL).

- **K** EMPC - When the ion abundance ratios associated with a particular compound are outside the QC limits, samples are flagged with a 'K' flag. A 'K' flag indicates an estimated maximum possible concentration for the associated compound.

- **U** Indicates the compound was analyzed and not detected.

- **Y** Samples that had recoveries of labeled standards outside the acceptance limits are flagged with 'Y'. In all cases, the signal-to-noise ratios are greater than 10:1, making these data acceptable.

- **ND** Indicates concentration is reported as 'Not Detected.'

- **S** Peak is saturated; data not reportable.

- **P** Indicates chlorodiphenyl ether interference present at the retention time of the target compound.

- **Q** Lock-mass interference by chlorodiphenyl ether compounds.

COLUMBIA ANALYTICAL SERVICES, INC. – Houston
Data Processing/Form Production and Peer Review Signatures

SR# Unique ID: EQ1200231 | (DB-5) | DB-225 | SPB-Octyl

First Level - Data Processing - to be filled by person generating the forms

Date:	Analyst:	Samples:
05/02/12	TC	-03, -04

Second Level - Data Review – to be filled by person doing peer review

Date:	Analyst:	Samples:
05/02/12	UKL	-03, -04

EQ1200231_03 → E1200403_001MS
EQ1200231_04 → E1200403_001DMS

COLUMBIA ANALYTICAL SERVICES, INC. – Houston
Data Processing/Form Production and Peer Review Signatures

SR# Unique ID: E1200403 (DB-5) DB-225 SPB-Octyl

First Level - Data Processing – to be filled by person generating the forms

Date:	Analyst:	Samples:
05/02/12	JC	-001

Second Level - Data Review – to be filled by person doing peer review

Date:	Analyst:	Samples:
05/02/12	LKL	-001

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Analytical Results

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COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Report

Client:	Sierra Analytical Laboratory, Inc	**Service Request:**	E1200403
Project:	1204233	**Date Collected:**	4/18/12 1150
Sample Matrix:	Soil	**Date Received:**	4/25/12
Sample Name:	B-10-2 (1204233-01)	**Units:**	ng/Kg
Lab Code:	E1200403-001	**Basis:**	Dry
		Percent Solids:	97.3

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor	Date Analyzed	Time Analyzed	Date Extracted
2,3,7,8-TCDD	ND	U	0.0633	0.976			1	5/1/12	1948	4/27/12

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	629.419	63		40-135	0.80	1.008
37Cl-2,3,7,8-TCDD	800	528.484	66		40-135	NA	1.009

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Report

Client:	Sierra Analytical Laboratory, Inc	**Service Request:**	E1200403
Project:	1204233	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ng/Kg
Lab Code:	EQ1200231-01	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor	Date Analyzed	Time Analyzed	Date Extracted
2,3,7,8-TCDD	ND	U	0.0761	0.927			1	5/1/12	1900	4/27/12

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	646.860	65		40-135	0.81	1.008
37Cl-2,3,7,8-TCDD	800	568.605	71		40-135	NA	1.009

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Client:	c Rqqust Nuc E1uos2 u04quE4q 3NXl	**Service Request:**	a Serrvri
Project:	Servei i	**Date Analyzed:**	F9SS9Se
Sample Matrix:	c4 o		

Lab Control Sample Summary

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	Lebr	**Units:**	N59C5
Prep Method:	A RFn4l	**Basis:**	I q
		Extraction Lot:	sSF6F6L

Lab Control Sample

a y Serrei Sgre

Analyte Name	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**
e3 3f 3Lgm, I I	eeHI	SbHI	SS6	Frsgs SFr

Results flagged with an asterisk (*) indicate values outside control criteria.

TRqlRNSqR14- RqRPsuN sqRuE- RsdRqlRNSl . . RqRNlRPsxh TI zsuqRsl RPRq(NRl s0: sEnRsP4. E uqRs) P N5s- uo) RPs NsEnRsluol) ouE4Ns' n lnsnu- RsN4l50RRNsq4) N lRl H

Tq NERl sF9b9Sessf DFv p4q(si ,

wWXo4' ewEuqo(P2 E1200403 4Nsq4ocu(dcRdqlE 14 of 25 c) dRqcRlsh R RqRNlRD SegrrrreSSreesqR-srr

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Report

Client:	Sierra Analytical Laboratory, Inc	**Service Request:**	E1200403
Project:	1204233	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	ng/Kg
Lab Code:	EQ1200231-02	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor	Date Analyzed	Time Analyzed	Date Extracted
2,3,7,8-TCDD	**22.3**		0.0892	0.963	0.80	1.001	1	5/1/12	2347	4/27/12

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	644.210	64		40-135	0.81	1.008
37Cl-2,3,7,8-TCDD	800	530.080	66		40-135	NA	1.009

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QA/QC Report

Client:	Sierra Analytical Laboratory, Inc	**Service Request:**	E1200403
Project:	1204233	**Date Collected:**	4/18/12
Sample Matrix:	Soil	**Date Received:**	4/25/12
		Date Analyzed:	5/ 1/12

Matrix Spike Summary
Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Sample Name:	B-10-2 (1204233-01)	**Units:**	ng/Kg
Lab Code:	E1200403-001	**Basis:**	Dry

Analytical Method: 8290
Prep Method: Method

		B-10-2 (1204233-01)MS **Matrix Spike** EQ1200231-03			B-10-2 (1204233-01)DMS **Duplicate Matrix Spike** EQ1200231-04					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
2,3,7,8-TCDD	ND	24.2	19.0	127	23.4	18.8	124	50 - 150	2	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Sierra Analytical Laboratory, Inc	**Service Request:**	E1200403
Project:	1204233	**Date Collected:**	4/18/12 1150
Sample Matrix:	Soil	**Date Received:**	4/25/12
Sample Name:	B-10-2 (1204233-01)	**Units:**	ng/Kg
Lab Code:	EQ1200231-03	**Basis:**	Dry
Run Type:	Matrix Spike	**Percent Solids:**	97.3

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor	Date Analyzed	Time Analyzed	Date Extracted
2,3,7,8-TCDD	**24.2**		0.0691	0.950	0.82	1.001	1	5/1/12	2211	4/27/12

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	678.614	68		40-135	0.81	1.008
37Cl-2,3,7,8-TCDD	800	617.856	77		40-135	NA	1.009

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Report

Client:	Sierra Analytical Laboratory, Inc	**Service Request:**	E1200403
Project:	1204233	**Date Collected:**	4/18/12 1150
Sample Matrix:	Soil	**Date Received:**	4/25/12
Sample Name:	B-10-2 (1204233-01)	**Units:**	ng/Kg
Lab Code:	EQ1200231-04	**Basis:**	Dry
Run Type:	Duplicate Matrix Spike	**Percent Solids:**	97.3

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor	Date Analyzed	Time Analyzed	Date Extracted
2,3,7,8-TCDD	**23.4**		0.0642	0.942	0.80	1.001	1	5/1/12	2259	4/27/12

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	692.695	69		40-135	0.81	1.008
37Cl-2,3,7,8-TCDD	800	600.845	75		40-135	NA	1.009

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Chain of Custody

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SUBCONTRACT ORDER

Sierra Analytical Labs, Inc.

Sierra Project #: 1204233

Comments

SENDING LABORATORY:

Sierra Analytical Labs, Inc.
26052 Merit Circle, Suite 104
Laguna Hills, CA 92653
Phone: (949) 348-9389
Fax: (949) 348-9115
Laboratory Contact: Nick Forsyth

Turn Around Time Requested: ☐ Normal ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 4 Day ☐ 5 Day

RECEIVING LABORATORY:

Columbia Analytical Services, Inc.
19408 Park Row Suite 320
Houston, TX 77084
Phone : (713) 266-1599
Fax:

Analysis	Expires	Sampled:	Laboratory ID	Comments
Sample ID: B-10-2 (1204233-01)	**Soil**	**04/18/12 11:50**		
Dioxin 8280 (2378-TCDD)	05/18/12 11:50			

Containers Supplied:
8 oz. Jar (E)

No seals 4°C
Blue ice / Bubble wrap
Tr# 126a3w10 or 48417867

Special Instructions :
PLEASE SHIP BACK ICE CHEST!
THANK YOU

☐ Intact ☐ Sample Seals
☐ Properly Labeled ☐ Chilled TEMP (°C) _____
☐ Appropriate Container ☐ Preservatives - Verified By _____

Relinquished By	Date / Time	Received By	Date / Time
	4/04/12 @ 1500		
Relinquished By	Date / Time	Received By	Date / Time
Relinquished By	Date / Time	Received By	Date / Time
			4-05-12 937

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Cooler Receipt Form

Project Chemist: MC

Client/Project: Sierra Analytical; 1204233

Service Request: E1200403

Date/Time Received: 4/25/12 09:37:00

Date/Time Logged in: 4/25/12 10:35:00

Technician: TL

Technician: TL

1. Method of delivery: ○ US Mail ○ Fed Ex ◉ UPS ○ DHL ○ Courier ○ Client

2. Samples received in: ◉ Cooler ○ Box ○ Envelope ○ Other

3. Were custody seals on coolers? ○ Yes ◉ No ○ N/A

Were they intact? ○ Yes ○ No ◉ N/A

Were they signed and dated? ○ Yes ○ No ◉ N/A

If yes, how many and where?

4. Method of delivery: ○ Inserts ○ Baggies ☑ Bubble Wrap ☑ Gel Packs ○ Wet Ice ○ Sleeves ○ Other

5. Foreign or Regulated Soil? ○ Yes ○ No

Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?	Filed
1Z693W100148417867		Apr 25, 2012	0937	TL	4/4	☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

6. Were custody papers properly filled out (ink, signed, dated, etc)? ◉ Yes ○ No ○ N/A

7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ◉ Yes ○ No ○ N/A

8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ◉ Yes ○ No ○ N/A

9. Were appropriate bottles/containers and volumes received for the requested tests? ◉ Yes ○ No ○ N/A

10. Did sample labels and tags agree with custody documents? ◉ Yes ○ No ○ N/A

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Broken	Date	Technician
			☐	☐		
			☐	☐		
			☐	☐		
			☐	☐		

Notes, Discrepancies, & Resolutions:

Print Form

Reset Form

Columbia Analytical Services INC

Sample Acceptance Policy

This policy outlines the criteria samples must meet to be accepted by CAS/ Houston.

Cooler Custody Seals (desirable, mandatory if specified in SAP):

- ✓ Intact on outside of cooler, signed and dated

Chain-of-Custody (COC) documentation (mandatory):

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample
- ✓ The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, CAS/Houston will complete a COC, which must be approved by the client, in writing, prior to proceeding with the analysis.

Sample Integrity (mandatory):

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

Temperature Requirement (varies by sample matrix):

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples can be shipped and stored at ambient temperature, ~23°C.
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder.

Service Request Summary

Folder #: **E1200403**

y ,verREc1 vs n,viicRCec 5r,: c Rbc2NicrNi5pRSe:
t iNov: rREc1 vs 043M4aa
t iNov: rREu1 2vis

Report To: f ,: 9ciI RgNih5r9
n,viicRCec 5r,: c Rbc2NicrNi5pRSe:
4' 3P4R vi,rRy,i: vpRu,rvR03M
bcLuecRd, hpRyCRR4' Pa

t 9NevREu1 2vis -M4TaM4T-ax-
yv REu1 2vis
gczREu1 2vis -M4TaM4T-00P
HTl c, s i,: Y)@h,viic c2hjevr

t iNov: rRy 9v1 ,hrsR . ,: 9cv RyNhhNe
F i,L,ecr,eLRbc2sR d F Anl F E
bNLLvI R65sR l bCggHf l m
q crvRCv: v,vvI s M4P/04
Serviec RquvRq crvsR P/0'/04
(Ct sR bC6 R(Ct
(uc ,),viRnvrsR yCnRnrceI ciI
gNi l hvrsR yCnRnrceI ciI
. viLvI DsR m
f vwNirRNR. q bDsR m
t jF jREu1 2visR 043M4aa
Hq q sR ENRHq q Rnwv: ,),vI

R0 TMRN_TG chhRciRRV. RybHCf R v) NeRb,eviRAewivhvivvI

Location: HTWSyF 4T6NzR0'

CAS Samp No	Client Samp No.	Matrix	Collected		SVM x4-3/RyqqR tyqg	SVM yCnRFt/RNrcR nN,Ih
H0433M3aT330	6T03T4R(043M4aaT30)	nN,	M0x/04	00P3	II	II

Preparation Information Benchsheet

Prep Run#: 156568 **Prep WorkFlow:** OrgExtDioxS(30) **Status:** Prepped
Team: Semivoa GCMS/EBAUCH **Prep Method:** Method **Prep Date/Time:** 4/27/12 11:46 AM

#	Lab Code	Client ID	B#	Method /Test	pH	Matrix	Amt. Ext.	Sample Description
1	E1200403-001	B-10-2 (1204233-01)	.01	8290/PCDD PCDF		Soil	10.533g	wet sand
2	E1200409-001	B215-08	.01	8290/PCDD PCDF		Soil	10.658g	dark brown sand
3	E1200410-001	B218-08	.01	8290/PCDD PCDF		Soil	10.704g	dark brown sand
4	EQ1200231-01	MB		8290/PCDD PCDF		Solid	10.793g	
5	EQ1200231-02	LCS		8290/PCDD PCDF		Solid	10.385g	
6	EQ1200231-03	B-10-2 (1204233-01) MS	.01	8290/PCDD PCDF		Solid	10.820g	
7	EQ1200231-04	B-10-2 (1204233-01) DMS	.01	8290/PCDD PCDF		Solid	10.907g	

Spiking Solutions

Name: 8290 Matrix Working Standard Inventory ID 41918 Logbook Ref: D13-6-3 (41918) Expires On: 04/02/2013

EQ1200231-02 100.00µL EQ1200231-03 100.00µL EQ1200231-04 100.00µL

Name: 8290/1613B Cleanup Working Standard Inventory ID 43357 Logbook Ref: D13-9-2 (43357) Expires On: 04/13/2013

E1200403-001 100.00µL E1200409-001 100.00µL E1200410-001 100.00µL EQ1200231-01 100.00µL EQ1200231-02 100.00µL EQ1200231-03 100.00µL
EQ1200231-04 100.00µL

Name: 8290 Internal Working Standard Inventory ID 44132 Logbook Ref: D13-11-5 (44132) Expires On: 10/24/2012

E1200403-001 100.00µL E1200409-001 100.00µL E1200410-001 100.00µL EQ1200231-01 100.00µL EQ1200231-02 100.00µL EQ1200231-03 100.00µL
EQ1200231-04 100.00µL

Preparation Materials

Carbon, High Purity	C2-71-3 (3107002) (43223)	Ethyl Acetate 99.9% Minimum EtOAc	C2-62-5 (35709)	Glass Wool	C2-70-3 (K93168686) (43370)
Sulfuric Acid Reagent Grade H2SO4	C2-70-7 (51182) (42520)	Dichloromethane (Methylene Chloride) 99.9% MeCl2	C2-71-5 (51266) (43224)	Sodium Chloride Reagent Grade NaCl	C2-65-5 (38670)
Sodium Hydroxide Reagent Grade NaOH	C2-53-6 (27838)	Sodium Sulfate Anhydrous Reagent Grade Na2SO4	C2-69-4 (2351C512) (40800)	Tridecane (n-Tridecane)	C2-69-3 (MKBG6777V) (40799)
Hexane (n-Hexane) 98.5% Minimum	C2-70-4 (51300) (42518)	Nonane (n-Nonane) 99%	C2-48-7 (STBB5477) (39812)	Silica Gel Reagent Grade	C2-70-1 (TH02H2EMS) (42517)
Toluene 99.9% Minimum	C2-70-5 (51195) (42519)				

Preparation Steps

Step:	Extraction	Step:	Acid Clean	Step:	Silica Gel Clean	Step:	Final Volume
Started:	4/27/12 11:46	Started:	4/30/12 17:10	Started:	4/30/12 19:18	Started:	5/1/12 07:05
Finished:	4/30/12 08:20	Finished:	4/30/12 17:23	Finished:	4/30/12 20:34	Finished:	5/1/12 11:15
By:	EBAUCH	By:	EBAUCH	By:	EBAUCH	By:	CDIAZ
Comments		Comments		Comments		Comments	

Preparation Information Benchsheet

Prep Run#: 156568 **Prep WorkFlow:** OrgExtDioxS(30) **Status:** Prepped
Team: Semivoa GCMS/EBAUCH **Prep Method:** Method **Prep Date/Time:** 4/27/12 11:46 AM

Comments: _____

Reviewed By: EB Date: 5/1/12

Chain of Custody

Relinquished By: _____ Date: _____ Extracts Examined

Received By: _____ Date: _____ Yes No

E1200403 25 of 25

CHAIN OF CUSTODY RECORD

SIERRA ANALYTICAL
TEL: 949•348•9389
FAX: 949•348•9115
26052 Merit Circle• Suite 105•Laguna Hills, CA•92653

Date: 4/18/12 Page 1 of 1

Lab Project No.: 120437

Client: County of LA, Dept. Public Wks
Client Address: 900 S Fremont Ave, Alhambra, CA 91803-1331
Client Tel. No.: (626) 458-4923
Client Fax. No.: (626) 458-4913
Client Proj. Mgr.: Geir Mathisen

Client Project ID: HF00710003
ENC#12C00000299
Big T Res. Sed. Char. Program

Turn Around Time Requested: ☐ Immediate ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 4 Day ☐ 5 Day ☒ Normal ☐ Mobile

Analysis Requested

Client Sample ID.	Sierra No.	Date	Time	Matrix	Preservative	Container Type	No. of Containers	6010B/7470 Title 22 Metals + Mercury	8310 / PAHs	8260B/VOCs+OXYS EDB DBCP	8270C/8321 SVOCs + carbonyls	8081A Pesticides	8082 / PCBs	8270C 1,4 Dioxane	8280A / Dioxin	8151 / Herbicides 8270C or Kepone/Mirex 8081	Geotracker EDD Info: Client LOGCODE / Site Global ID / Field Point Names/ Comments
B-10-2	01	4/18/12	11:50	SOIL	ICE	2 oz JAR/ 3 VOAs	4	X	X	X	X	X	X	X	X	X	

1 Sampler Signature: [signature] Printed Name: GEIR MATHISEN
Shipped Via: (Carrier/Waybill No.)

2 Relinquished By: [signature] Date: 4/18/12 Time: 11:00 Company: LA COUNTY DPW
Received By: [signature] Date: 4/18/12 Time: 11:00 Company: Sierra

3 Relinquished By: Date: Time: Company:
Received By: Date: Time: Company:

4 Relinquished By: Date: Time: Company:
Received By: Date: Time: Company:

Special Instructions: See your bid proposal dated Dec. 5, 2011 including Table 1A and 1B for minimum required analyses to be tested.

Total Number of Containers Submitted to Laboratory:

The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analysis specified above under SIERRA's Terms and Conditions, unless otherwise agreed upon in writing between SIERRA and CLIENT.
* - Samples determined to be hazardous by SIERRA will be returned to CLIENT.

Total Number of Containers Received by Laboratory:

Sample Disposal:
☐ Return to Client
☒ Lab Disposal*
☐ Archive _____ mos.
☐ Other _____

FOR LABORATORY USE ONLY - Sample Receipt Conditions:

☒	Intact	☒	Chilled - Temp. (°C) 4.0
☐	Sample Seals	☐	Preservatives - Verified By
☒	Properly Labelled	☐	Other
☒	Appropriate Sample Container	☒	Storage Location 250 / VOAs SOIL / 500 - WATER

Rev: 102005

DISTRIBUTION: White - To Accompany Samples, Yellow - Laboratory Copy, Pink - Field Personnel Copy

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331

BID REQUEST

FOR: ***ENVIRONMENTAL LABORATORY SERVICE***

CONTRACTOR:	Sierra Analytical Labs, Inc.	ATTENTION:	Richard Forsyth
ADDRESS:	26052 Merit Circle, Suite 104	PHONE:	(949) 348-9389
	Laguna Hills, California 92653	EMAIL:	rickf@sierralabs.net

Please return completed Bid Quotations by email with identifying job name, to the following contacts:
Attention: Geir Mathisen and Charles Nestle **Email:** gmathisen@dpw.lacounty.gov, cnestle@dpw.lacounty.gov
FAX: (626) 458-4913 **PHONE:** (626) 458-4923
Bid Quotations must be received by: **4 p. m. on December 6, 2011.**

JOB NAME:	**Big Tujunga Reservoir Sedimentation Characterization Program**
JOB LOCATION:	**Los Angeles County, California (TB Guide Page: 4725 Grid: C5)**
SAMPLE PICK-UP:	**Samples to be picked up by the laboratory at the site or at Alhambra Headquarters.**
TURN-AROUND TIME:	**Five-day turn-around-time is required for all samples (except Dioxane and Dioxin).**

SCOPE OF WORK INCLUDES:
Laboratory services for the analysis of approximately **twenty soil** samples for listed tests below. Samples may consist of a mixture of soil, fine gravel and organic material. The samples will be picked-up by the laboratory over a period of ten to thirteen calendar days.

Number	Analyte*	EPA Method	Unit Cost	Total Cost	Detection Limits (ppm/ppb)
20	Title 22 Metals+mercury	EPA 6010B/7470	65.00	1300.00	D.L.'s will
20	PAHs	EPA 8310	80.00	1600.00	meet 7II
20	VOCs+Oxygenates .	EPA 8260B (5035 Method)	55.00	1100.00	regulatory
20	SVOCs including carbofurans * (HPLC 8321B)	EPA 8270C/8321	85.00/135.00	1700.00/2700.00	requirements
20	Organochlorine Pesticides	EPA 8081A	35.00	700.00	
20	Polychlorinated Biphenyls	EPA 8082	30.00	600.00	
20	1,4 Dioxane - Sub lab	EPA ~~8260B~~ $270C	175.00	3500.00	
20	Dioxin (2,3,7,8-TCDD) - Sub lab	EPA 8280A	375.00	7500.00	
20	EDB and DBCP - included in above analysis	EPA 8260B	—	—	
20	Herbicides	EPA 8151	75.00	1500.00	
20	Kepone and Mirex	EPA 8270C or 8081	35.00	700.00	

***See attached list of minimum required analytes to be tested (Table 1A & 1B). If additional tests are required please include the costs in your bid. Lowest possible detection limit required and meet listed levels on Table 1A &1B.**

*Carbofurans - Sub lab

Signature of Preparer: Rebekah J Arnitz

Total Cost of Completed Job:* 22,900.00

Printed Name of Preparer: Rebekah J Arnitz

Applicable detection limits shall meet LARWQCB requirements for petroleum hydrocarbon impacted sites (09/2006). See *http://www.waterboards.ca.gov/losangeles/publications_forms/forms/ust/lab_forms/labreq9-06.pdf* .

