LA RIVER MASTER PLAN

APPENDIX VOLUME I

DESIGN GUIDELINES

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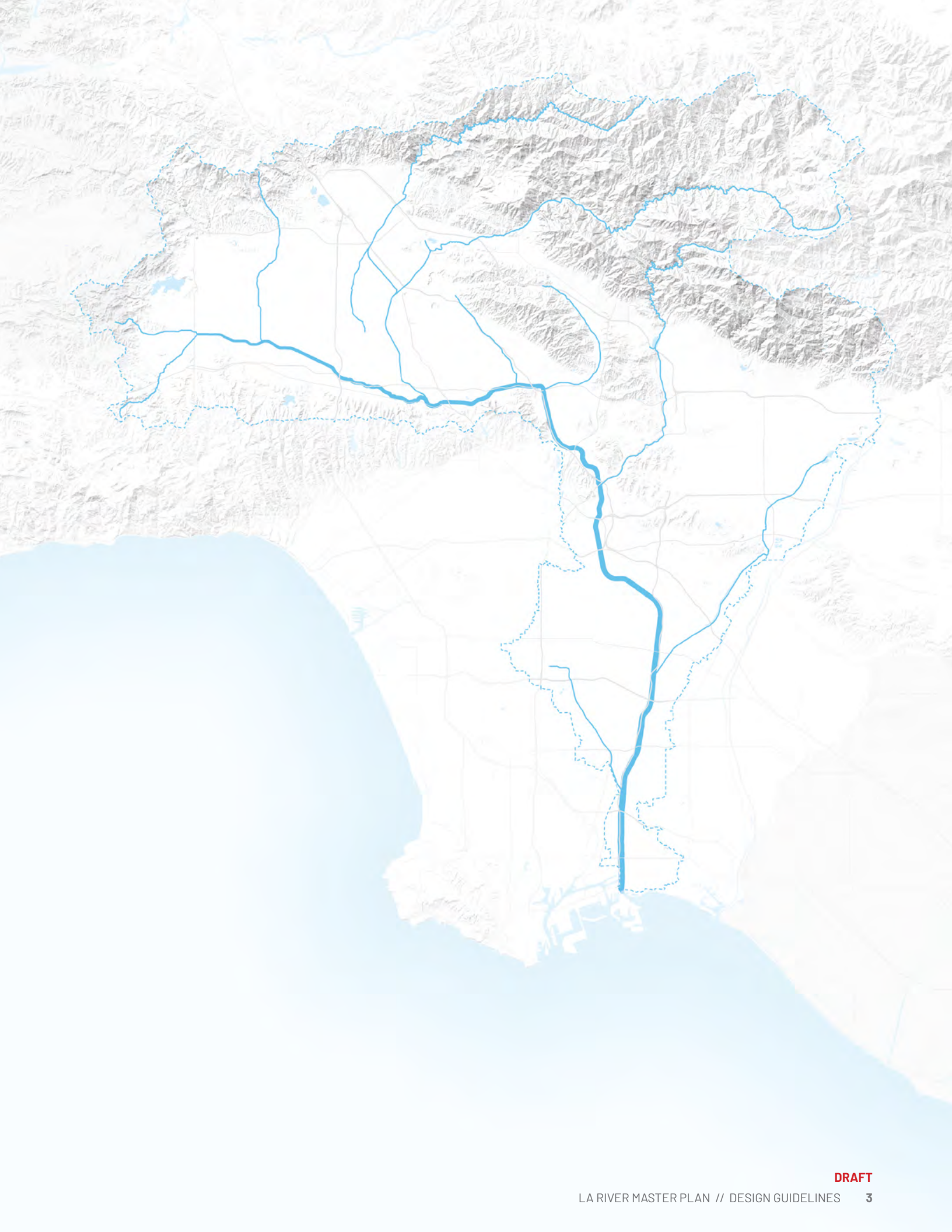

PREPARED FOR:
LOS ANGELES COUNTY AND LOS ANGELES COUNTY PUBLIC WORKS

THIS BOOK IS APPENDIX VOLUME I FOR THE 2020 LA RIVER MASTER PLAN

These guidelines represent the Flood Control District permit requirements. Project proponents are responsible for implementing these guidelines in accordance with prevailing codes, LA County policies, and other authorities having jurisdiction.

While these guidelines are specific to the LA River, certain approaches and techniques may be applicable to other rivers and tributaries in LA County.

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INTRODUCTION

Figure 1