Additional Requirements: Maintain Proof of General Liability, Professional (Errors & Omissions) Liability/Pollution Liability; Auto Liability; and Workers Comp. Liability with Los Angeles County named as additional insured on the certificate. Service is to include sample container delivery, laboratory reports, laboratory consultations, courier service, sample disposal and storage, and any additional required supplements.

This request for a Bid Quotation does not constitute a guarantee of any work. Consultants work is subject to the terms of their current as-needed contract.

TABLE 1A
Soil Sampling Parameters, Vulcan Developed Soil Concentration Levels (VDSCL), and EPA Test Methods

Parameter	Vulcan Developed Soil Concentration Levels (mg/kg)	EPA Test Method (or equivalent)
METALS		
Antimony	31.0	6010
Arsenic	10.0	6010
Barium	5300	6010
Beryllium	1.4	6010
Cadmium	9.0	6010
Chromium (total)	210.0	6010
Cobalt	4600.0	6010
Copper	2800.0	6010
Lead	400.0	239.2
Mercury (methyl)	6.1	7471
Molybdenum	380.0	6010
Nickel	150.0	6010
Selenium	380.0	6010
Silver	380.0	6010
Thallium sulfate	5.2	6010
Vanadium	540.0	6010
Zinc	23000.0	6010
POLYNUCLEAR AROMATIC HYDROCARBONS		
Acenaphthene	3700	8310
Anthracene	20000	8310
Benz(a)anthracene	0.62	8310
Benzo(A)pyrene	0.061	8310
Benzo(B)fluroanthene	0.62	8310
Benzo(K)fluoranthene	6.2	8310
Chrysene	62	8310
Dibenz(A,H) anthracene	0.062	8310
Flouranthene	2300	8310
Flourene	2600	8310
Indenopyrene	0.62	8310
Napthalene	56	8310
Pyrene	2000	8310
BTEX		
Benzene	0.65	8021
Toluene	520	8021
Ethylbenzene	1500	8021
Xylenes	210	8021
ORGANICS		
Carbon tetrachloride	0.24	8260
o-Dichlorobenzene	370	8260
1,2-Dichloroethane	0.35	8260
1,2-Dichloropropane	0.35	8260
Styrene	1700	8260
Tetrachloroethylene	5.7	8260
1,2,4-Trichlorobenzene	570	8260

TABLE 1A (continued)
Soil Sampling Parameters, Vulcan Developed Soil Concentration Levels (VDSCL), and EPA Test Methods

Parameter	Vulcan Developed Soil Concentration Levels (mg/kg)	EPA Test Method (or equivalent)
ORGANICS (continued)		
1,1,1-Trichloroethane	1200	8260
1,1,2-Trichloroethane	0.84	8260
Trichloroethylene	2.8	8260
p-Dichlorobenzene	3.4	8260
1,1-Dichloroethylene	0.054	8260
cis-1,2-Dichloroethylene	31.0	8021A
trans-1,2-Dichloroethylene	63.0	8260
Vinyl Chloride	0.016	8260
Chlorobenzene	65.0	8260
Dichloromethane (Methylene Chloride)	8.9	8260
Trichlorofluoromethane	390	8260
1,1-Dichloroethane	3.3	8260
1,3-Dichloropropene	0.7	8260
1,1,2,2-Tetrachloroethane	0.38	8260
1,1,2-Trichloro-1,2,2-Trifluoroethane	5600	8260
Alachlor	6	8081
Atrazine	2.2	8081
2,4-D	690	8151
Dalapon	1800	8151
Dibromochloropropane (DBCP)	0.06	8260
Di(2-ethylhexyl)adipate	410	525
Dinoseb	61	8151
Endrin	18	8081
Ethylene dibromide (1,2-Dibromoethane)	0.0069	8260
Hexachlorobenzene	0.3	8081
Hexachloro-cyclopentadiene	420	8081
Lindane (HCH gamma)	0.044	8081
Methoxychlor	310	625
Oxamyl (Vydate)	1500	632
Pentachlorophenol	3	8151
Picloram	4300	8151
PCBs (Polychlorinated Biphenyls)	0.22	8081
Simazine	4.1	505
Toxaphene	0.44	505
2,4,5-TP (Silvex]	490	8151
Carbofuran	310	632
Chlordane	1.6	625
Di(2-ethylhexyl)phthalate	35	625
Heptachlor	0.11	625
Heptachlor epoxide	0.053	625

TABLE 1B
Soil Sampling Parameters, California Human Health Screening Levels , and EPA Test Methods

Parameter	California Human Health Screening Levels (mg/kg)	EPA Test Method (or equivalent)
Organic Neutral Chemicals		
Aldrin	0.033	80801A
DDD	2.3	80801A
DDE	1.6	80801A
DDT	1.6	80801A
Dieldrin	0.035	80801A
1, 4 Dioxane	18	8270C
Dioxin (2, 3, 7, 8-TCDD)	0.0000046	8280A
Kepone	0.035	8270C
Mirex	0.031	80801A

APPENDIX C
VULCAN DEVELOPED SOIL CONCENTRATION LEVES AND CALIFORNIA HUMAN HEALTH SCREENING LEVELS

TABLE 1A
Soil Sampling Parameters, Vulcan Developed Soil Concentration Levels (VDSCL), and EPA Test Methods

Parameter	Vulcan Developed Soil Concentration Levels (mg/kg)	EPA Test Method (or equivalent)
METALS		
Antimony	31.0	6010
Arsenic	10.0	6010
Barium	5300	6010
Beryllium	1.4	6010
Cadmium	9.0	6010
Chromium (total)	210.0	6010
Cobalt	4600.0	6010
Copper	2800.0	6010
Lead	400.0	239.2
Mercury (methyl)	6.1	7471
Molybdenum	380.0	6010
Nickel	150.0	6010
Selenium	380.0	6010
Silver	380.0	6010
Thallium sulfate	5.2	6010
Vanadium	540.0	6010
Zinc	23000.0	6010
POLYNUCLEAR AROMATIC HYDROCARBONS		
Acenaphthene	3700	8310
Anthracene	20000	8310
Benz(a)anthracene	0.62	8310
Benzo(A)pyrene	0.061	8310
Benzo(B)fluroanthene	0.62	8310
Benzo(K)fluoranthene	6.2	8310
Chrysene	62	8310
Dibenz(A,H) anthracene	0.062	8310
Flouranthene	2300	8310
Flourene	2600	8310
Indenopyrene	0.62	8310
Napthalene	56	8310
Pyrene	2000	8310
BTEX		
Benzene	0.65	8021
Toluene	520	8021
Ethylbenzene	1500	8021
Xylenes	210	8021
ORGANICS		
Carbon tetrachloride	0.24	8260
o-Dichlorobenzene	370	8260
1,2-Dichloroethane	0.35	8260
1,2-Dichloropropane	0.35	8260
Styrene	1700	8260
Tetrachloroethylene	5.7	8260
1,2,4-Trichlorobenzene	570	8260

TABLE 1A (continued)
Soil Sampling Parameters, Vulcan Developed Soil Concentration Levels (VDSCL), and EPA Test Methods

Parameter	Vulcan Developed Soil Concentration Levels (mg/kg)	EPA Test Method (or equivalent)
ORGANICS (continued)		
1,1,1-Trichloroethane	1200	8260
1,1,2-Trichloroethane	0.84	8260
Trichloroethylene	2.8	8260
p-Dichlorobenzene	3.4	8260
1,1-Dichloroethylene	0.054	8260
cis-1,2-Dichloroethylene	31.0	8021A
trans-1,2-Dichloroethylene	63.0	8260
Vinyl Chloride	0.016	8260
Chlorobenzene	65.0	8260
Dichloromethane (Methylene Chloride)	8.9	8260
Trichlorofluoromethane	390	8260
1,1-Dichloroethane	3.3	8260
1,3-Dichloropropene	0.7	8260
1,1,2,2-Tetrachloroethane	0.38	8260
1,1,2-Trichloro-1,2,2-Trifluoroethane	5600	8260
Alachlor	6	8081
Atrazine	2.2	8081
2,4-D	690	8151
Dalapon	1800	8151
Dibromochloropropane (DBCP)	0.06	8260
Di(2-ethylhexyl)adipate	410	525
Dinoseb	61	8151
Endrin	18	8081
Ethylene dibromide (1,2-Dibromoethane)	0.0069	8260
Hexachlorobenzene	0.3	8081
Hexachloro-cyclopentadiene	420	8081
Lindane (HCH gamma)	0.044	8081
Methoxychlor	310	625
Oxamyl (Vydate)	1500	632
Pentachlorophenol	3	8151
Picloram	4300	8151
PCBs (Polychlorinated Biphenyls)	0.22	8081
Simazine	4.1	505
Toxaphene	0.44	505
2,4,5-TP (Silvex]	490	8151
Carbofuran	310	632
Chlordane	1.6	625
Di(2-ethylhexyl)phthalate	35	625
Heptachlor	0.11	625
Heptachlor epoxide	0.053	625

TABLE 1B
Soil Sampling Parameters, California Human Health Screening Levels , and EPA Test Methods

Parameter	California Human Health Screening Levels (mg/kg)	EPA Test Method (or equivalent)
Organic Neutral Chemicals		
Aldrin	0.033	80801A
DDD	2.3	80801A
DDE	1.6	80801A
DDT	1.6	80801A
Dieldrin	0.035	80801A
1, 4 Dioxane	18	8270C
Dioxin (2, 3, 7, 8-TCDD)	0.0000046	8280A
Kepone	0.035	8270C
Mirex	0.031	80801A

TABLE 1C

The following waste materials are not accepted to any Vulcan Facility under any circumstances:

- Asbestos
- Liquid Wastes
- Tires
- Liquid Paint Containers
- Aerosol Paint Containers
- Motor Oil Containers
- Roofing Cement Containers
- Cloth
- Cardboard
- Plywood
- Tree Branches, Roots, Leaves
- Auto Parts, Air and Oil Filters
- Roofing Tar Containers
- Lumber
- Wood Pallets
- Paper
- Plastic Containers
- Plastic Straps and Packaging
- Miscellaneous Plastic Pieces
- Gypsum Board
- Styrofoam
- Materials Containing Asbestos
- Asphalt Roof Shingles
- Foam Rubber
- Fiberglass
- Antifreeze Containers
- Carpets and Rugs
- Municipal Household Waste
- Rubber Products
- Duct Tape
- Oil Soaked Soil or Debris
- PVC Pipe
- Felt Tar Paper
- Metal and Plastic Drums
- Petroleum Contaminated Soil

COOPERATIVE AGREEMENT BETWEEN THE
LOS ANGELES DISTRICT FLOOD CONTROL DISTRICT AND
THE VULCAN MATERIALS COMPANY
REGARDING EXCHANGE OF EXCAVATED MATERIAL
FOR SEDIMENT PLACEMENT RIGHTS

A G R E E M E N T

THIS cooperative agreement (hereinafter referred to as AGREEMENT) is entered into between the Los Angeles County Flood Control District (hereinafter referred to as DISTRICT) and the Vulcan Materials Company (hereinafter referred to as VULCAN).

W I T N E S S E T H

WHEREAS, DISTRICT is a special district organized and operating under the provisions of the Los Angeles County Flood Control Act; and

WHEREAS, pursuant to the Los Angeles County Flood Control Act, DISTRICT owns and/or manages flood control and water conservation facilities in the County of Los Angeles, and said efforts result in the capture of storm flows used to replenish groundwater basins in the County of Los Angeles; and

WHEREAS, DISTRICT is proposing an improvement project to enlarge the groundwater recharge basins at its Hansen Spreading Grounds facility; and

WHEREAS, DISTRICT estimates that approximately 1.25 million cubic yards of material will be excavated from the groundwater recharge basins in connection with said improvement project; and

WHEREAS, VULCAN operates an inert quarry, including a conveyor system and loading apparatus, adjacent to the Hansen Spreading Grounds; and

WHEREAS, a preliminary soil investigation of the Hansen Spreading Grounds conducted by VULCAN indicates that some or all of the material to be excavated from the groundwater recharge basins may be useful to VULCAN; and

WHEREAS, DISTRICT, from time to time, must remove sediment that has accumulated in various flood control and water conservation facilities (e.g., debris basins) throughout the County of Los Angeles and dispose of that sediment at landfills and other facilities authorized to accept such material; and

WHEREAS, VULCAN owns and operates an inert landfill on Glenoaks Boulevard and the Sheldon and Boulevard gravel pits in Sun Valley, which facilities are authorized to accept sediment that meets the requirements for the exemption from Construction and Demolition waste or inert debris operations set forth in 14 California Administrative Code § 17388.2(a)(5), and that does not contain any hazardous substances;

NOW, THEREFORE, in consideration of the mutual benefits to be derived by the parties, it is hereby agreed as follows:

1. DEFINITIONS. The following definitions shall apply to this AGREEMENT, including all exhibits hereto

1.1. The term "PROJECT" shall mean the improvement project by DISTRICT to enlarge the groundwater recharge basins at its Hansen Spreading Grounds facility.

1.2. The term "EXCAVATED MATERIAL" shall mean the material excavated from the groundwater recharge basins in connection with PROJECT, estimated to be approximately 1.25 million cubic yards.

1.3. The term "CONVEYOR SYSTEM" shall mean the conveyor system and loading apparatus operated by VULCAN at its inert quarry adjacent to DISTRICT'S Hansen Spreading Grounds facility.

1.4. The term "VULCAN FACILITIES" shall mean, collectively, the inert landfill on Glenoaks Boulevard and the Sheldon and Boulevard gravel pits in Sun Valley, operated by VULCAN.

1.5. The term "SEDIMENT" shall mean any earthen material that is removed from DISTRICT'S various flood control and water conservation facilities (e.g., debris basins).

1.6. The term "DESIGNATED AREA" shall mean the area, within the Hansen Spreading Grounds, depicted in Exhibit C.

1.7. The term "HAZARDOUS MATERIALS" shall mean any hazardous or toxic substance, material, or waste, which is or becomes regulated by the United States government, the State of California, or any other governmental authority, including, without limitation, any material or substance which (a) is defined or listed as a “hazardous material,” “toxic pollutant,” “hazardous waste,” “hazardous substance” or “hazardous pollutant” under applicable Federal, State, or local law or administrative code promulgated thereunder, (b) contains hydrocarbons of any kind, nature or description, including but not limited to gas, oil, and similar petroleum products other than reclaimed asphalt pavement, (c) contains asbestos, (d) contains PCBs, or (e) contains radioactive materials.

1.8. The term “CPI” shall mean the U.S. Department of Labor, Bureau of Labor Statistics’ All Urban Consumers’ Price Index for the Los Angeles-Riverside-Orange County area, as published in the U.S. Department of Labor, Bureau of Labor Statistics’ Consumer Price Indices, Pacific Cities and U.S. City Average, or such superceding document published by the U.S. Department of Labor, Bureau of Labor Statistics.

2. REMOVAL OF EXCAVATED MATERIAL FROM PROJECT

2.1. Upon the commencement of PROJECT, DISTRICT shall deposit EXCAVATED MATERIAL at the DESIGNATED AREA, in accordance with the procedures and conditions specified in Exhibit A to this AGREEMENT. DISTRICT shall provide written notice of the commencement of PROJECT to VULCAN.

2.2. Commencing on the date of the written notice from DISTRICT that the PROJECT has commenced, VULCAN shall be authorized to enter and use the DESIGNATED AREA for the storage, sorting, and preliminary processing of the EXCAVATED MATERIAL, in accordance with and subject to the procedures and conditions specified in Exhibit A to this AGREEMENT.

2.3. VULCAN shall remove all EXCAVATED MATERIAL deposited at the DESIGNATED AREA, using the CONVEYOR SYSTEM, in accordance with the procedures and conditions specified in Exhibit A to this AGREEMENT.

2.4. Upon the completion or earlier termination of the excavation operations in connection with PROJECT, DISTRICT shall provide written notice thereof to VULCAN. VULCAN shall cease all use of and vacate the DESIGNATED AREA not later than 2 weeks from the date of said notice. Prior to vacating the DESIGNATED AREA VULCAN shall restore the DESIGNATED AREA to a condition similar to its condition as of the date of the written notice of the commencement of the PROJECT.

2.5. Upon completion or earlier termination of the excavation operations in connection with the PROJECT, DISTRICT and VULCAN shall jointly determine the actual volume of EXCAVATED MATERIAL deposited at the DESIGNATED AREA by DISTRICT and removed by VULCAN (hereafter referred to as the "ACTUAL PROJECT VOLUME").

3. PLACEMENT OF ACCUMULATED SEDIMENT AT VULCAN FACILITIES

3.1. DISTRICT may, as it deems necessary, transport SEDIMENT to the VULCAN FACILITIES, or any of them, in accordance with the procedures and conditions specified in Exhibit B to this AGREEMENT.

3.2. VULCAN shall accept and place all SEDIMENT transported to the VULCAN FACILITIES by DISTRICT, up to an amount equal to the ACTUAL PROJECT VOLUME, and subject to the procedures and conditions specified in Exhibit B to this Agreement.

3.3. VULCAN may, prior to having accepted and placed an amount of SEDIMENT equal to the ACTUAL PROJECT VOLUME, terminate its obligation, described in subsection 3.2, above; provided, however, that if

VULCAN does so, it shall compensate DISTRICT for the difference between the ACTUAL PROJECT VOLUME and the volume of SEDIMENT accepted and placed at the VULCAN FACILITIES as of the date of VULCAN'S termination, at a rate to be calculated at the time of the termination that will be equivalent to a $15 per cubic yard on the effective date of this AGREEMENT, adjusted for inflation at a rate of the CPI.

3.4. DISTRICT'S entitlement to transport SEDIMENT to the VULCAN FACILITIES and VULCAN'S obligation to accept and place all such SEDIMENT, as described in this Section 3, shall continue for a period of 25 years from and after the effective date of this AGREEMENT, as described in subsection 4.1, below, and shall automatically expire thereafter, unless extended by mutual agreement of DISTRICT and VULCAN.

4. GENERAL TERMS AND PROVISIONS:

4.1. This AGREEMENT shall be effective on the date it is executed by all parties

4.2. Insurance.

4.2.1. As of the effective date of this AGREEMENT and during the entire period that VULCAN is authorized to use the DESIGNATED AREA under this AGREEMENT, VULCAN shall procure and maintain in full force and effect insurance policies providing for the following insurance coverage:

- Comprehensive General Liability coverage of not less than five million dollars ($5,000,000) combined single limit for third party liability and one million dollars ($1,000,000) per occurrence.

- Automobile Liability coverage of not less than one million dollars ($1,000,000) per accident.

- Worker’s Compensation coverage in such amount as will fully comply with the laws of the State of California and that shall indemnify, insure, and provide legal defense for both VULCAN and DISTRICT against any loss, claim or damage arising from any injuries or occupation diseases occurring to any worker employed by or any person retained by VULCAN in the course of carrying out the work or services to be performed on the DESIGNATED AREA contemplated in this AGREEMENT.

4.2.2. DISTRICT and the County of Los Angeles, their governing boards, officers, agents, contractors, and employees shall be named as

Additional Insureds on all policies of insurance. VULCAN shall furnish to DISTRICT a Certificate of Insurance evidencing VULCAN'S insurance coverage no later than ten (10) working days after execution of the Agreement by VULCAN. Upon renewal of said policy, VULCAN shall furnish to DISTRICT a Certificate evidencing VULCAN'S continued insurance coverage as required by this AGREEMENT.

4.2.3. 4.2.3. All DISTRICT contractors transporting SEDIMENT to VULCAN FACILITES shall maintain the following insurance throughout the duration of the agreement contemplated herein:

- Comprehensive General Liability coverage of not less than one million dollars ($1,000,000) per occurrence.

- Automobile Liability coverage of not less than one million dollars ($1,000,000) per accident.

- Worker's Compensation coverage in such amount as will fully comply with the laws of the State of California and that shall indemnify, insure, and provide legal defense for both VULCAN and DISTRICT against any loss, claim or damage arising from any injuries or occupation diseases occurring to any worker employed by or any person retained by DISTRICT's contractors in the course of carrying out the work or services to be performed at DISTRICT's facilities, VULCAN FACILITIES contemplated in this AGREEMENT and the associated haul routes.

4.3. Indemnification

4.3.1. DISTRICT shall indemnify, defend, and hold VULCAN and its respective officers, employees, and agents harmless from and against any claims, demands, liability, damages, costs and expenses, including, without limitation, involving bodily injury, death, or personal injury of any person or property damage of any nature whatsoever, arising from or related to the following:

(i) A breach of DISTRICT'S obligations under this Agreement, or

(ii) Any act or omission of DISTRICT or its officers, agents, employees, contractors, or subcontractors in the performance of this AGREEMENT, including (a) the transportation of SEDIMENT to the VULCAN FACILITIES, (b) a breach of any representation, warranty, covenant, or certification made by DISTRICT to VULCAN; (c) the investigation or monitoring of site conditions or any cleanup, containment, restoration, removal, or other remedial work

required under any applicable Federal, State, or local law, by any judicial order or by any governmental entity arising from or related to SEDIMENT transported to and placed at the VULCAN FACILITES by the DISTRICT, its agents or employees; and (d) any claim of liability under the Comprehensive Environmental Response, Compensation, and Liability Act, the Solid Waste Disposal Act, the Toxic Substances Control Act, the Federal Water Pollution Control Act, or any State counterparts or extensions of the foregoing arising from or related to SEDIMENT transported to and placed at the VULCAN FACILITIES.

4.3.2. VULCAN shall indemnify, defend, and hold DISTRICT and the County of Los Angeles, and their respective officers, employees, and agents harmless from and against any claims, demands, liability, damages, costs, and expenses; including, without limitation, involving bodily injury, death, or personal injury of any person or property damage of any nature whatsoever, arising from or related to the following:

(i) A breach of VULCAN'S obligations under this Agreement, or

(ii) Any act or omission of VULCAN or its officers, agents, employees, contractors, or subcontractors in the performance of this AGREEMENT, including (a) VULCAN'S use the DESIGNATED AREA for the storage, sorting, and preliminary processing of the EXCAVATED MATERIAL and (b) VULCAN'S removal of EXCAVATED MATERIAL from the DESIGNATED AREA using the CONVEYOR SYSTEM.

4.4. Notices

4.4.1. All notices provided under this AGREEMENT must be in writing and, unless otherwise provided herein, shall be deemed validly given on the date either: (1) personally delivered to the address indicated below; or (2) on the third business day following deposit, postage prepaid, using certified mail, return receipt requested, in any U.S. Postal mailbox or at any U.S. Post Office; or (3) on the date of transmission by facsimile to the facsimile number provided below.

4.4.2. All notices, demands, or requests made in connection with this AGREEMENT shall be addressed to the following:

VULCAN MATERIAL COMPANY
Contact person?
Address?

DISTRICT

Mr. Donald L. Wolfe, Director
County of Los Angeles
Department of Public Works
P.O. Box 1460
Alhambra, CA 91802-1460

IN WITNESS WHEREOF, each party hereto has caused this AGREEMENT to be executed by its duly authorized officer or official.

ATTEST:

LOS ANGELES DISTRICT
FLOOD CONTROL DISTRICT,
a body corporate and politic

By _____
Chief Engineer

APPROVED AS TO FORM:

RAYMOND G. FORTNER, JR.
County Counsel

By_____
Deputy

VULCAN MATERIAL COMPANY

Date_____ By_____
VULCAN MATERIALS COMPANY
Title:

APPROVED AS TO FORM:

By_____
VULCAN MATERIALS COMPANY
Title:

Exhibit A

PROCEDURES AND CONDITIONS REGARDING REMOVAL OF EXCAVATED MATERIAL FROM PROJECT

A.1. DISTRICT or its contractor will deposit the EXCAVATED MATERIAL in the DESIGNATED AREA in accordance with the approved plans and specifications for PROJECT.

A.2. VULCAN shall be responsible for all costs associated with testing, loading, and transporting the EXCAVATED MATERIAL from the DESIGNATED AREA to its ultimate destination (as determined by VULCAN).

A.3. VULCAN is responsible for obtaining all permits from the proper regulatory agencies necessary for the removal of the EXCAVATED MATERIAL from the DESIGNATED AREA, including any permits required in connection with VULCAN'S loading equipment and CONVEYOR SYSTEM.

A.4. The soil density to be used to convert cubic yards to tons shall be ?

A.5. VULCAN shall conduct its operations for the removal of the EXCAVATED MATERIAL from the PROJECT, up to 14 hours per day, 6 days a week. On average, VULCAN will remove 5,000 to 6,000 tons of EXCAVATED MATERIAL per day.

A.6. VULCAN shall conduct its operations for the removal of the EXCAVATED MATERIAL in accordance with all procedures, conditions and limitations contained in the approved specifications for PROJECT, including but not limited to maximum stockpile, minimum EXCAVATED MATERIAL transported, and staging requirements.

A.7. VULCAN shall install and operate primary crusher/processing equipment in the DESIGNATED AREA and be responsible for all costs associated with the erection, operation, and dismantling of the loading and processing equipments at no cost to the DISTRICT.

A.8. VULCAN may inspect and test all EXCAVATED MATERIAL delivered to the DESIGNATED AREA prior to loading such EXCAVATED MATERIAL onto the CONVEYOR SYSTEM, at no cost to the DISTRICT.

Exhibit B

PROCEDURES AND CONDITIONS REGARDING PLACEMENT OF ACCUMULATED SEDIMENT AT VULCAN FACILITIES

B.1. Notice Of Proposed Delivery Of SEDIMENT

Prior to transporting any SEDIMENT to the VULCAN FACILITIES, DISTRICT shall provide VULCAN with written notice of the date of the proposed delivery and the source and approximate volume of the SEDIMENT proposed to be delivered. DISTRICT shall provide said notice to VULCAN at least 21 business days prior to the proposed delivery date.

B. 2. SEDIMENT Testing

No later than two (2) business days from the date of the written notice from DISTRICT described in paragraph B.1., VULCAN may, in its discretion and at its sole cost, initiate inspection and testing of the SEDIMENT proposed to be delivered to the VULCAN FACILITIES to determine: (1) whether the SEDIMENT proposed to be delivered exceeds any of the Vulcan Developed Soil Concentration Levels (VDSCL) specified in Tables 1A and 1B of this AGREEMENT, and (2) whether the SEDIMENT proposed to be delivered contains any of the unacceptable waste material specified in Table 1C of this AGREEMENT. If VULCAN performs such an inspection and/or test, it shall provide to DISTRICT copies of the reports of such inspection and testing within two (2) business days of VULCAN'S receipt of said reports .

B.3. SEDIMENT Rejection

B.3.1. VULCAN may reject any of SEDIMENT proposed to be delivered to the VULCAN FACILITIES to the extent that: (1) the SEDIMENT that exceeds any of the VDSCL, (2) the SEDIMENT contains any unacceptable waste material as specified in Table 1C, or (3) the SEDIMENT contains volatile organic compounds.

B.3.2. Prior to rejecting any SEDIMENT, VULCAN shall do all of the following:

(a) Inform DISTRICT, both verbally and in writing, of VULCAN'S reason(s) for the proposed rejection; and

(b) Meet with DISTRICT and attempt, in good faith, to resolve any dispute DISTRICT may have with the reasons for VULCAN'S proposed rejection of the SEDIMENT.

B.3.3. If, after complying with the provisions of Section B.3.2., above, VULCAN determines to reject any SEDIMENT, VULCAN shall provide DISTRICT written notice thereof, not later than two (2) business days prior to the date of the proposed delivery specified in the written notice specified in paragraph B.1, above.

B.3.4. Upon receipt of a timely written notice of rejection from VULCAN, DISTRICT shall not transport or deliver the SEDIMENT identified in the written notice of rejection to the VULCAN FACILITIES.

B.4. SEDIMENT Delivery

B.4.1 If VULCAN has not provided DISTRICT with a timely written notice of rejection, VULCAN shall, not later than two (2) business days prior to the date of the proposed delivery, designate and notify the DISTRICT of the VULCAN FACILITIES which will receive the SEDIMENT. SEDIMENT shall be deposited only in the area(s) designated by VULCAN personnel, during VULCAN'S approved hours of operation, and in accordance with VULCAN'S specified procedures.

B.4.2. DISTRICT or its contractor shall be solely responsible for the transportation of SEDIMENT from DISTRICT'S facilities to the VULCAN FACILITIES. DISTRICT and DISTRICT'S contractors shall comply with all applicable transportation laws, including load limit and tarp laws, and all applicable safety rules while transporting SEDIMENT to the VULCAN FACILITIES.

B.4.3. All SEDIMENT transported to the VULCAN FACILITIES shall be subject to inspection by VULCAN personnel prior to deposition at the VULCAN FACILITIES. VULCAN may, in its discretion and at its sole cost, perform a visual and/or a video inspection of all incoming loads of SEDIMENT delivered to the VULCAN FACILITIES. All trucks delivering said SEDIMENT shall be required to remove their tarps prior to checking-in. VULCAN may check all SEDIMENT loads with a Photo Ionization Detector (PID) at the gate of the VULCAN FACILITY or at the disposal areas within the VULCAN FACILITY. VULCAN shall conduct all visual and PID inspections of SEDIMENT loads prior to their deposition by the DISTRICT. VULCAN shall log and record all PID records with the DISTRICT employee’s or DISTRICT contractor’s name, vehicle license number, date, time, and location of disposal. VULCAN may reject any load which appears to contain volatile organic compounds based on the PID reading and, if rejected, the load shall be removed by DISTRICT.

B.4.4. DISTRICT shall provide VULCAN a weekly truck count of sediment transported to VULCAN FACILITIES by DISTRICT, pursuant to this AGREEMENT. VULCAN may choose to compare ~~their~~ its own truck count

with the count provided by the DISTRICT. Both parties shall attempt, in good faith, to resolve any discrepancies that may arise.

B.4.5. VULCAN may choose to randomly weigh trucks loaded with SEDIMENT to determine the average weight / volume of SEDIMENT per truck. VULCAN shall present its findings to the DISTRICT for its approval. Otherwise, VULCAN and DISTRICT shall mutually agree on the unit weight / volume of one truck load.

B.4.6. DISTRICT shall be responsible for the acts and omissions of independent haulers bringing SEDIMENT into the VULCAN FACILITIES, and such independent haulers shall be deemed to be the agents of DISTRICT.

B.5. VULCAN shall be responsible for paying all disposal fees required by the State, County, and any other regulatory agencies.

B.6. The provisions of the AGREEMENT with respect to activities that may be undertaken by VULCAN, including but not limited to inspection of SEDIMENT and designation of areas for placement of SEDIMENT at the VULCAN FACILITES, shall not constitute a limitation or waiver of any of the rights and remedies of VULCAN or DISTRICT'S responsibilities hereunder.

APPENDIX F

GEOTECHNICAL INVESTIGATION
MAPLE CANYON SEDIMENT PLACEMENT SITE

BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT

GEOTECHNICAL INVESTIGATION

MAPLE CANYON SEDIMENT PLACEMENT SITE

BIG TUJUNGA RESERVOIR
SEDIMENT REMOVAL PROJECT



COUNTY OF LOS ANGELES
PUBLIC WORKS
Public Service That Works

GEOTECHNICAL INVESTIGATIONS

GEOTECHNICAL AND MATERIALS

ENGINEERING DIVISION

GEOLOGY SOILS GEOLOGY SOILS GEOLOGY SOILS GEOLOGY SOILS GEOLOGY SOILS GEOLOGY SOILS GEOLOGY SOILS GEOLOGY SOILS

January 31, 2018

TO: Christopher Stone
Stormwater Engineering Division

Attention Alex Ho

FROM: Greg Kelley Greg Kelley
Geotechnical and Materials Engineering Division

GEOTECHNICAL INVESTIGATION
MAPLE CANYON SEDIMENT PLACEMENT SITE
BIG TUJUNGA RESERVOIR SEDIMENT REMOVAL PROJECT
PROJECT ID WRDD000028 (PROJECT NO. HF00710003)

In accordance with your request dated August 23, 2012, we conducted a geotechnical investigation for the subject project. The conclusions and recommendations from the investigation are included in the attached report.

If you have any questions regarding this matter, please contact Karen Mendez at Extension 7896.

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GEOTECHNICAL INVESTIGATION
MAPLE CANYON SEDIMENT PLACE SITE
BIG TUJUNGA RESERVOIR
SEDIMENT REMOVAL PROJECT

ANGELES NATIONAL FOREST
UNINCORPORATED LOS ANGELES COUNTY

Prepared for

County of Los Angeles
Department of Public Works
Stormwater Engineering Division

Prepared by

County of Los Angeles
Department of Public Works
Geotechnical and Materials Engineering Division

January 31, 2018

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INTRODUCTION

This report documents a geotechnical investigation performed at the Maple Sediment Placement Site (SPS) located within the Angeles National Forest approximately 10 miles east-northeast of the unincorporated community of Sunland (Figure 1). It was approved as a 68-acre SPS by the United States Forest Service (USFS), effective July 1, 1981, following completion of an Environmental Assessment. The total fill capacity of Maple Canyon SPS is approximately 12 million cubic yards (mcy) and it was initially designed to be filled in five phases over 50 years and remain in operation until 2031. The currently proposed grading will be Phase 3.

Sediment removed from Big Tujunga Reservoir will be mechanically compacted to modern standards and hauled to the site with trucks, which were mechanically compacted to modern standards. Survey Division sounded the reservoir in 2011 and determined that approximately 2 mcy of sediment had accumulated. An additional 2.4 mcy is anticipated to accumulate in the reservoir owing to the 2009 Station Fire that burned 87 percent of the reservoir's watershed tributary. Thus, approximately 4.4 mcy of sediment will be placed at the Maple SPS over its construction span of 4 years.

Cleanout activities at Big Tujunga Reservoir are required to provide sufficient capability to protect downstream lives and property from the recurring threat of floods. These cleanouts restore reservoir capacity which provides greater flood control and water conservation capabilities.

SCOPE OF WORK

The scope of work for this investigation included the following:

1) Review of topographic, geologic, and hydrogeologic data pertinent to the site, as well as analysis of oblique and stereoscopic aerial photographs (see References).

2) Geotechnical observations at the site.

3) Completing six hollow-stem auger borings to depths of 26 to 45 feet below ground surface (bgs). Boring logs are presented in Appendix A and boring locations are shown on Plate 1.

4) Completing 22 backhoe trenches to a maximum depth of 10 feet. Trench logs are presented in Appendix B and trench locations are shown on Plate 1.

5) Lithologic logging of the borings and trenches by the visual-manual method.

6) Sampling of the borings at 5-foot intervals and geotechnical laboratory testing of select soil samples to determine shear strength and other index properties. A summary of the laboratory test results is presented in Appendix C.

7) Preparing this report describing the investigation and presenting our professional opinions, conclusions, and recommendations.

SITE DESCRIPTION

Maple Canyon has a length of approximately 1 mile and descends from 4,000 feet above sea level (asl) to 2,050 feet asl in Big Tujunga Canyon in the western San Gabriel Mountains. Big Tujunga Canyon Road crosses the canyon at 2,200 feet asl. The overall slope gradient is 20˚ (37 percent slope) and varies from 11˚ (20 percent slope) in the area of the SPS to 40˚ (84 percent slope) above Angeles Forest Highway. Side slopes vary from about 2:1 (26˚) to near vertical. The upper canyon is split into two drainages that are west and southwest draining; the main canyon drains to the west-northwest. The entrance to Maple Canyon SPS is directly across from the entrance to Big Tujunga Dam.

The existing fill varies in elevation from 2,350 asl at the toe, 600 feet east of Big Tujunga Canyon Road, to a working pad at 2,800 asl. The pad supports drainage structures and varies in elevation from the front at 2,800 feet asl to the back at 2,843 feet asl. Three debris basins are located at the upper eastern edge of the fill where the basins intercept overland flow from the three major drainages and direct the flow through buried drains to the toe. A paved, 20-foot-wide road winds up the fill with five switchbacks. Interspersed with the road are 20 drainage benches. Between benches, slopes are 2:1 (H:V); the fill has an overall gradient of 3.8:1 (14.5˚). Relief between the top of the fill and Angeles Forest Highway varies from 338 feet to 469 feet.

PROPOSED ENGINEERED FILL

The proposed engineered fill in the SPS is approximately 380 feet high with slope gradients of 2:1 (H:V) and an overall gradient of 3:1. Terrace drains will be 15 feet wide and spaced vertically every 25 feet. A 20-foot-wide access road that winds up the slope face will be extended to the top of the fill. Eventually the top of the SPS slope will approximate the elevation of Angeles Forest Highway and the Clear Creek Truck Trail, as shown on Plate 2.

SITE HISTORY

This narrative is based on review of oblique and stereoscopic aerial photographs maintained in our files (Langsner, 1956, Robinson, 1977, 1991) and materials provided by Stormwater Engineering Division. This narrative is provided because spill fill from three phases of road construction will be encountered during clean out and fill placement in upper Maple Canyon SPS. Lower Maple Canyon was filled during the first reservoir sediment removal project in 1968-1970. The first road into the area was the Edison Pole Road (currently Forest Service Road 3N27 north of Big Tujunga Canyon Road). This road was built in the 1920s to construct and maintain the power line across the San Gabriel Mountains (Langsner, 1956). It ran up Arroyo Seco, turned west on the south side of Josephine Peak, then turned northward into upper Maple Canyon. It then crossed Big Tujunga Canyon ¾-mile above the reservoir and approximately 1.3 miles northeast of the dam. By 1938, an access road to the dam had been graded from the Edison Pole Road through Maple Canyon and to the top of the left abutment. This access road is known as the Clear Creek Truck Trail (CCTT) (Figure 2 and Plate 1). Angeles Forest Highway (AFH) was under construction and the only section in the vicinity of the dam not completed in June 1938 was in upper Maple Canyon. AFH followed the Edison Pole Road in the vicinity of the dam, but in Maple Canyon the Edison Pole Road was higher on the slope. The power line crosses the upper part of Maple SPS and the northern end of the reservoir. Spill fill (road construction debris) from the Edison Pole Road, AFH, and CCTT was deposited in the upper slopes of Maple Canyon and will be encountered during grading of the SPS.

The first major road into this part of the San Gabriel Mountains was Angeles Crest Highway (State Route 2) initiated in 1929 and completed in 1956. Road construction reached Red Box, 7 miles southeast of the dam, by 1934. Angeles Forest Highway was constructed westward from Angeles Crest Highway at Clear Creek Station. Big Tujunga Canyon Road (BTCR) (Forest Service Road 3N53) was constructed down the canyon from AFH. By February 1954 the road had reached Maple Canyon where the entrance to the Dam site and Maple Canyon SPS occur. The bridge just south of Big Tujunga Reservoir was built in 1958.

Big Tujunga Dam, a concrete, variable-radius arch dam, was built from February 1930 through July 1931. Access to the dam site was provided by a dirt road following Big Tujunga Canyon Creek with up to 22 stream crossings. The road transitioned to a trail just north of the dam site. Cranes were built on both abutments and a concrete plant was constructed where the plunge pool is today. A foot bridge across the canyon provided access to the abutments. An estimated 50-foot thick layer of alluvium was removed to expose the underlying granitic rock for the dam foundation. The crest of the

dam was large enough to drive vehicles across once access was provided around 1938. The dam tenders' houses were constructed on the alluvial fan downstream of the right abutment.

Some 450 homes site existed in the canyon below the dam, but most of these were destroyed by the February-March 1938 flood which crested the dam's spillway. The flow rate was estimated at 50,000 cubic feet per second. Eventually, a high road (BTCR) was built above stream grade. The U.S. Army Corp of Engineers built Hansen Dam downstream to protect the San Fernando Valley from a future 1938-magnitude flood event.

The first clean out of sediment behind the dam started in 1968. Sediments were sluiced through the dam and carried over the dam's right abutment on a conveyor belt system. Access to the reservoir was provided by driving the dam crest and following an unpaved dirt road northeastward across Manzanita Flats. The current north access road was constructed with bull dozers from the dam crest downward to the stream bed from late August through October 1968. As shown on Figure 2, sediments were placed as fill within the canyon downstream of the dam, first in the upper debris disposal area (Fill Area No. 1) followed by the lower debris disposal area (Fill Area No. 2).

The fill areas were constructed on stream sediment within the floodplain and bedrock ridges that caused the creek to meander were excavated. This altered the flow path of the creek by straightening it. The two cuts, northern and southern, are shown on Figure 2 and were completed by January 1970. Fill was moved on the conveyor belt system from the reservoir directly into trucks and then end-dumped at the disposal sites. Eventually four conveyor belts were used. Fill placement at the top of Fill Area No. 2 was achieved by trucking up an access road just north of the current bridge within Breakneck Canyon (see Figure 2). Filling of Maple Canyon, below the current BTCR, started in late 1968 as a part of Fill Area No. 1. The lower fill face of both fill areas along the creek were armored with rip-rap grouted in place. The two fill areas were apparently completed by late 1970. Fill Areas Nos. 1 and 2 have been referred to as the Upper and Lower Debris Disposal Areas and are currently referred to as the Big Tujunga Upper and Lower SPSs, respectively.

During reservoir clean out, the January-February 1969 flood occurred filling the reservoir at the dam with sediment to about ¾-full, destroying the conveyor systems, and significantly increasing the amount of sediment that needed to be removed to restore reservoir storage volume. Large gullies were eroded into the fills. Spillway flow occurred during this storm.

Sediments from the second and third clean outs of the reservoir were placed at the Maple Canyon Debris Disposal Area, currently known as the Maple Canyon Sediment Placement Site (Figure 2). The access road into the reservoir on the left abutment was constructed at about the same time as the two cleanouts to truck sediment from the reservoir to Maple Canyon SPS.

Phase 1 grading of 2.2 mcy of sediment (3,169,610 tons) was officially completed on February 22, 1983, over an area of approximately 14 acres. Phase 2 grading of 1.49 mcy was completed in 1994 and covered an additional 8 acres of the SPS. Fill was placed without removing colluvium and residual soil. Testing of relative compaction and moisture content of the fill was not accomplished. Corrugated steel pipe (CSP) was buried within the fill to direct surface water on and uphill of the fill to the toe of the fill and into Maple Canyon Creek. The debris basin adjacent the east side of BTCR directed water through the Fill Area No. 2 and thus to Big Tujunga Canyon Creek.

The 1983 storms again caused spillway flow and significant erosion of Fill Area No. 1 along the buried 84" CSP and access road. The Maple Canyon Relief Drain was constructed from a new desilting basin west of BTCR, down BTCR, and into the Clear Creek drainage just west of the bridge (Figure 2).

SUBSURFACE EXPLORATION

Exploration of the existing fill consisted of six borings drilled with a hollow stem CME-75 drill rig operated by the Department of Public Works Flood Maintenance Division (FMD), now Stormwater Maintenance Division. The borings were excavated to a maximum depth of 45 feet along the elevation where placement of the proposed fill is anticipated to begin. The borings were drilled to determine if previously placed unclassified fill soils are competent to support the proposed fill.

Exploration to determine the thickness of colluvium on the canyon slopes consisted of 22 backhoe trenches excavated on April 27 and May 31, 2016. A CAT 420F backhoe/front end loader operated by the Department of Public Works FMD was used for the exploration. An attempt to sample the colluvium with hand sampling equipment was unsuccessful, as the sample would not remain in the sampling tube.

Laboratory tests were performed on representative samples obtained during drilling. The approximate location of the borings and trenches are shown on Plate 1.

GEOLOGIC CONDITIONS

The San Gabriel Mountain Range, one of the prominent Transverse Ranges of southern California, is a high, rugged, lens-shaped mountainous area extending from the Newhall Pass eastward about 60 miles to Cajon Pass. Its maximum width of approximately 25 miles is in the central part of the range. The west-northwest draining Maple Canyon is located in the southwest San Gabriel Mountains.

Geologic Structure

The site is located on the Cretaceous-age (90± million years) Josephine quartz monzonite, north of the inactive Maple Canyon Fault and north branch of the San Gabriel Fault (Figure 3). The Maple Canyon Fault has been mapped on Plate 1 just north of the CCTT based on the presence of a transverse drainage on the south wall of the canyon. Thus, the fault and associated intense fracturing, may be encountered during Phase 3 grading and a part of the ultimate fill grading. The quartz monzonite is more weathered south of the fault and removals during benching may encounter highly weathered quartz monzonite.

The inactive north branch of the San Gabriel Fault will not be encountered during grading.

The main geologic structure in Maple Canyon is the fracturing of the bedrock. The rock is closely to moderately fractured, locally intensely fractured, with local and through-going fractures. While joint orientations in the field were taken when accessible (see Plate 1), a regional joint fabric was not discernible.

Bedrock (grd)

According to Dibblee 2002, this basement rock consists of leucocratic plutonic rocks that are nearly white, massive, medium-grained, and composed of quartz, sodic plagioclase, potassic feldspars, and minor biotite mica. This rock intrudes all other plutonic and metamorphic rock in the area.

Local geologic conditions are shown on the Geologic Map (see Plate 1). A rock slide has been mapped above Angeles Forest Highway. It is outside of the areas of proposed grading.

Surficial Materials

The surficial materials that will be encountered and require partial to total removal prior to placing fill (during grading) include thick brush, soil, alluvium, colluvium, and non-engineered spill fill and previously placed fill.

Brush

The southern canyon slope has extensive vegetation owed to its north-facing aspect that allows soil moisture to accumulate on its surface. The very thick brush, including trees, will be a significant construction concern since the vegetation will need to be removed within the limits of grading prior to fill placement. This vegetation will need to be removed offsite since its volume is more than can be accumulated under the 5 percent or less of organic debris specification for the quality of the fill. The rest of the site has vegetation, but not sufficiently thick to represent it as a separate unit on the geologic map.

Soil

Soil mantles the site as residual soil from weathering processes. It is thicker on the southern slope than elsewhere, but is unique except for the rock cliff faces. The material is usually black to brown, finer grain silt and sand, and loose. This material will need to be removed within the limits of grading prior to fill placement.

Alluvium (Qal)

Alluvium presently occurs in the debris basins on the east uphill side of the SPS. This material is grey, fine to coarse grain sand and gravel. This material will need to be removed within the limits of grading prior to fill placement.

Spill Fill (Afs)

There are three spill fills that will be encountered during grading and they are not differentiated on the map, except by location. The spill fill occurs as a result of road construction. Spill fill from the Edison Pole Road was deposited downslope at the head of the canyon. This material was pushed further down slope during construction of Angeles Forest Highway. The highway was constructed by blasting, jack hammering, and pushing the debris over the slopes. This material blankets areas at the head of the canyon and is very coarse and loose (see Plate 1) as it originates from essentially unweathered granitic rock. The spill fills from both roads are not differentiated on the geologic map.

The third spill fill was deposited non-slope from the CCTT. The downslope limit of this fill is estimated since it is obscured by the soil and brush on this slope. This material was not observed, but is considered finer grained than the other spill fills because it originates from the weathered rock south of the Maple Canyon Fault. Spill fills will need to be removed within the limits of grading prior to fill placement.

Non-Engineered Fill (Afn)

Non-engineered fill was placed at the SPS during Phase 1 and 2 grading. This is considered unclassified fill. It is our understanding that compaction and moisture content testing was not performed. Where drilled, the soils consist primarily of silty sands (SM) and poorly graded sands with silt and gravel (SP-SM) in medium dense to dense condition and extend to depths greater than 40 feet. The drilling did not differentiate the underlying colluvium from the non-engineered fill, nor was bedrock encountered.

The non-engineered fill on the fill pad (elevations ~2,800 to 2,850) will need to be over-excavated prior to engineered fill placement. See the Recommendations for the over-excavation requirement.

Colluvium (Col)

Two deposits of colluvium occur at the site. They are only differentiated by position; the thicker deposits are individually mapped, while the material on the slopes are not.

Colluvium occurs on the slopes as a thick residual soil that accumulates owed to weathering of the rock. On the slope faces this material is accumulating as modern deposits. The trench logs contained detailed descriptions where this material was encountered. It is a loose silt to boulder sized gravel. This material will need to be removed within the limits of grading prior to fill placement.

Very thick deposits occur in the upper canyons above the fill pad and below the non-engineered fill. Mapping of the deposits beneath the fill is based on aerial photographic analysis (see References). These deposits are Pleistocene in age (11,000 years to 1.6 million years) and are equivalent to the Older dissected gravel (Qog) mapped just north of Maple Canyon by Dibblee, 2002. This material filled the canyon and was then dissected by stream erosion (blue dashed lines on the Geologic Map).

In the upper canyons, this material is up to 30 feet thick and may have to be removed within the limits of grading prior to fill placement. Exploration and testing will be required of the colluvium to determine if it can be left in place during grading when access to the steep slopes can be provided. During trenching, an unsuccessful attempt was made to obtain a sample of the material.

Colluvium will need to be removed within the limits of grading prior to fill placement.

Subsurface Water

Natural seeps or springs were observed at the site in the north-facing slope south of the proposed SPS (see Plate 1); however, groundwater was not encountered in the exploratory borings or trenches. The broken crystalline granitic bedrock to the south of the proposed SPS is permeable enough to absorb rainwater. During and shortly after rainfall, water may infiltrate into the slope, percolate along the fractures and slowly flow as subsurface water into the fill and eventually to Big Tujunga Canyon Creek.

Seismic Ground Motion

Since strong ground motion from earthquakes is anticipated at the site within the lifespan of the proposed fill, it has been considered during analysis, and should be considered during design. In the event of a large earthquake on any of the nearby active faults, permanent ground deformation over a large area is likely to occur consisting of lateral and/or vertical movement. Potential constraints requiring mitigative design for the project resulting from permanent ground deformation have not been evaluated by the geotechnical engineer.

STABILITY ANALYSES

The existing non-engineered fill has an overall gradient of 3:1, local slopes were constructed at a gradient of 2:1 or less. Based on the County Grading Code, gross stability analysis is not required. The existing fill is considered statically and seismically stable, as is the proposed fill provided our recommendations are followed.

Surficial Stability

Based on occurrences at other SPS sites, localized surficial failures within the outer 4 feet of the proposed fill slope are likely to occur during and after major rain events; therefore, surficial stability analysis is not provided for this project. Soil materials from surficial failures may be collected onsite and reused as necessary.

CONCLUSIONS

The proposed project is feasible from a geotechnical standpoint.

The existing non-engineered fill is suitable for support of the proposed engineered fill.

The proposed fill slopes will have adequate gross stability factors of safety, provided our recommendations are implemented.

Surficial erosion and localized surficial failures may be anticipated following intensive rainfall. Based on the remote and isolated conditions of the site, surficial failures should not adversely affect any offsite properties.

RECOMMENDATIONS

Maximum gradient of the fill slope should be 2:1 (H:V).

Drainage benches should be at least 15 feet wide and constructed every 25 vertical feet or less. Drainage benches may be combined with the access road to achieve surface drainage.

It is recommended that surficial stability be mitigated with routine maintenance.

Preliminary and final design plans and specifications should be submitted to GMED for review and approval in order to verify that our recommendations have been incorporated into the plans.

A representative from GMED should be invited to the preconstruction meeting.

Geotechnical observations should be made by qualified personnel during construction to confirm anticipated conditions or to make appropriate recommendations where conditions deviate. If GMED is to provide construction observations, please contact us at (626) 458-4925, at least two (2) weeks prior to the start of work for foundation excavations and grading.

At the completion of grading construction, a final survey map, a fill compaction report, and an as-graded geological map shall be prepared based on information obtained during grading.

Benching

Prior to the placement of engineered fill, the canyon slopes shall be benched (excavated) to expose bedrock. Benches shall be approximately 4 feet high vertically and create a flat bench upon which the fill will be compacted. This operation is meant to remove unsuitable materials, including but not limited to, vegetation, alluvium, residual soil, colluvium, spill fill, non-engineered fill, and any other material not deemed suitable for support of engineered fill by the project geotechnical engineer.

Prior to Fill Placement

The existing non-engineered fill shall be over-excavated 3 feet below current grade, scarified to a depth of 1 foot, and recompacted to 90 percent relative compaction within 2 percent of optimum moisture. Compaction testing shall be completed prior to fill placement to verify compliance with the specification.

Sediments within the debris basins must be removed from rock prior to placement of engineered fill.

Fill Quality

The organic content of the fill must be less than 5 percent by volume and not contain concentrations of organics such as tree trunks. Organics may be removed during fill placement by on-site pickers and must be properly disposed of off-site.

The fill shall contain rocks no larger than 6 inches in diameter unless the rocks are wind rowed. Wind rowed rocks shall be placed in a shallow trench a minimum of one diameter apart, covered with dirt, and jetted with water to force fine grained material around each rock.

Sediments from the reservoir may have higher water content during weighing and transport than suitable for use in engineered fill. Wet soils must be dried out prior to placement or blended with dry soil to achieve the appropriate moisture content.

Fill Placement

Fill shall be constructed as an engineered fill. The fill should be placed in loose lifts not exceeding 8 inches in thickness, moisture conditioned as necessary, and mechanically compacted to 90 percent relative compaction within 2 percent of optimum moisture in accordance with ASTM D1557.

Construction of the Fill Slope Face

Two methods may be used to construct the fill slope face. The slope face may be overbuilt at least 2 horizontal feet from final grade and then trimmed back to a compacted core at grade. The fill may be placed at grade and mechanically compacted with a sheepsfoot roller on the back of a dozer at least every 4 vertical feet.

Whichever method is used, fill slope compaction testing will be conducted to determine compliance. The contractor will have to excavate and recompact all parts of the fill slope face that do not meet the compaction specifications.

Quality Control Observations and Testing

In-grading quality control observations must be made by California-licensed geologists and geotechnical engineers on a continuous to periodic basis as conditions warrant.

Field density tests must be made by a qualified soils technician under the direct supervision of a California-licensed geotechnical engineer. The testing may be completed using the Nuclear Test Methods, ASTM D2922-96 and D3017-88, provided a sand cone test is competed for every ten nuclear gage tests to verify compaction. The sand cone test must follow the ASTM D1556-96 method.

Sufficient density tests shall be taken and recorded per the following specification: at least one test for every 1,000 cubic yards of fill placed and at least one test every 2 feet of vertical fill placement.

Areas with failing density tests shall be reworked by the contractor and retested by the soils technician.

The soils technician will obtain representative samples of each different type of soil and send them to the lab for determination of a maximum per ASTM D1557. A list of the different maximums shall be maintained on-site by the soils technician.

Drainage

Adequate surface drainage should be provided for the proposed fill slope using terrace drains and associated down drains, as well as debris basins and buried drains.

Temporary drainage should be provided during construction. This includes providing adequate inlet structures prior to each rainy season during the lifetime of the project.

Corrosion Potential

During construction, corrosion testing should be performed on selected engineered fill samples. Provisions should be taken to protect concrete structures in contact with the engineered fill.

Construction Considerations

Contractor must identify and protect any structures that will be left in place from damage during grading activities.

A chipper may be used to reduce oversized organic material to chips.

LIMITATIONS

This report has been prepared for the exclusive use of Stormwater Engineering Division for the specific site discussed herein and should not be considered transferable to other sites or projects. In the event that any modification of the design, configuration, or use of the site is planned, the conclusions and recommendations contained in this report are no longer valid.

This study was conducted according to generally accepted geotechnical practice for projects of this magnitude. Our conclusions and recommendations are based on the data available and our interpretation of the data based on our experience and background. Hence, our conclusions and recommendations are professional opinions and are not meant to be a control of nature; therefore, no warranty is herein expressed or implied.

This report may not be duplicated without the consent of the Department of Public Works.

If you have any questions concerning this report, please contact Karen Mendez at (626) 458-7896.

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REFERENCES

As-built Plans dated August 12, 1991. Big Tujunga Dam and Reservoir Maple Canyon Sediment Placement Site, County of Los Angeles Department of Public Works.

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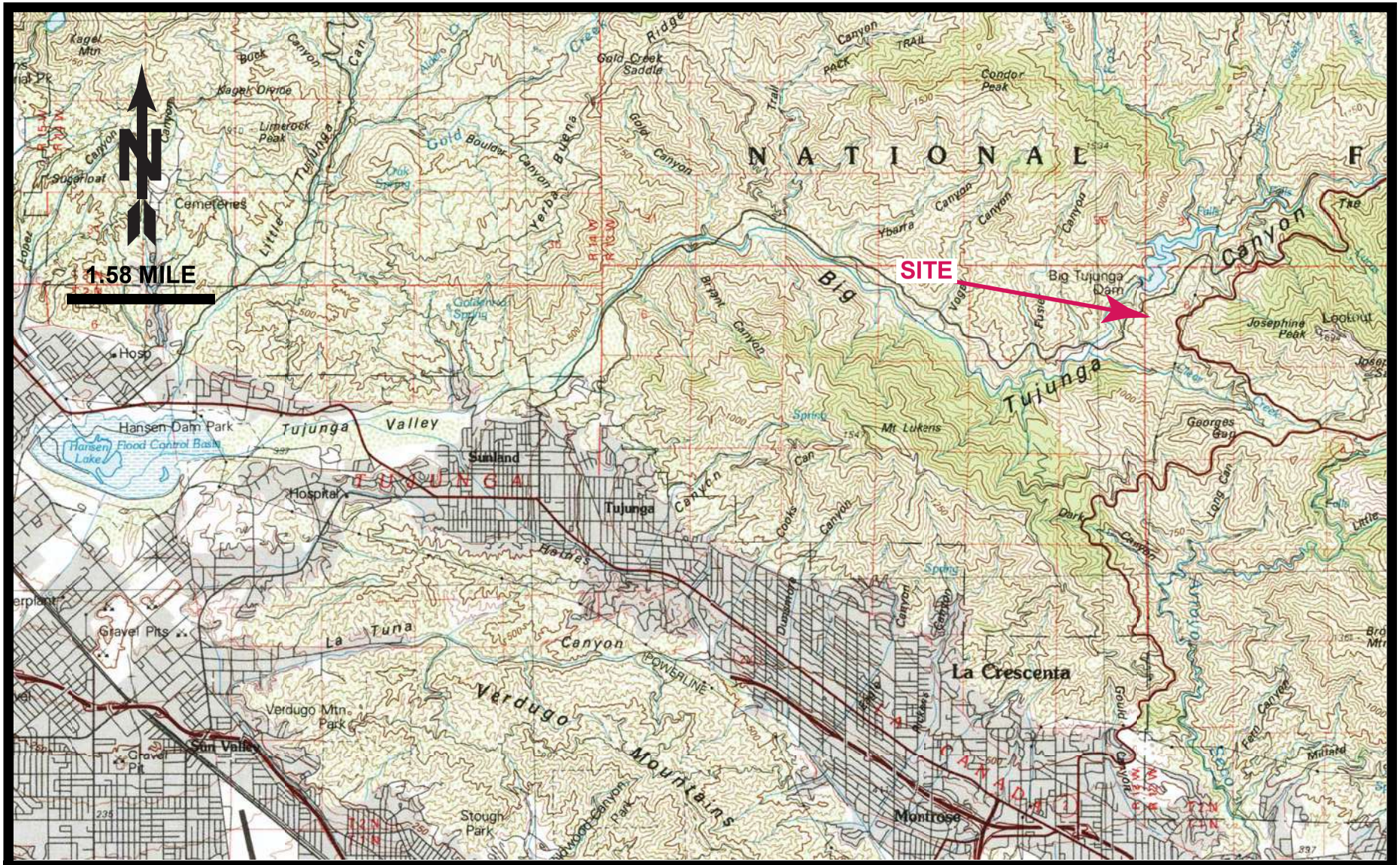
W.R. Wahler and Associates, March 1969, Proposal to Provide Engineering and Geological Services for Big Tujunga Dam Debris Disposal Project.

W.R. Wahler and Associates, August 1971, Design and Construction Recommendations for Big Tujunga Dam Debris Disposal Project.

Stereoscopic Aerial Photographs

Year	Source	Flight	Frames
1928	Fairchild	C300	F-279, F-280, F248, F249
6/15/1938	USDA	AXJ-52	55-56
2/3/1954	USDA	AXJ-15K	127-128
1973	U2	73-036	133-135
2/23/1970	American Aerial	70125	1-3
8/29/1980	American Aerial	80203	1-5
5/5/2010	RBF	10-1393	1-1 to 1-5, 2-1 to 2-3

FIGURES



GEOLOGY SOILS

GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

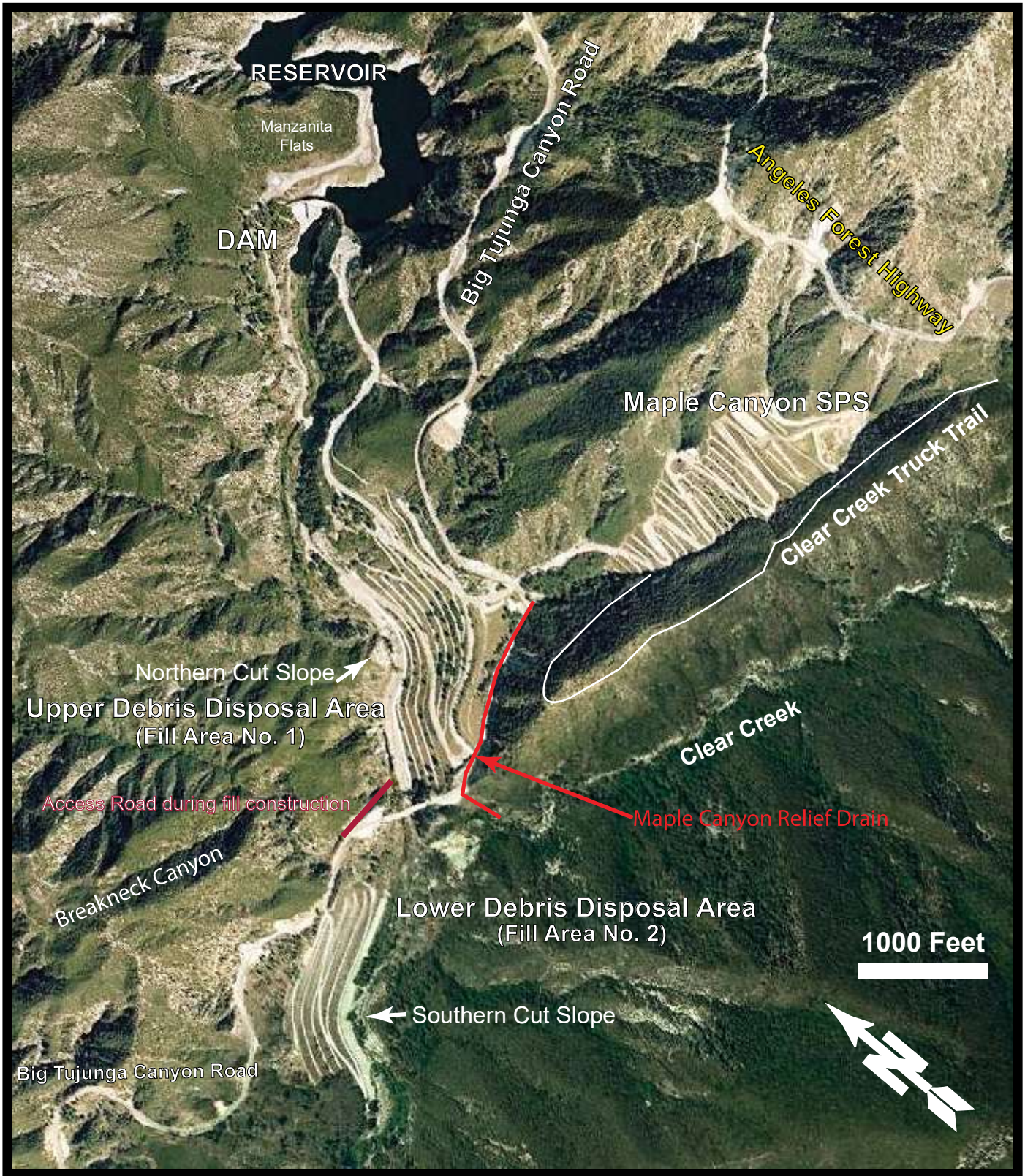
Location Map

Maple Canyon Sediment Placement Site

Digitized by
R. Larson

5/5/16

Figure 1



GEOLOGY SOILS

GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

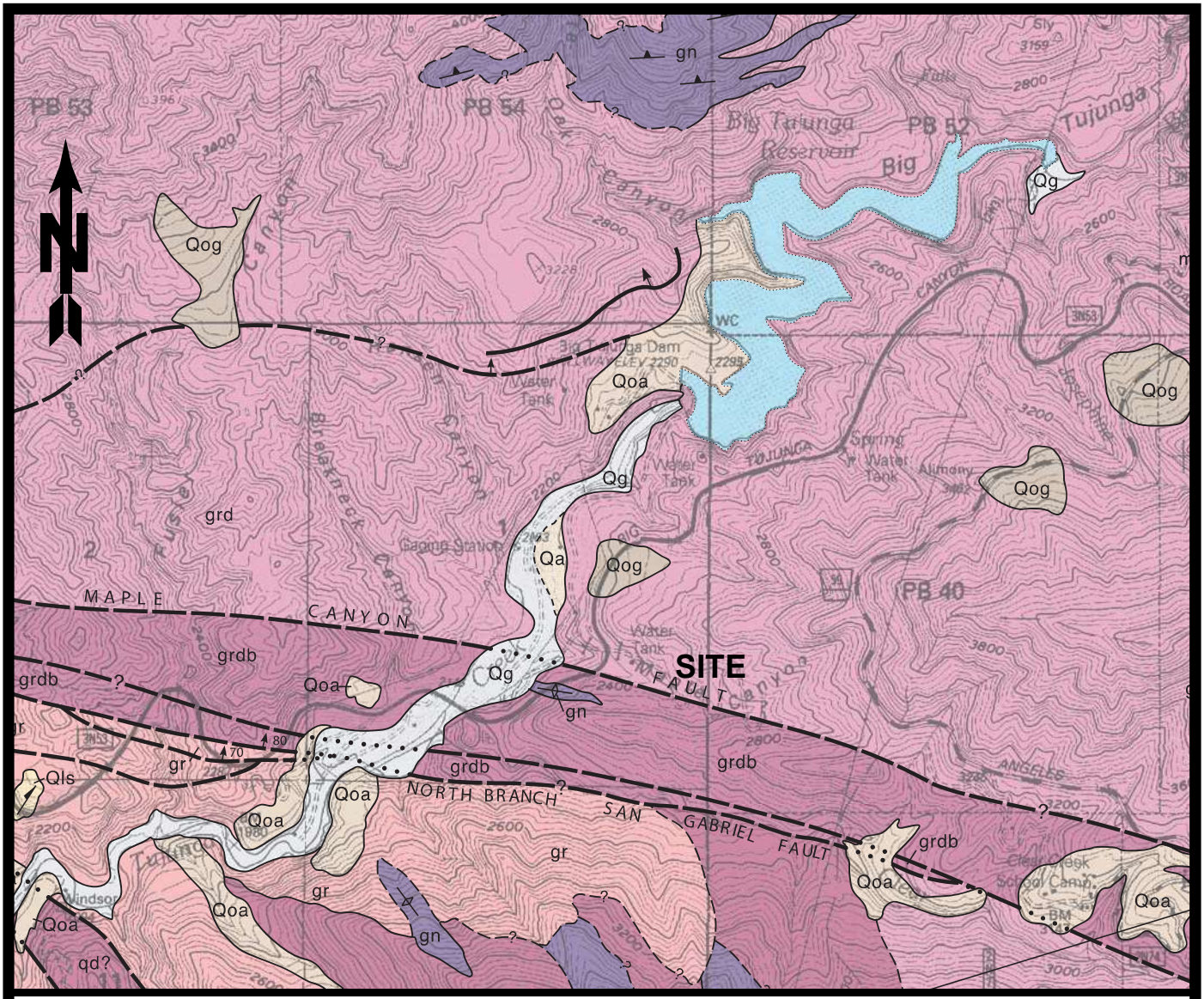
Regional Vicinity Photo

Maple Canyon
Sediment Placement Site

Digitized by
R. Larson

5/5/16

Figure 2



Legend

Surficial sediments
Qa - stream alluvium
Qg - stream gravel
Qls - landslide
Qoa - older dissected alluvium
Qog - older dissected gravel

Basement rock
gr - quartz monzonite
grd - Josephine quartz monzonite
grdb - Josephine quartz monzonite, weathered
gn - gneiss

Scale: 1 inch = 2000 ft.

Dibblee, T.W. Jr. and Carter, B., 2002, Geologic Map of the Condor Peak Quadrangle, Los Angeles, California

GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

Regional Geologic Map

Maple Canyon
Sediment Placement Site

Digitized by
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Figure 3

APPENDIX A

BORING LOGS

Project: Big Tujunga Dam and Reservoir Sediment Removal
Project Location: Maple SPS
PCA: HF00710003
Monitoring Well Installed: Yes / (No)

SUMMARY LOG OF BORING AND SAMPLING

Los Angeles County Department of Public Works
Geotechnical and Materials Engineering Division

Boring No.: B-1A	Date(s) Drilled: 1/24/12	Logged by: O. Cruz	Boring Diameter 6.5 in.	Ground Elevation N/A ft.	Page 1 of 2	
Station No./ Boring Location: Plate 1		Drilled by: FMD	Hammer Weight 140 lbs.	Total Depth 31 ft.	Depth to Invert N/A ft.	
Long/ Lat: N/A		Drilling Method/ Equipment: Hollow Stem	Drop Height 30 in.	Depth to Groundwater N/A ft.	Depth to Bedrock N/A ft.	

DEPTH (FEET)	FIELD DATA: Sample No.	Drive / Bulk	Blow Count (per 6 in.)	Comments/ Interpretations/ Attitudes/ PID - PPM	Graphic Log / Lithology	DESCRIPTION AND/OR LITHOLOGIC DESCRIPTION	LABORATORY TESTING: USCS	In-situ γ_d (pcf)	In-situ MC (%)	Sieve % Passing No. 4	Sieve % Passing No. 200	Type of Tests
0						SILTY SAND medium dense, medium brown, dry, some gravel 1.5" to 3"	SM					
5	1R		4 10 14			@5': thin sandy layer with few gravel, light brown		111.2	9.9			
	2B					@7': black, trace of organic odor						
10	3R		12 18 25			Poorly-graded SAND with SILT and GRAVEL dense, medium brown to grey, fine gravel	SP-SM					
15	4R		11 15 25			@15': moist, coarse gravel, trace of organics, granitic fragments						
	5B											
20	6R		13 19 30									
25	7R		20 50/2"			@25': very dense, decrease in silt content, moist, gray to dark brown, increase in coarse gravel, granitic fragments						

LEGEND

- California Ring (2.5 in. OD) Sample
- California Ring (3 in. OD) Sample
- SPT (2 in. OD) Sample
- Bulk Sample
- Depth to invert
- Seepage Encountered During Drilling
- Groundwater Encountered During Drilling
- Distinct Contact
- Gradational or Uncertain Contact
- γ_d - Dry Density
- MC - Moisture Content

Types of Tests

AT	- Atterberg Limits	HY	- Hydrometer
CO	- Consolidation	MD	- Maximum Density
CR	- Corrosion	SA	- Sieve Analysis
DS	- Direct Shear	SE	- Sand Equivalence
EI	- Expansion Index	TR	- Triaxial

Note: This log contains observations and interpretations that are valid only for the specific date and location of the boring. Subsurface conditions vary between borings and with time. Material descriptions are derived using visual classification methods and may vary from descriptions/classifications based on laboratory testing.

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Station No./ Boring Location: Plate 1		Drilled by: FMD	Hammer Weight 140 lbs.	Total Depth 31.5 ft.	Depth to Invert N/A ft.	
Long/ Lat: N/A		Drilling Method/ Equipment: Hollow Stem	Drop Height 30 in.	Depth to Groundwater N/A ft.	Depth to Bedrock N/A ft.	

DEPTH (FEET)	FIELD DATA: Sample No.	Drive / Bulk	Blow Count (per 6 in.)	Comments/ Interpretations/ Attitudes/ PID - PPM	Graphic Log / Lithology	DESCRIPTION AND/OR LITHOLOGIC DESCRIPTION	LABORATORY TESTING: USCS	In-situ γ_d (pcf)	In-situ MC (%)	Sieve % Passing No. 4	Sieve % Passing No. 200	Type of Tests
30	8R		22 45 35/1″									
						TD= 31.5′						
35												
40												
45												
50												
55												

LEGEND

- California Ring (2.5 in. OD) Sample
- California Ring (3 in. OD) Sample
- SPT (2 in. OD) Sample
- Bulk Sample
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Boring No.: B-2A	Date(s) Drilled: 1/24/12	Logged by: O. Cruz	Boring Diameter 6.5 in.	Ground Elevation N/A ft.	Page 1 of 2	
Station No./ Boring Location: Plate 1		Drilled by: FMD	Hammer Weight 140 lbs.	Total Depth 31.5 ft.	Depth to Invert N/A ft.	
Long/ Lat: N/A		Drilling Method/ Equipment: Hollow Stem	Drop Height 30 in.	Depth to Groundwater N/A ft.	Depth to Bedrock N/A ft.	

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0				surface soils were wet (rained previous weekend)		SILTY SAND medium dense, dark brown, moist	SM					
	1R		10 17 22									
	3B					@4.5′: granite fragment 2.5″ diameter						
5	2R		8 10 14			@6′: increase in sand content @7′: black, trace of organic material, decrease in moisture						
	4R		12 16 20									
10	5R		11 17 21			@10′: trace of granite, a few fine gravel						
15			21 25/0″	2.5″ rock plugged tip								
	6R		15 23 31			Poorly graded SAND with GRAVEL dense, grey, moist, coarse sand, fine gravel	SP					
	7B											
20	8R		13 27 31			Poorly-graded SAND with SILT & GRAVEL very dense, increase in gravel content, some silt	SP-SM					
25	9R		20 20 25			@25′: rock fragments approximately 1″ wide, wet, grey-brown						

LEGEND

- California Ring (2.5 in. OD) Sample
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- SPT (2 in. OD) Sample
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Project: Big Tujunga Dam and Reservoir Sediment Removal
Project Location: Maple SPS
PCA: HF00710003
Monitoring Well Installed: Yes / (No)

SUMMARY LOG OF BORING AND SAMPLING

Los Angeles County Department of Public Works
Geotechnical and Materials Engineering Division

Boring No.: B-2A	Date(s) Drilled: 1/24/12	Logged by: O. Cruz	Boring Diameter 6.5 in.	Ground Elevation N/A ft.	Page 2 of 2	
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30	10R		14 28 42			TD= 31.5′						
35												
40												
45												
50												
55												

LEGEND

- California Ring (2.5 in. OD) Sample
- California Ring (3 in. OD) Sample
- SPT (2 in. OD) Sample
- Bulk Sample
- Depth to invert
- Seepage Encountered During Drilling
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DS - Direct Shear	SE - Sand Equivalence
EI - Expansion Index	TR - Triaxial

Note: This log contains observations and interpretations that are valid only for the specific date and location of the boring. Subsurface conditions vary between borings and with time. Material descriptions are derived using visual classification methods and may vary from descriptions/classifications based on laboratory testing.

Project: Big Tujunga Dam and Reservoir Sediment Removal
Project Location: Maple SPS
PCA: HF00710003
Monitoring Well Installed: Yes / (No)

SUMMARY LOG OF BORING AND SAMPLING

Los Angeles County Department of Public Works
Geotechnical and Materials Engineering Division

Boring No.: B-3A	Date(s) Drilled: 1/25/12	Logged by: O. Cruz	Boring Diameter 6.5 in.	Ground Elevation N/A ft.	Page 1 of 1
Station No./ Boring Location: Plate 1		Drilled by: FMD	Hammer Weight 140 lbs.	Total Depth 26.5 ft.	Depth to Invert N/A ft.
Long/ Lat: N/A		Drilling Method/ Equipment: Hollow Stem	Drop Height 30 in.	Depth to Groundwater N/A ft.	Depth to Bedrock N/A ft.

DEPTH (FEET)	FIELD DATA: Sample No.	Drive / Bulk	Blow Count (per 6 in.)	Comments/ Interpretations/ Attitudes/ PID - PPM	Graphic Log / Lithology	DESCRIPTION AND/OR LITHOLOGIC DESCRIPTION	LABORATORY TESTING: USCS	In-situ γ_d (pcf)	In-situ MC (%)	Sieve % Passing No. 4	Sieve % Passing No. 200	Type of Tests
0						SILTY SAND medium dense, medium brown, dry	SM					
5	1R		6 10 12			@5': cobble, hard drilling moist, little gravel, black (trace organic) medium dense						
	2B											
10	3R		11 25 25			@10' dense		117.1	9.6			DS
15			5 12 19	no recovery		@14': increase in gravel content, up to 4" wide native soils, dark brown						
20	4R		20 23 25			Poorly-graded SAND with SILT & GRAVEL dense, light brown, dry, broken up sands, some gravel, little silt	SP-SM					
	6B											
25	5R		16 28 34			@25': weathered bedrock, light brown, dry, granite conglomerate fragments TD= 26.5'		127.0	5.1			DS

LEGEND

- California Ring (2.5 in. OD) Sample
- California Ring (3 in. OD) Sample
- SPT (2 in. OD) Sample
- Bulk Sample
- Depth to invert
- Seepage Encountered During Drilling
- Groundwater Encountered During Drilling
- Distinct Contact
- Gradational or Uncertain Contact
- γ_d - Dry Density
- MC - Moisture Content

Types of Tests

AT - Atterberg Limits	HY - Hydrometer
CO - Consolidation	MD - Maximum Density
CR - Corrosion	SA - Sieve Analysis
DS - Direct Shear	SE - Sand Equivalence
EI - Expansion Index	TR - Triaxial

Note: This log contains observations and interpretations that are valid only for the specific date and location of the boring. Subsurface conditions vary between borings and with time. Material descriptions are derived using visual classification methods and may vary from descriptions/classifications based on laboratory testing.

Project: Big Tujunga Dam and Reservoir Sediment Removal Project Location: Maple SPS PCA: HF00710003 (Monitoring Well Installed: Yes / No)	**SUMMARY LOG OF BORING AND SAMPLING** Los Angeles County Department of Public Works Geotechnical and Materials Engineering Division

Boring No.: B-4A	Date(s) Drilled: 1/25/12	Logged by: O. Cruz	Boring Diameter 6.5 in.	Ground Elevation N/A ft.	Page 1 of 2		
Station No./ Boring Location: Plate 1		Drilled by: FMD	Hammer Weight 140 lbs.	Total Depth 41.5 ft.	Depth to Invert N/A ft.		
Long/ Lat: N/A		Drilling Method/ Equipment: Hollow Stem	Drop Height 30 in.	Depth to Groundwater N/A ft.	Depth to Bedrock N/A ft.		

DEPTH (FEET)	FIELD DATA: Sample No.	Drive / Bulk	Blow Count (per 6 in.)	Comments/ Interpretations/ Attitudes/ PID - PPM	Graphic Log / Lithology	DESCRIPTION AND/OR LITHOLOGIC DESCRIPTION	USCS	LABORATORY TESTING: In-situ γ_d (pcf)	In-situ MC (%)	Sieve % Passing No. 4	Sieve % Passing No. 200	Type of Tests
0												
				rained previous weekend		SILTY SAND medium dense, medium brown, dry	SM					
	1R		8 14 15			@2.5': black (trace organics), moist		120.1	7.5			
5	2R		10 16 15					96.9	46.4	27	9	SA MD
	4B											
	3R		5 9 10					107.3	11.5			DS
10	5R		4 4 4			@10': loose lense						
15	6R		8 16 20			Poorly graded SAND with SILT and GRAVEL dense, dark grey to medium brown, coarse sand and gravel	SP-SM					
	7B											
20	8R		21 35 45			@20': very dense						
25	9R		6 23 33			@20': increase in gravel content, dense						
	10B											

LEGEND

- California Ring (2.5 in. OD) Sample
- California Ring (3 in. OD) Sample
- SPT (2 in. OD) Sample
- Bulk Sample
- Depth to invert
- Seepage Encountered During Drilling
- Groundwater Encountered During Drilling
- Distinct Contact
- Gradational or Uncertain Contact
- γ_d - Dry Density
- MC - Moisture Content

Types of Tests

AT - Atterberg Limits	HY - Hydrometer
CO - Consolidation	MD - Maximum Density
CR - Corrosion	SA - Sieve Analysis
DS - Direct Shear	SE - Sand Equivalence
EI - Expansion Index	TR - Triaxial

Note: This log contains observations and interpretations that are valid only for the specific date and location of the boring. Subsurface conditions vary between borings and with time. Material descriptions are derived using visual classification methods and may vary from descriptions/classifications based on laboratory testing.

Project: Big Tujunga Dam and Reservoir Sediment Removal
Project Location: Maple SPS
PCA: HF00710003
Monitoring Well Installed: Yes / (No)

SUMMARY LOG OF BORING AND SAMPLING

Los Angeles County Department of Public Works
Geotechnical and Materials Engineering Division

Boring No.: B-4A	Date(s) Drilled: 1/25/12	Logged by: O. Cruz	Boring Diameter 6.5 in.	Ground Elevation N/A ft.	Page 2 of 2	
Station No./ Boring Location: Plate 1		Drilled by: FMD	Hammer Weight 140 lbs.	Total Depth 41.5 ft.	Depth to Invert N/A ft.	
Long/ Lat: N/A		Drilling Method/ Equipment: Hollow Stem	Drop Height 30 in.	Depth to Groundwater N/A ft.	Depth to Bedrock N/A ft.	

DEPTH (FEET)	FIELD DATA: Sample No.	Drive / Bulk	Blow Count (per 6 in.)	Comments/ Interpretations/ Attitudes/ PID - PPM	Graphic Log / Lithology	DESCRIPTION AND/OR LITHOLOGIC DESCRIPTION	LABORATORY TESTING: USCS	In-situ γ_d (pcf)	In-situ MC (%)	Sieve % Passing No. 4	Sieve % Passing No. 200	Type of Tests
30	10R		16 25 35			@30': moist, fine gravel						
35												
40	11R		14 41 51			@40': very dense						
						TD=41.5'						
45												
50												
55												

LEGEND

- California Ring (2.5 in. OD) Sample
- California Ring (3 in. OD) Sample
- SPT (2 in. OD) Sample
- Bulk Sample
- Depth to invert
- Seepage Encountered During Drilling
- Groundwater Encountered During Drilling
- Distinct Contact
- Gradational or Uncertain Contact
- γ_d - Dry Density
- MC - Moisture Content

Types of Tests

- AT - Atterberg Limits
- CO - Consolidation
- CR - Corrosion
- DS - Direct Shear
- EI - Expansion Index
- HY - Hydrometer
- MD - Maximum Density
- SA - Sieve Analysis
- SE - Sand Equivalence
- TR - Triaxial

Note: This log contains observations and interpretations that are valid only for the specific date and location of the boring. Subsurface conditions vary between borings and with time. Material descriptions are derived using visual classification methods and may vary from descriptions/classifications based on laboratory testing.

Project: Big Tujunga Dam and Reservoir Sediment Removal
Project Location: Maple SPS
PCA: HF00710003
Monitoring Well Installed: Yes / (No)

SUMMARY LOG OF BORING AND SAMPLING

Los Angeles County Department of Public Works
Geotechnical and Materials Engineering Division

Boring No.: B-5A	Date(s) Drilled: 1/26/12	Logged by: O. Cruz	Boring Diameter 6.5 in.	Ground Elevation N/A ft.	Page 1 of 2		
Station No./ Boring Location: Plate 1		Drilled by: FMD	Hammer Weight 140 lbs.	Total Depth 45 ft.	Depth to Invert N/A ft.		
Long/ Lat: N/A		Drilling Method/ Equipment: Hollow Stem	Drop Height 30 in.	Depth to Groundwater N/A ft.	Depth to Bedrock N/A ft.		

DEPTH (FEET)	FIELD DATA: Sample No.	Drive / Bulk	Blow Count (per 6 in.)	Comments/ Interpretations/ Attitudes/ PID - PPM	Graphic Log / Lithology	DESCRIPTION AND/OR LITHOLOGIC DESCRIPTION	LABORATORY TESTING: USCS	In-situ γ_d (pcf)	In-situ MC (%)	Sieve % Passing No. 4	Sieve % Passing No. 200	Type of Tests
0						SILTY SAND medium dense, medium brown, moist	SM					
	2B											
5	1R		9 26 31			Poorly graded SAND with SILT and GRAVEL dense, dark grey to dark brown, moist	SP-SM					
						@9': medium dense, light grey, increase in fine gravel content, coarse-grained sand						
10	3R		12 16 17					114.1	3.7			
15	4R		10 13 20									
20	5R		11 24 26			@20': dense						
25												

LEGEND

- California Ring (2.5 in. OD) Sample
- California Ring (3 in. OD) Sample
- SPT (2 in. OD) Sample
- Bulk Sample
- Depth to invert
- Seepage Encountered During Drilling
- Groundwater Encountered During Drilling
- Distinct Contact
- Gradational or Uncertain Contact
- γ_d - Dry Density
- MC - Moisture Content

Types of Tests

AT - Atterberg Limits	HY - Hydrometer
CO - Consolidation	MD - Maximum Density
CR - Corrosion	SA - Sieve Analysis
DS - Direct Shear	SE - Sand Equivalence
EI - Expansion Index	TR - Triaxial

Note: This log contains observations and interpretations that are valid only for the specific date and location of the boring. Subsurface conditions vary between borings and with time. Material descriptions are derived using visual classification methods and may vary from descriptions/classifications based on laboratory testing.

Project: Big Tujunga Dam and Reservoir Sediment Removal
Project Location: Maple SPS
PCA: HF00710003
Monitoring Well Installed: Yes / (No)

SUMMARY LOG OF BORING AND SAMPLING

Los Angeles County Department of Public Works
Geotechnical and Materials Engineering Division

Boring No.: B-5A	Date(s) Drilled: 1/26/12	Logged by: O. Cruz	Boring Diameter 6.5 in.	Ground Elevation N/A ft.	Page 2 of 2	
Station No./ Boring Location: Plate 1		Drilled by: FMD	Hammer Weight 140 lbs.	Total Depth 45 ft.	Depth to Invert N/A ft.	
Long/ Lat: N/A		Drilling Method/ Equipment: Hollow Stem	Drop Height 30 in.	Depth to Groundwater N/A ft.	Depth to Bedrock N/A ft.	

DEPTH (FEET)	FIELD DATA: Sample No.	Drive / Bulk	Blow Count (per 6 in.)	Comments/ Interpretations/ Attitudes/ PID - PPM	Graphic Log / Lithology	DESCRIPTION AND/OR LITHOLOGIC DESCRIPTION	LABORATORY TESTING: USCS	In-situ γ_d (pcf)	In-situ MC (%)	Sieve % Passing No. 4	Sieve % Passing No. 200	Type of Tests
30	6R		10 21 30									
35						@35′: hard drilling						
40	7B		35/6″	no recovery		@40′: very hard drilling, medium grey, powder-like						
45						TD= 45′						
50												
55												

LEGEND

- California Ring (2.5 in. OD) Sample
- California Ring (3 in. OD) Sample
- SPT (2 in. OD) Sample
- Bulk Sample
- Depth to invert
- Seepage Encountered During Drilling
- Groundwater Encountered During Drilling
- Distinct Contact
- Gradational or Uncertain Contact
- γ_d - Dry Density
- MC - Moisture Content

Types of Tests

- AT - Atterberg Limits
- CO - Consolidation
- CR - Corrosion
- DS - Direct Shear
- EI - Expansion Index
- HY - Hydrometer
- MD - Maximum Density
- SA - Sieve Analysis
- SE - Sand Equivalence
- TR - Triaxial

Note: This log contains observations and interpretations that are valid only for the specific date and location of the boring. Subsurface conditions vary between borings and with time. Material descriptions are derived using visual classification methods and may vary from descriptions/classifications based on laboratory testing.

Project: Big Tujunga Dam and Reservoir Sediment Removal
Project Location: Maple SPS
PCA: HF00710003
Monitoring Well Installed: Yes / (No)

SUMMARY LOG OF BORING AND SAMPLING

Los Angeles County Department of Public Works
Geotechnical and Materials Engineering Division

Boring No.: B-6A	Date(s) Drilled: 1/26/12	Logged by: O. Cruz	Boring Diameter	6.5 in.	Ground Elevation	N/A ft.	Page 1 of 1
Station No./ Boring Location:	Plate 1	Drilled by: FMD	Hammer Weight	140 lbs.	Total Depth	26 ft.	Depth to Invert N/A ft.
Long/ Lat:	N/A	Drilling Method/ Equipment: Hollow Stem	Drop Height	30 in.	Depth to Groundwater	N/A ft.	Depth to Bedrock N/A ft.

DEPTH (FEET)	FIELD DATA: Sample No.	Drive / Bulk	Blow Count (per 6 in.)	Comments/ Interpretations/ Attitudes/ PID - PPM	Graphic Log / Lithology	DESCRIPTION AND/OR LITHOLOGIC DESCRIPTION	USCS	LABORATORY TESTING: In-situ γ_d (pcf)	In-situ MC (%)	Sieve % Passing No. 4	Sieve % Passing No. 200	Type of Tests
0						SILTY SAND medium dense, medium brown, moist	SM					
5	1R		20 39 44			@5': very dense, dry, trace gravel						
	2B											
10	3R		17 25 28			@10': black (trace organics), dense @12': dark grey- dark brown, moist						
	5B					Poorly graded SAND with SILT medium dense, dark brown to black, moist	SP-SM			97.7	50.0	SA MD
15	4R		6 11 15					115.0	13.1			DS
20	5R		20 38 50/4"			@20': trace gravel @23': hard drilling						
25	6R		28 45 25/1"			@25': gravel approximately 2.5" wide TD=26'						

LEGEND

- California Ring (2.5 in. OD) Sample
- California Ring (3 in. OD) Sample
- SPT (2 in. OD) Sample
- Bulk Sample
- Depth to invert
- Seepage Encountered During Drilling
- Groundwater Encountered During Drilling
- Distinct Contact
- Gradational or Uncertain Contact
- γ_d - Dry Density
- MC - Moisture Content

Types of Tests

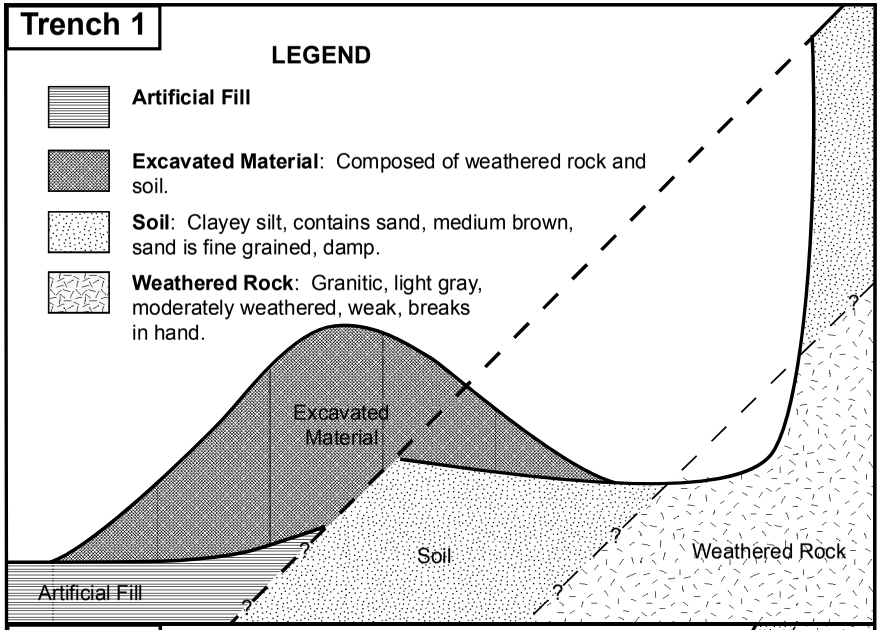
AT - Atterberg Limits	HY - Hydrometer
CO - Consolidation	MD - Maximum Density
CR - Corrosion	SA - Sieve Analysis
DS - Direct Shear	SE - Sand Equivalence
EI - Expansion Index	TR - Triaxial

Note: This log contains observations and interpretations that are valid only for the specific date and location of the boring. Subsurface conditions vary between borings and with time. Material descriptions are derived using visual classification methods and may vary from descriptions/classifications based on laboratory testing.

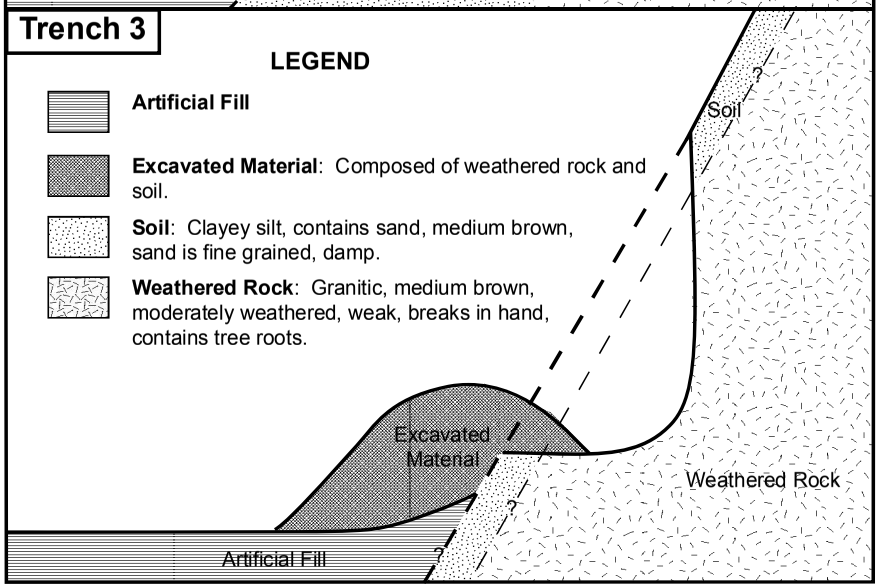
APPENDIX B

TRENCH LOGS

Trench 1



Trench 3



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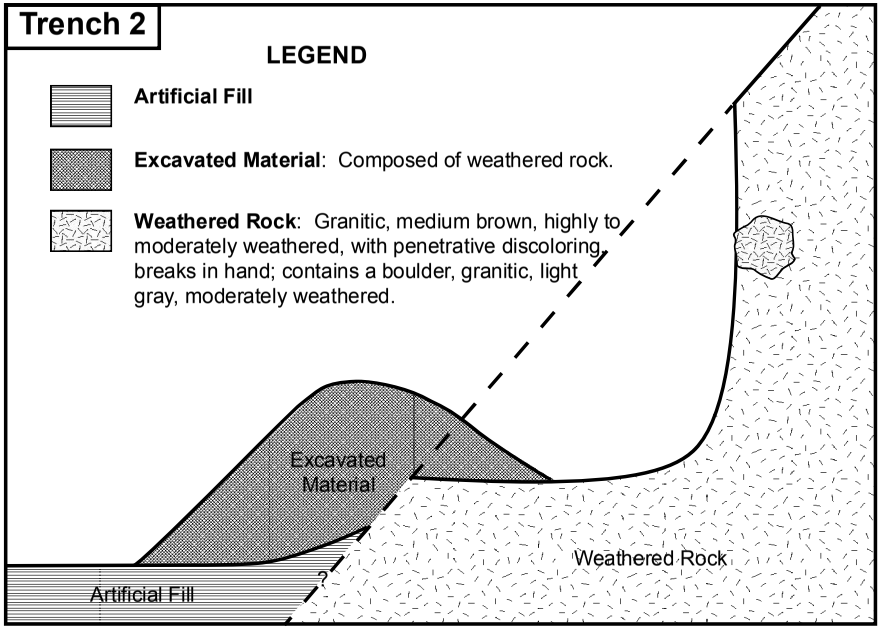


GRAPHIC SCALE

1 inch = 2 feet
Horiztonal = Vertical

GEOLOGY INVESTIGATIONS

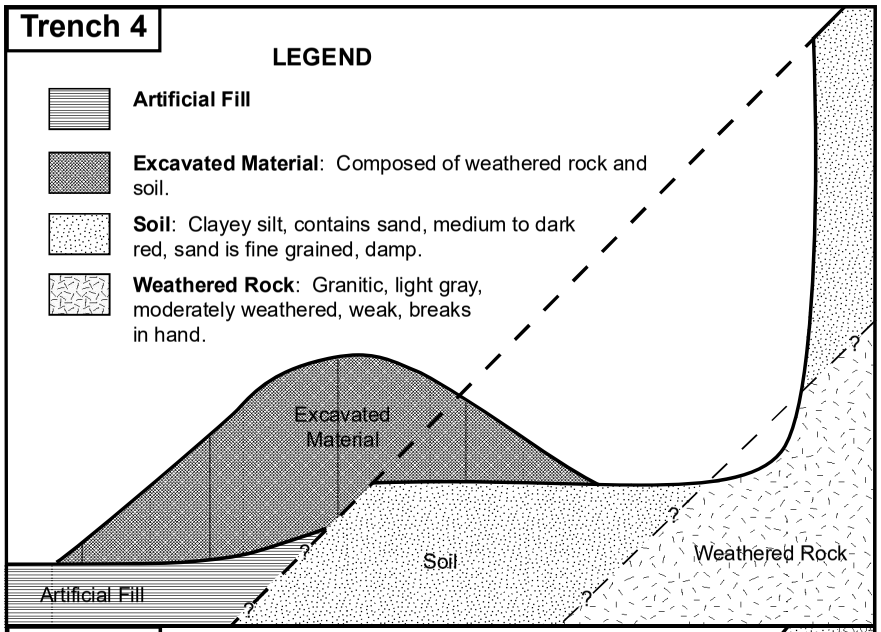
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

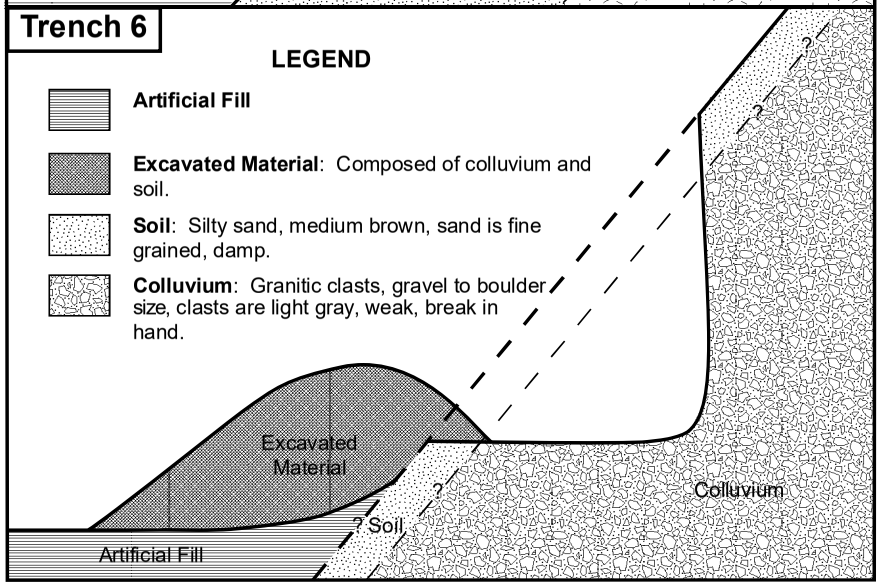
TRENCH LOGS 1,2, & 3
Big Tujunga Reservoir Sediment Removal Project
Tujunga, CA

Date: Sept 2016	Drafted by: RLM/RAL	Scale: 1" = 2'	FIGURE 1

Trench 4



Trench 6



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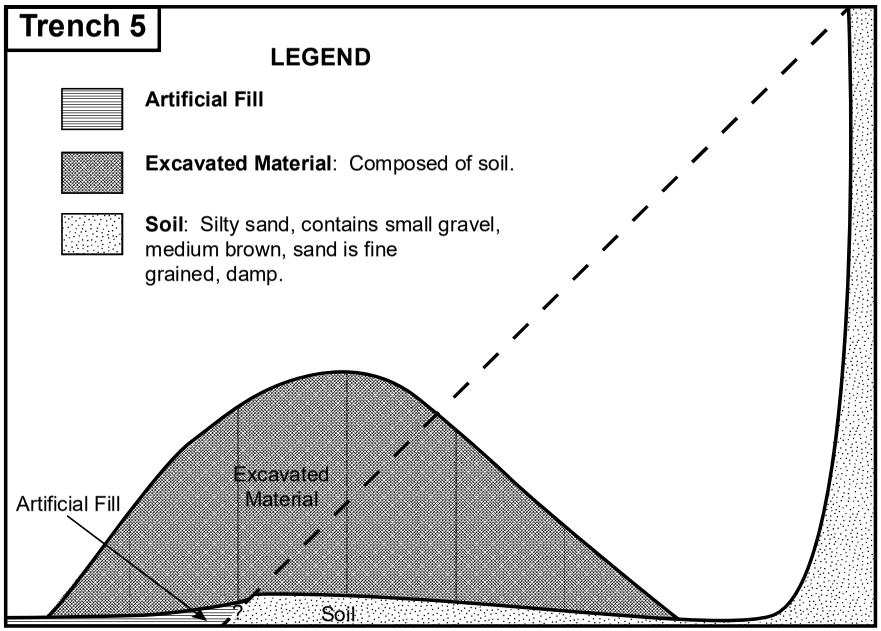


GRAPHIC SCALE

1 inch = 2 feet
Horiztonal = Vertical

GEOLOGY INVESTIGATIONS

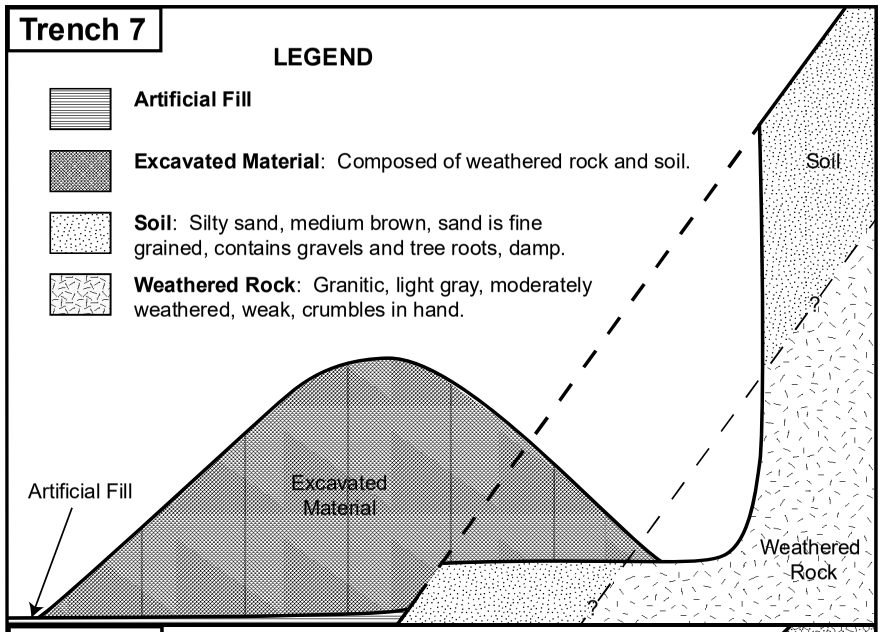
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

TRENCH LOGS 4,5, & 6
Big Tujunga Reservoir Sediment Removal Project
Tujunga, CA

Date: Sept 2016	Drafted by: RLM/RAL	Scale: 1" = 2'	FIGURE 2

Trench 7



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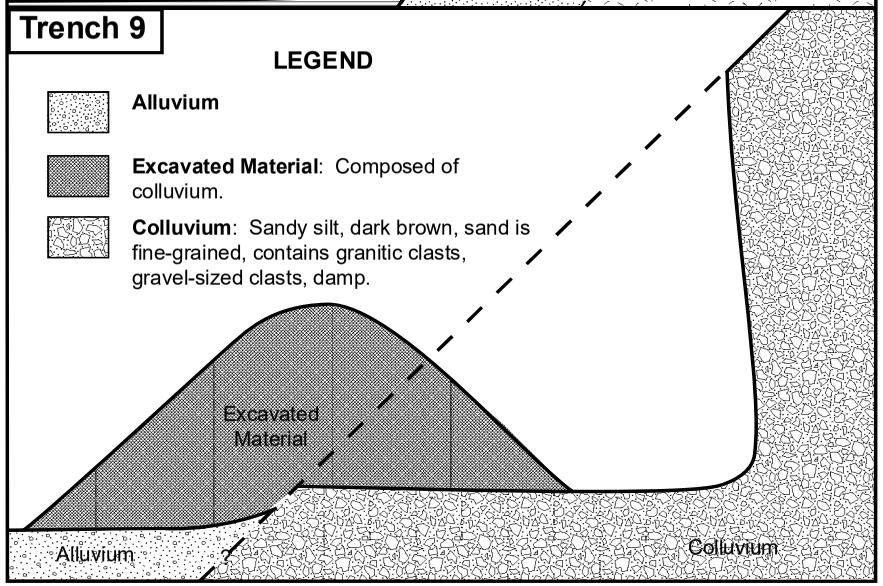

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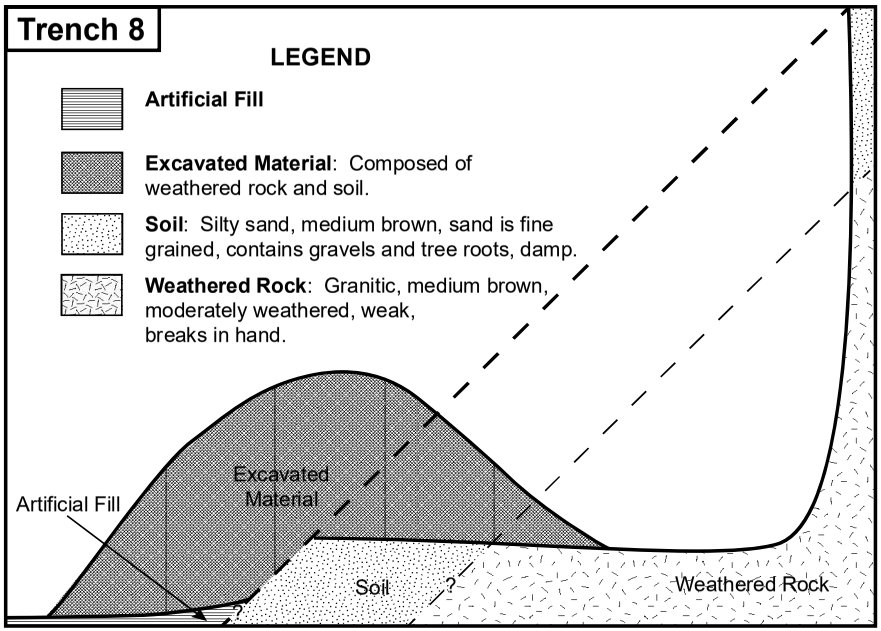


GRAPHIC SCALE

1 inch = 2 feet
Horiztonal = Vertical

GEOLOGY INVESTIGATIONS

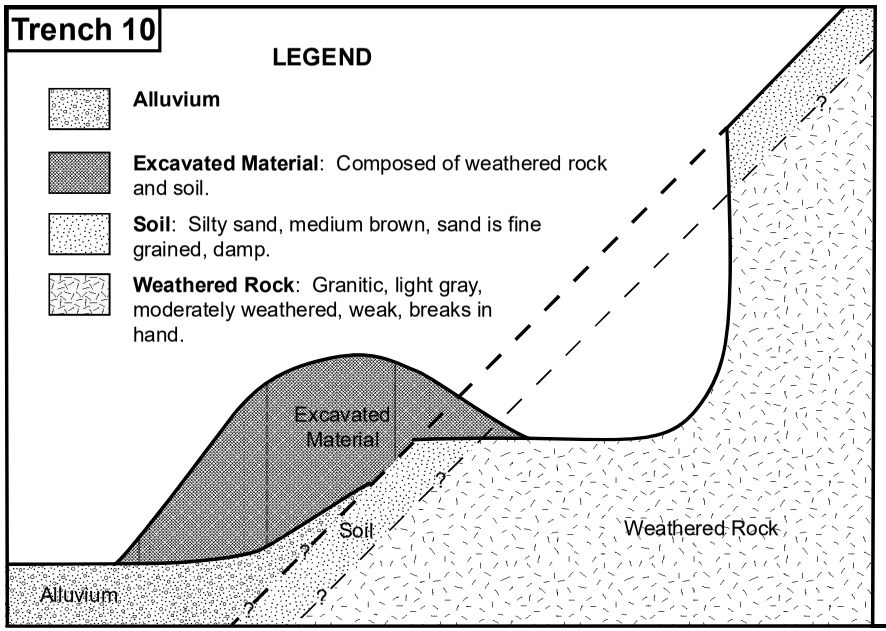
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

TRENCH LOGS 7, 8, & 9
Big Tujunga Reservoir Sediment Removal Project
Tujunga, CA

Date: Sept 2016	Drafted by: RLM/RAL	Scale: 1" = 2'	FIGURE 3

Trench 10



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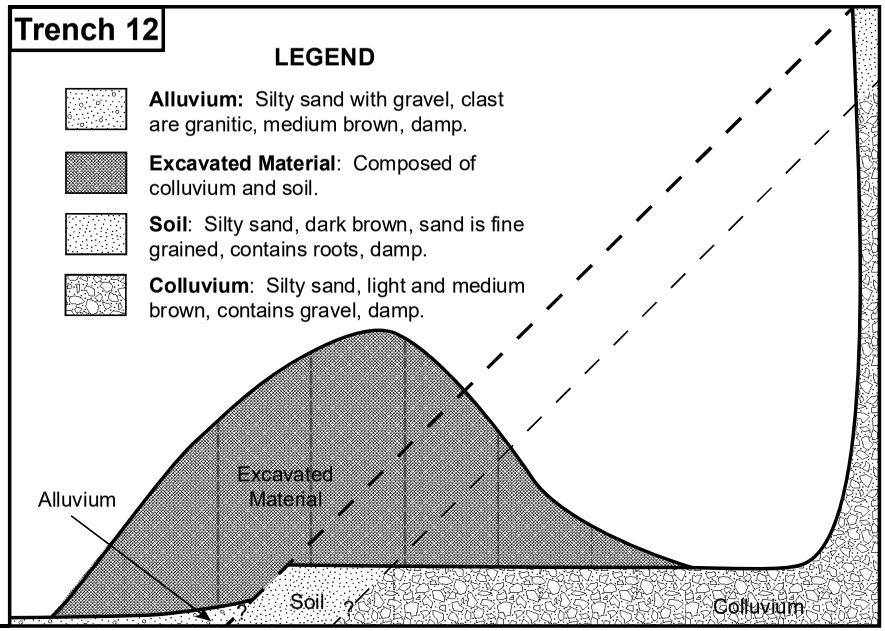

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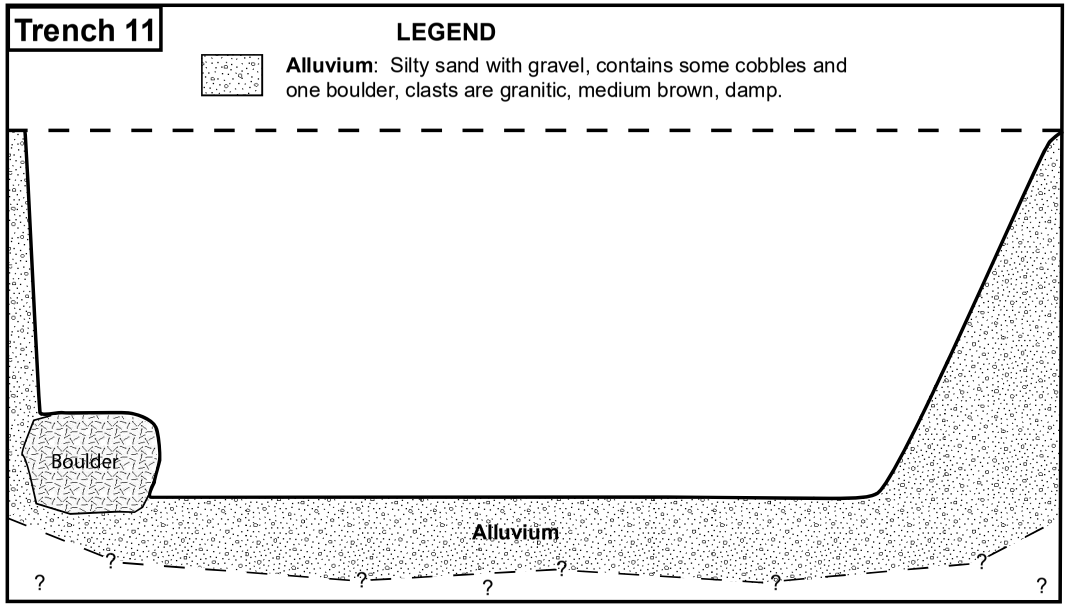


GRAPHIC SCALE

1 inch = 2 feet
Horiztonal = Vertical

GEOLOGY INVESTIGATIONS

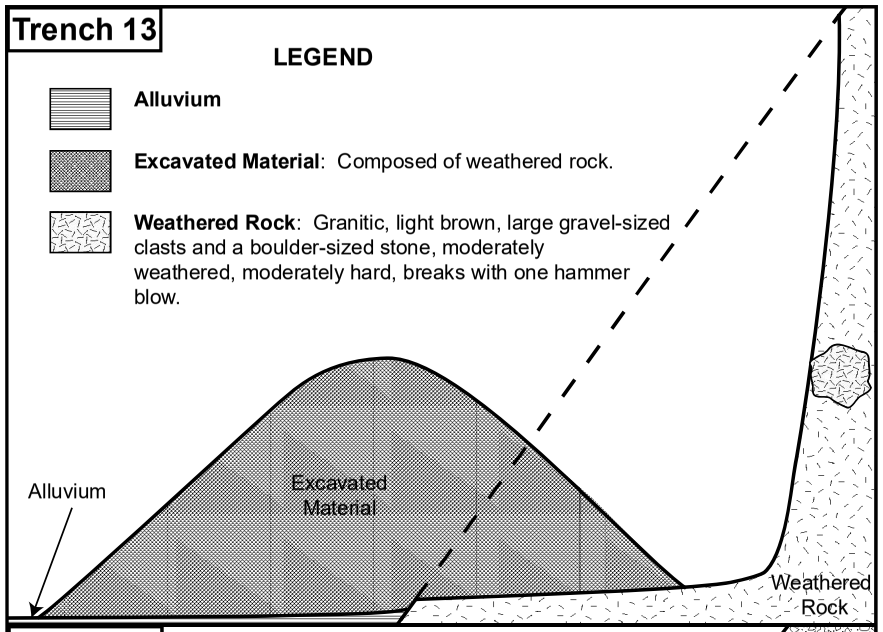
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

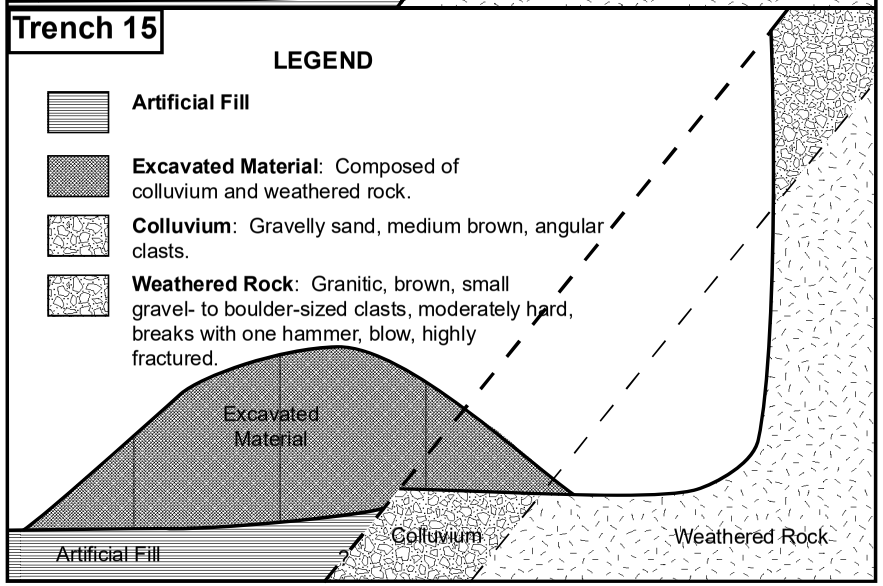
TRENCH LOGS 10,11, & 12
Big Tujunga Reservoir Sediment Removal Project
Tujunga, CA

Date: Sept 2016	Drafted by: RLM/RAL	Scale: 1" = 2'	FIGURE 4

Trench 13



Trench 15



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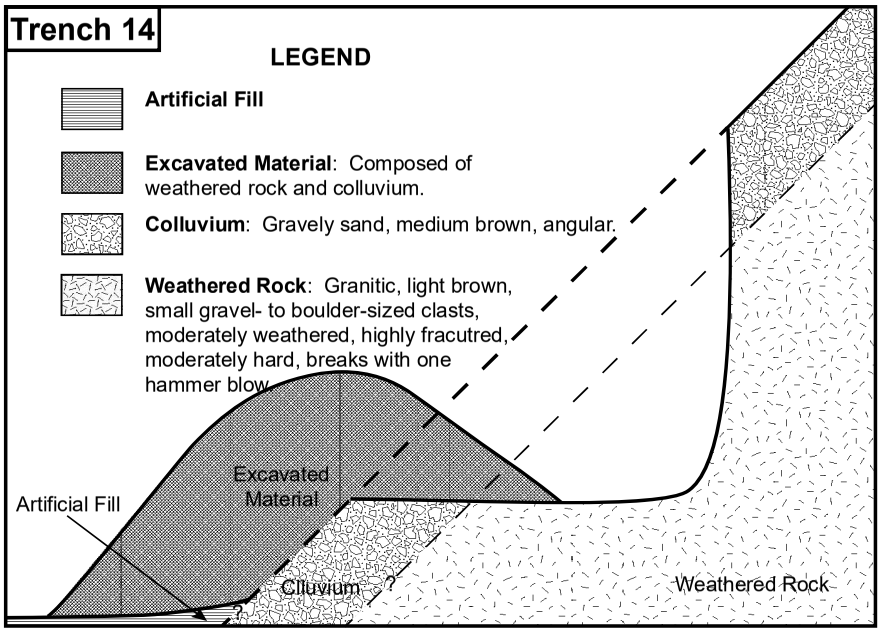


GRAPHIC SCALE

1 inch = 2 feet
Horiztonal = Vertical

GEOLOGY INVESTIGATIONS

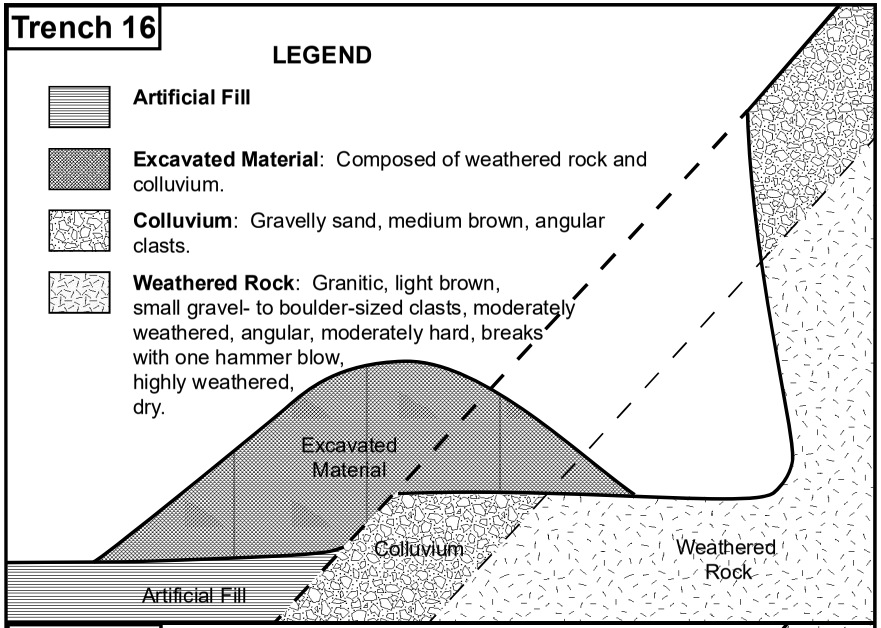
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

TRENCH LOGS 13,14, & 15
Big Tujunga Reservoir Sediment Removal Project
Tujunga, CA

Date: Sept 2016	Drafted by: RLM/RAL	Scale: 1" = 2'	FIGURE 5

Trench 16



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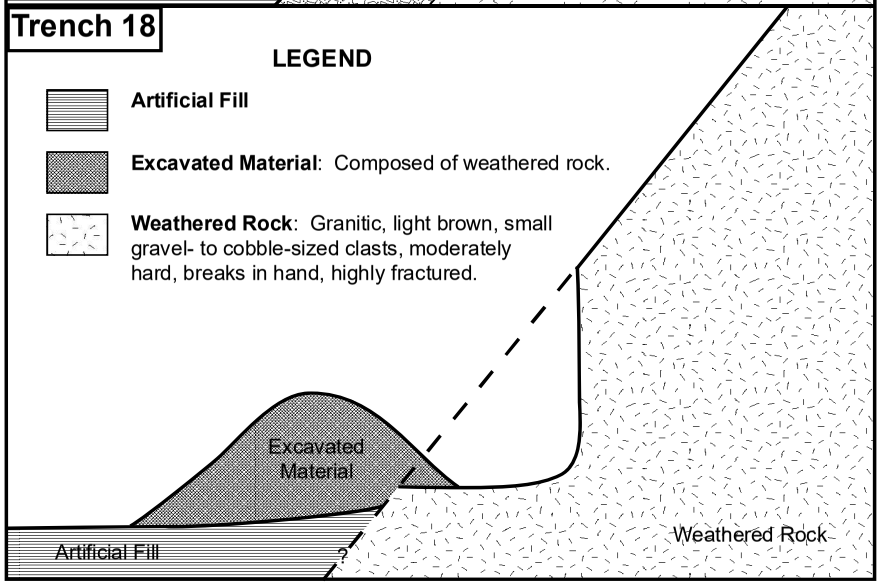

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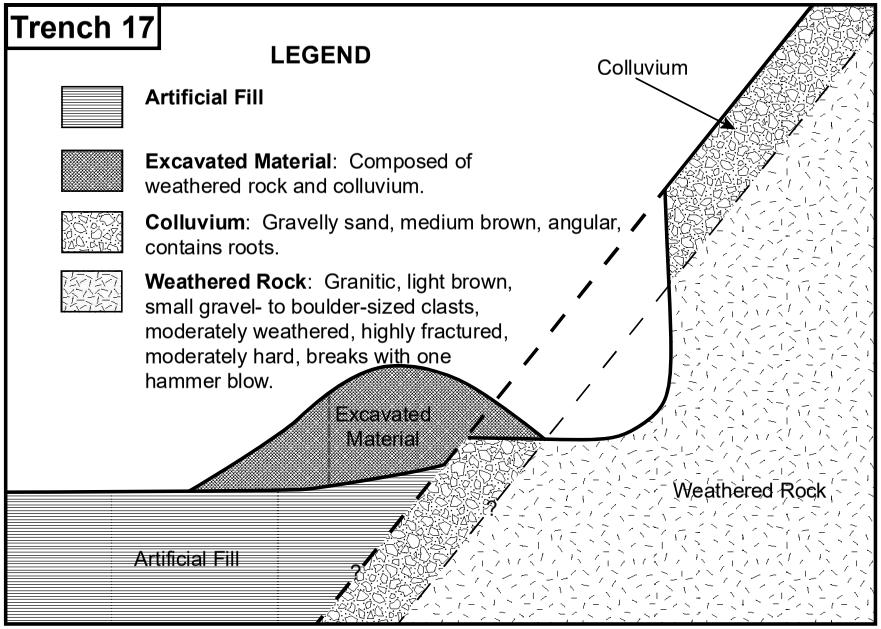


GRAPHIC SCALE

1 inch = 2 feet
Horiztonal = Vertical

GEOLOGY INVESTIGATIONS

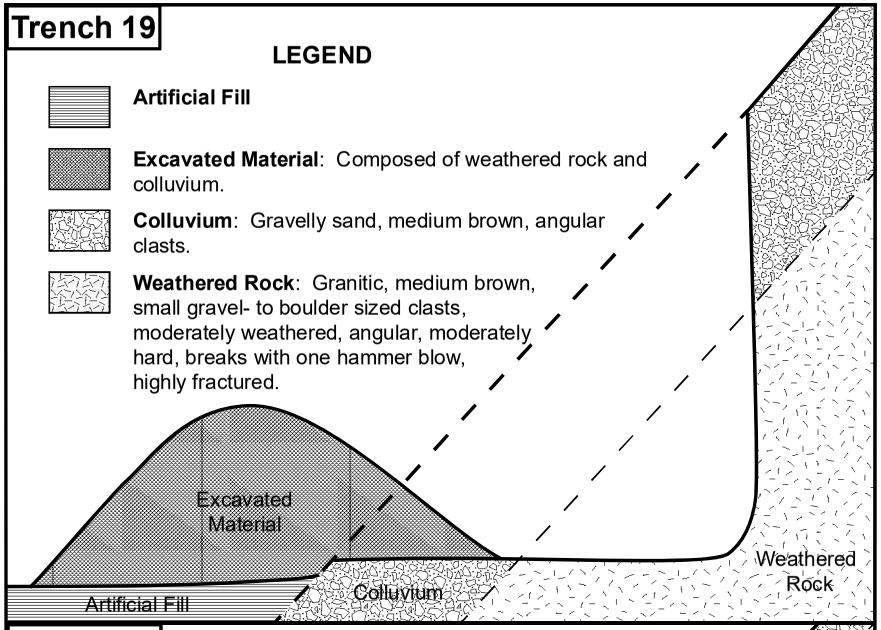
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

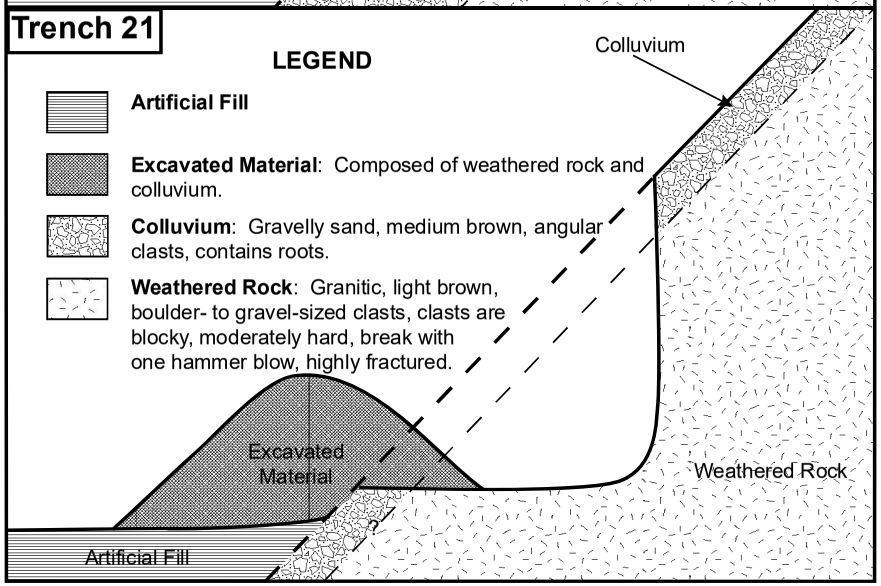
TRENCH LOGS 16,17, & 18
Big Tujunga Reservoir Sediment Removal Project
Tujunga, CA

Date: Sept 2016	Drafted by: RLM/RAL	Scale: 1" = 2'	FIGURE 6

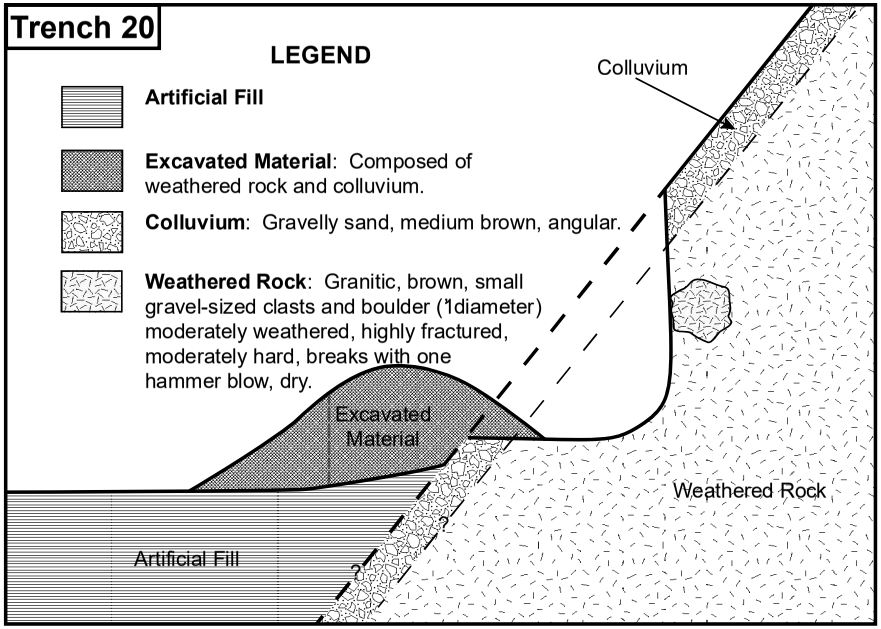
Trench 19



Trench 21



Trench 20



GRAPHIC SCALE

1 inch = 2 feet
Horiztonal = Vertical

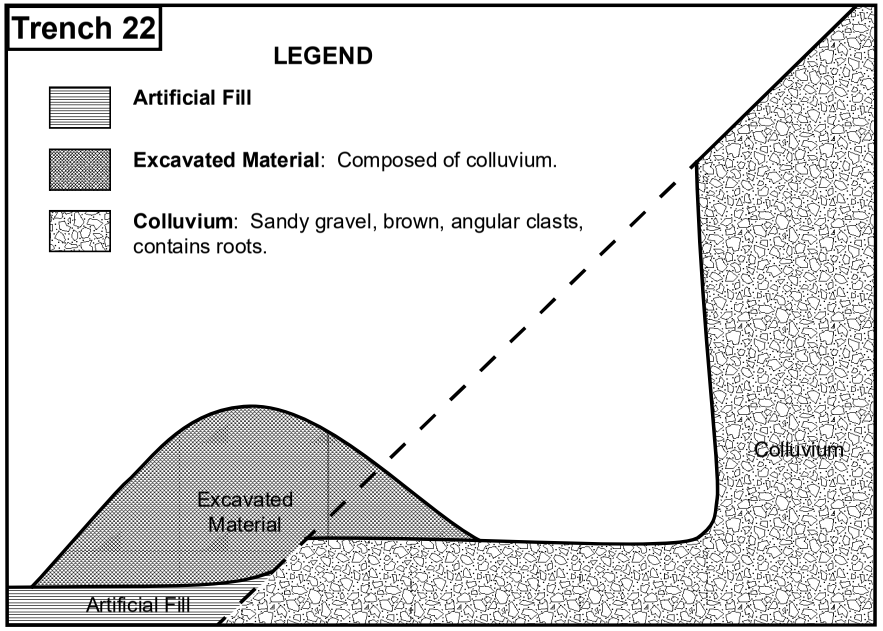
GEOLOGY INVESTIGATIONS

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

TRENCH LOGS 19, 20, & 21
Big Tujunga Reservoir Sediment Removal Project
Tujunga, CA

Date: Sept 2016	Drafted by: RLM/RAL	Scale: 1" = 2'	FIGURE 7



GRAPHIC SCALE

1 inch = 2 feet
Horiztonal = Vertical

GEOLOGY INVESTIGATIONS

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

TRENCH LOG 22
Big Tujunga Reservoir Sediment Removal Project
Tujunga, CA

Date: Sept 2016	Drafted by: RLM/RAL	Scale: 1" = 2'	FIGURE 8

APPENDIX C

GEOTECHNICAL LABORATORY RESULTS

SUMMARY OF LABORATORY TEST RESULTS

Geotechnical Laboratory

PROJECT NAME: Big Tujunga Reservoir Cleanout
TECHNICIAN: JA-HA-EH
PCA: HF00710003

ENGINEER: Olga Cruz
DATE: 4/16/2012
PAGE: 2 OF 2

BORING/ SAMPLE	DEPTH	UNIFIED SOIL CLASSIFICATION					MOISTURE AND DRY DENSITY				DIRECT SHEAR				CHEMICAL				Permeability
		Class.	ATTERBERG LIMITS		#4	#200	γ field	m.c.field	γ bulk	m.c.optimum	Φ ultimate	c ultimate	Φ maximum	c maximum	pH	Min. Resistivity	Cl	SO_4	
B - S	(ft)		LL	PI	% Pass	% Pass	pcf	%	pcf	%	Degree	psf	Degree	psf		(K ohm-cm)	(ppm)	(ppm)	(ft/day)
1A-1R	5						111.2	9.9											
1A-2B	7-9																		
3A-3R	10						117.1	9.6			36	0	44	0					
3A-5R	25						127.0	5.1			48	0	49	0					
4A-1R	2.5						120.1	7.5											
4A-4B	4-7	SC	27	9	96.9	46.4			132.8	9.2									
4A-3R	7.5						107.3	11.5			33	0	33	0					
5A-3R	10						114.1	3.7											
6A-5B	12-15	ML	20	3	97.7	50.0			131.0	9.8	36	0	44	0					
6A-4R	15						115.0	13.1											
B2-6R	17'	Top rings					125.7	6.0											
B2-6R	17'	Bott.rings					126.2	3.5											
B3-2B	5-8								128.0	10.5									

SUMMARY OF LABORATORY TEST RESULTS

Geotechnical Laboratory

PROJECT NAME: Maple SPS at Big Tujunga Dam
TECHNICIAN: TA, MG, EH
PCA: HF00710003

ENGINEER: O. Cruz, R. Larson
DATE: 6/6/2016
PAGE: 1 **OF** 1

Updated 6/30/2016

BORING /SAMPLE	DEPTH	UNIFIED SOIL CLASSIFICATION					* MOISTURE AND DRY DENSITY				^ DIRECT SHEAR				CHEMICAL				Expansion Index
		Class.	ATTERBERG LIMITS		#4	#200	γ_{field}	m.c.$_{field}$	$\gamma_{max.}$	m.c.$_{optimum}$	Φ_{ult}	c_{ult}	$\Phi_{maxi.}$	$c_{maxi.}$	pH	Min. Resistivity	Cl	SO_4	(EI / Potential)
B - S	(inch)		LL	PI	% Pass	% Pass	pcf	%	pcf	%	Degree	psf	Degree	psf		(K ohm-cm)	(ppm)	(ppm)	
Sampel 1	0-12	GP			20.8	2.7													
(Test Pit)																			
Sampe 2	0-32	SM			70.5	16.2													
(Sample Site)																			
Hand Samples																			
Set #1	0-6	SM			70.4	18.0	97.5	2.3			36	0	45 <	0					
Set #2	6-11	† SM			73.9	13.2	111.6	8.8			35	159	35	224					

† Close to SW-SM please review extended distribution graph

* Sampled ring density may not reflect in-situ conditions; due to the dryness of the area water was added during sampling for better sample retention within the hand sampler.

^ Three residual passes were performed on each data point

Geotechnical and Materials Engineering Division
Los Angeles County Department of Public Works

Geologic Map and Cross Section

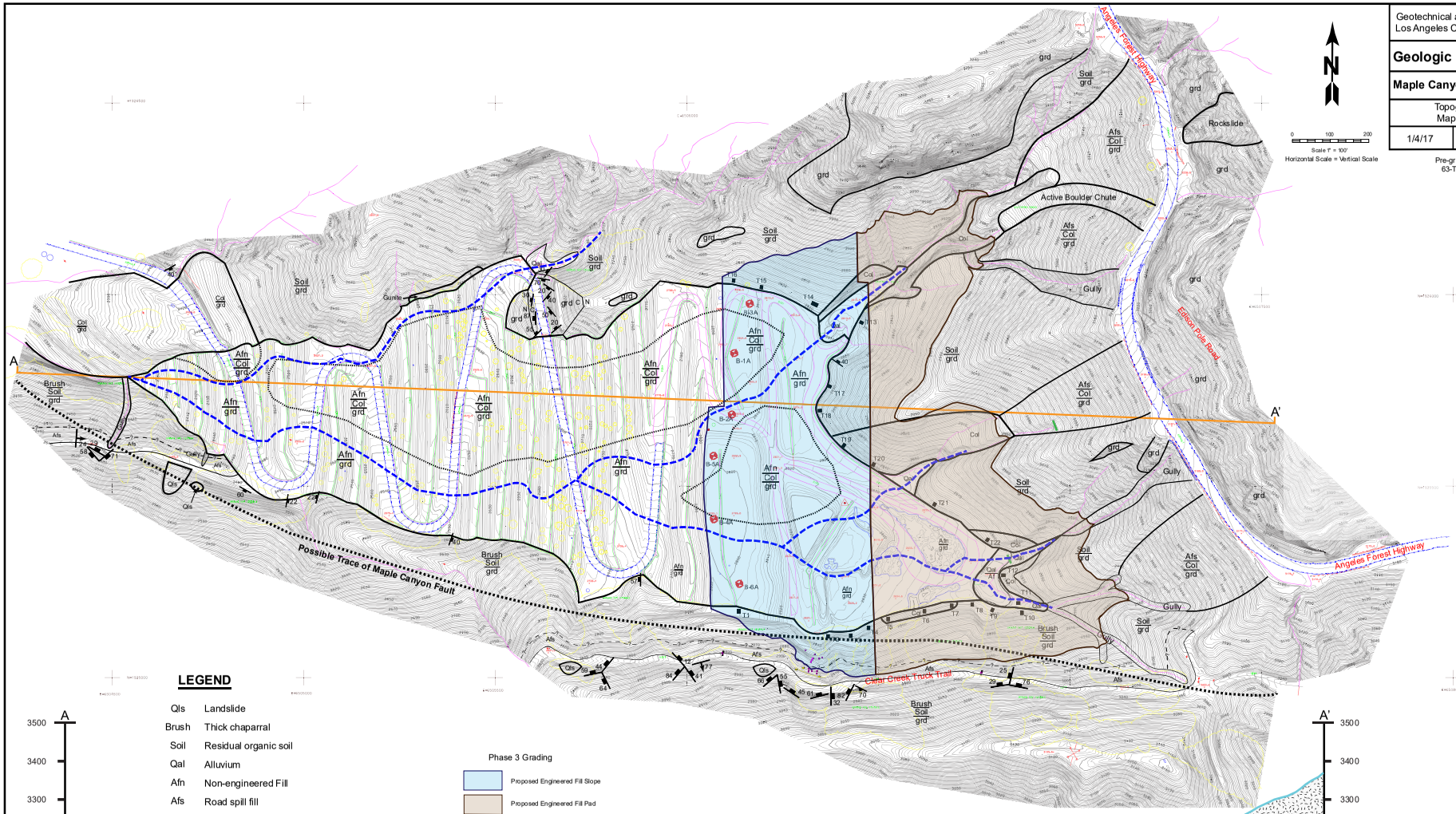
Maple Canyon Sediment Placement Site

Topography flown May 5, 2010
Map created August 26, 2010

1/4/17	drawn by Robert A. Larson	PLATE 1

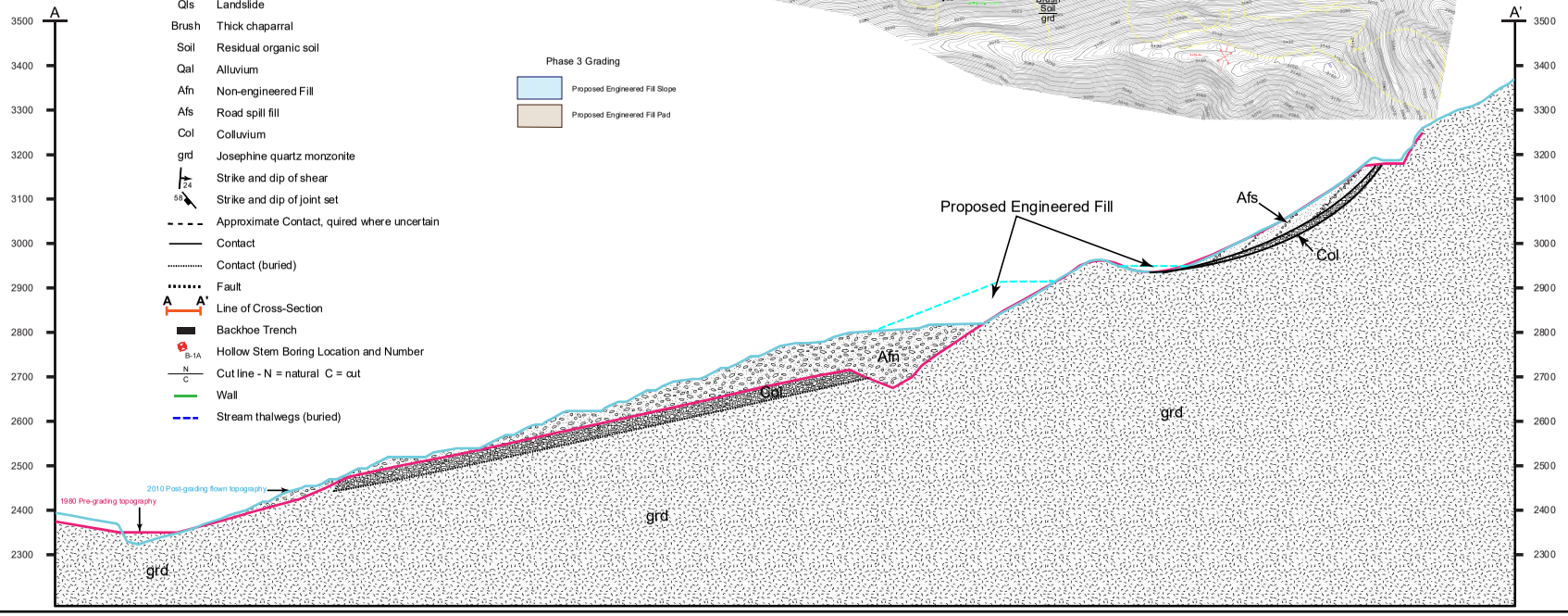
Pre-grading topography from Survey Maps
63-T128 and 63-T129 dated 8/29/1980

Scale 1" = 100'
Horizontal Scale = Vertical Scale



LEGEND

Qls	Landslide
Brush	Thick chaparral
Soil	Residual organic soil
Qal	Alluvium
Afn	Non-engineered Fill
Afs	Road spill fill
Col	Colluvium
grd	Josephine quartz monzonite
24	Strike and dip of shear
58	Strike and dip of joint set
- - -	Approximate Contact, quired where uncertain
———	Contact
·····	Contact (buried)
▪▪▪▪▪	Fault
A A'	Line of Cross-Section
■	Backhoe Trench
B-1A	Hollow Stem Boring Location and Number
N / C	Cut line - N = natural C = cut
———	Wall
- - -	Stream thalwegs (buried)



Geotechnical and Materials Engineering Division
Los Angeles County Department of Public Works

PHASE 3 GRADING PLAN

PLATE 2

℄ MAIN ACCESS ROAD ALIGNMENT DATA

Element	Northing	Easting	Bearing	Delta	Radius	Arc Length	Tangent Length	BC STA	EC STA	PI Northing	PI Easting
	100+00.00	1,925,694.49	6,506,081.42								
	105+56.92	1,925,156.73	6,506,226.20	S15°04'07"E	-	-	-	-	-	-	-
Δ6	-	-	-	80°00'00"	45.00	141.37	-	105+56.92	106+98.29	-	-
	106+98.25	1,925,180.12	6,506,313.11	-	-	-	-	-	-	-	-
	107+67.94	1,925,247.38	6,506,295.00	N15°04'07"W	-	-	-	-	-	-	-
Δ7	-	-	-	25°13'43"	152.23	67.03	34.07	107+67.94	108+34.97	1,925,280.64	6,506,287.61
	108+54.98	1,925,313.87	6,506,295.10	-	-	-	-	-	-	-	-
	113+50.84	1,925,817.11	6,506,408.55	N12°42'16"E	-	-	-	-	-	-	-
	113+50.84	1,925,817.11	6,506,408.55	-	-	-	-	-	-	-	-
	115+63.51	1,926,025.73	6,506,449.84	N11°11'41"E	-	-	-	-	-	-	-

℄ DRI ACCESS ROAD ALIGNMENT DATA

Element	Northing	Easting	Bearing	Delta	Radius	Arc Length	Tangent Length	BC STA	EC STA	PI Northing	PI Easting
	400+00.00	1,926,025.73	6,506,449.84	N11°11'41"E	-	-	-	-	-	-	-
	400+18.88	1,926,044.25	6,506,453.51	-	-	-	-	-	-	-	-
Δ5	-	-	-	78°17'16"	45.00	61.49	36.63	400+18.88	400+80.37	1,926,080.18	6,506,460.62
	400+80.37	1,926,080.52	6,506,497.24	N89°28'57"E	-	-	-	-	-	-	-
	401+85.58	1,926,081.47	6,506,602.45	-	-	-	-	-	-	-	-
Δ6	-	-	-	64°27'04"	20.00	22.50	12.61	401+85.58	402+08.08	1,926,081.58	6,506,615.06
	402+08.08	1,926,093.00	6,506,620.39	-	-	-	-	-	-	-	-
	402+24.75	1,926,108.11	6,506,627.45	N25°01'54"E	-	-	-	-	-	-	-

℄ DRI ACCESS ROAD ALIGNMENT DATA

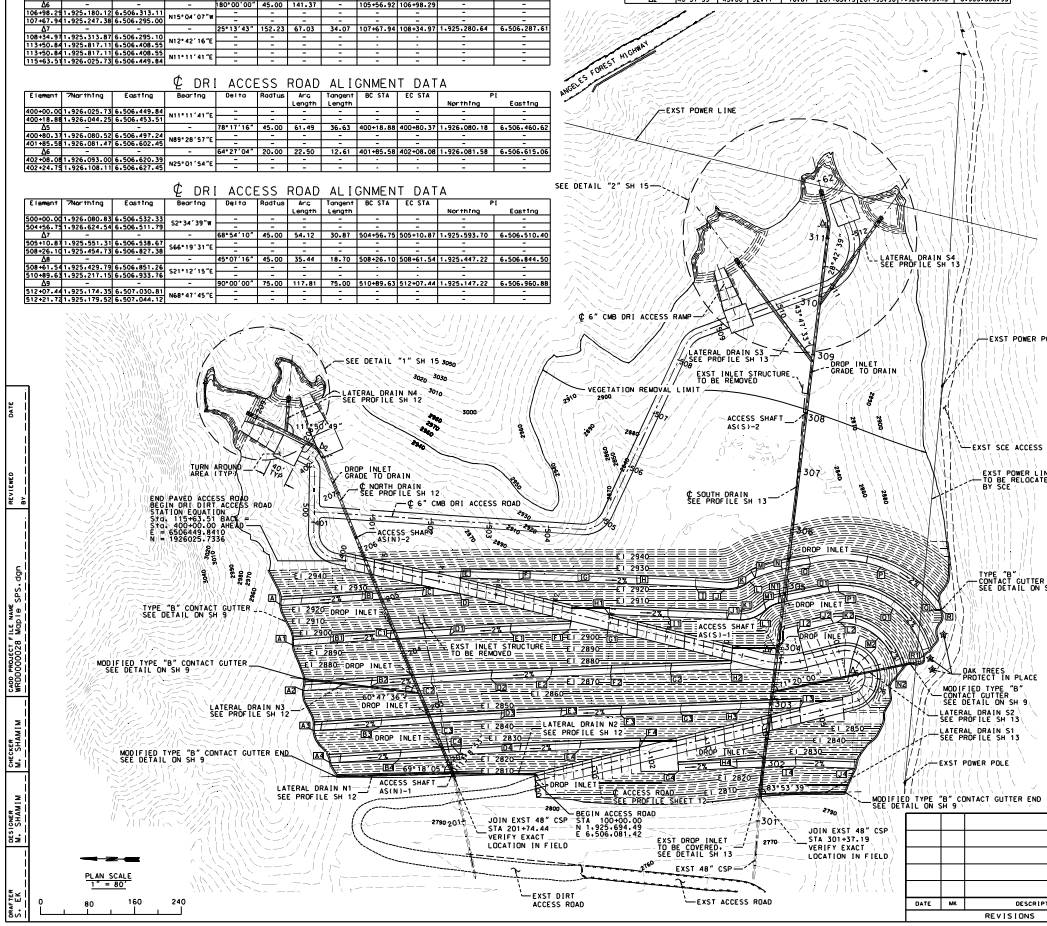
Element	Northing	Easting	Bearing	Delta	Radius	Arc Length	Tangent Length	BC STA	EC STA	PI Northing	PI Easting
	500+00.00	1,926,080.83	6,506,532.33	S2°34'39"W	-	-	-	-	-	-	-
	504+56.75	1,926,624.54	6,506,511.79	-	-	-	-	-	-	-	-
Δ7	-	-	-	68°54'10"	45.00	54.12	30.87	504+96.75	505+10.87	1,925,593.70	6,506,510.40
	505+10.87	1,925,551.31	6,506,538.67	S66°19'31"E	-	-	-	-	-	-	-
	508+26.10	1,925,454.73	6,506,827.38	-	-	-	-	-	-	-	-
Δ8	-	-	-	45°07'16"	45.00	35.44	18.70	508+26.10	508+61.54	1,925,447.22	6,506,844.50
	508+61.54	1,925,429.79	6,506,851.26	-	-	-	-	-	-	-	-
	510+89.63	1,925,217.15	6,506,933.76	S21°12'15"E	-	-	-	-	-	-	-
Δ9	-	-	-	90°00'00"	75.00	117.81	75.00	510+89.63	512+07.44	1,925,147.22	6,506,950.88
	512+07.44	1,925,174.35	6,507,030.81	-	-	-	-	-	-	-	-
	512+21.72	1,925,179.52	6,507,044.12	N68°47'45"E	-	-	-	-	-	-	-

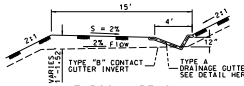
℄ CONSTRUCTION CURVE DATA NORTH AND SOUTH DRAINS

Element	Delta	Radius	Arc Length	Tangent Length	BC STA	EC STA	PI Northing	PI Easting
Δ1	21°08'26"	45.00	16.62"	8.40"	311+18.23	311+34.85	1,925,213.24	6,507,043.12
Δ2	40°57'35"	45.00	32.17'	16.81'	207+63.73	207+95.90	1,926,073.43	6,506,638.93

BENCH GRADING COORDINATE TABLE

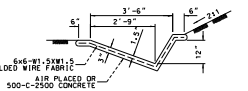
POINT	NORTHING	EASTING
A	1,926,133.94	6,506,371.49
B	1,925,997.07	6,506,383.23
C	1,925,893.69	6,506,392.09
D	1,925,828.97	6,506,397.64
E	1,925,831.19	6,506,424.59
F	1,925,728.97	6,506,424.20
G	1,925,628.70	6,506,422.27
H	1,926,133.49	6,506,420.34
I	1,925,428.16	6,506,448.41
J	1,925,377.24	6,506,415.30
K	1,925,356.03	6,506,418.96
L	1,925,336.94	6,506,426.91
M	1,925,327.04	6,506,435.14
N	1,925,280.88	6,506,451.08
O	1,925,233.11	6,506,461.22
P	1,925,114.04	6,506,457.98
Q	1,925,017.57	6,506,388.12
R	1,925,010.13	6,506,388.39
A1	1,926,111.36	6,506,303.81
B1	1,926,049.61	6,506,383.23
C1	1,925,893.69	6,506,392.09
D1	1,925,845.23	6,506,326.76
E1	1,925,745.23	6,506,336.19
F1	1,925,641.41	6,506,340.29
G1	1,925,575.53	6,506,340.85
H1	1,925,574.41	6,506,367.79
I1	1,925,474.05	6,506,365.85
J1	1,925,373.69	6,506,363.92
K1	1,925,327.55	6,506,367.78
L1	1,925,307.92	6,506,380.83
M1	1,925,297.58	6,506,389.30
N1	1,925,286.38	6,506,393.08
O1	1,925,199.53	6,506,417.92
P1	1,925,184.25	6,506,414.39
Q1	1,925,091.57	6,506,388.34
R1	1,925,036.92	6,506,309.09
A2	1,926,092.37	6,506,226.97
B2	1,925,978.27	6,506,236.81
C2	1,925,876.02	6,506,245.62
D2	1,925,773.90	6,506,253.94
E2	1,925,612.09	6,506,260.04
F2	1,925,570.27	6,506,266.14
G2	1,925,468.45	6,506,272.24
H2	1,925,366.64	6,506,278.35
I2	1,925,232.47	6,506,344.37
J2	1,925,192.02	6,506,360.64
K2	1,925,186.30	6,506,361.79
L2	1,925,180.48	6,506,362.19
M2	1,925,186.30	6,506,361.79
N2	1,925,186.30	6,506,361.79
A3	1,925,186.30	6,506,361.79
B3	1,925,186.30	6,506,361.79
C3	1,925,186.30	6,506,361.79
D3	1,925,186.30	6,506,361.79
E3	1,925,186.30	6,506,361.79
F3	1,925,186.30	6,506,361.79
G3	1,925,186.30	6,506,361.79
H3	1,925,186.30	6,506,361.79
I3	1,925,186.30	6,506,361.79
A4	1,925,186.30	6,506,361.79
B4	1,925,186.30	6,506,361.79
C4	1,925,186.30	6,506,361.79
D4	1,925,186.30	6,506,361.79
E4	1,925,186.30	6,506,361.79
F4	1,925,186.30	6,506,361.79
G4	1,925,186.30	6,506,361.79
H4	1,925,186.30	6,506,361.79
I4	1,925,186.30	6,506,361.79
J4	1,925,186.30	6,506,361.79





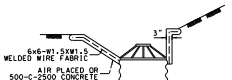
TYPICAL BENCH

SCALE: 1" = 5'



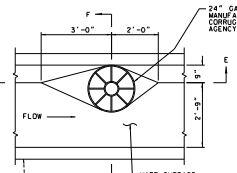
TYPICAL TYPE A DRAINAGE GUTTER

SCALE: 1" = 2'



SECTION F-F

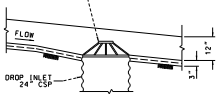
SCALE: 1" = 2'



MODIFIED TYPE A DRAINAGE GUTTER AT DROP INLET

SCALE: 1" = 2'

24" GALVANIZED CONE GRATE MANUFACTURED BY PACIFIC CORRUGATED PIPE CO. OR AGENCY APPROVED EQUAL. TYP SEE DETAIL HEREON



SECTION E-E

SCALE: 1" = 2'

DATE	BY	REVISIONS

DRAFTER S. EK | DESIGNER M. SHAMIM | CHECKER M. SHAMIM | CADD PROJECT FILE NAME WRD0000028 Mod-19 SPS.dgn | REVISED DATE BY

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

BIG TUJUNGA DAM AND RESERVOIR

MAPLE CANYON SEDIMENT PLACEMENT SITE

FILL PLAN, SECTIONS AND DETAILS

PROJECT ENGINEER | DATE

WRD0000028	JOB HF00710003	DWG 63-D192.10	SHEET 10 OF 24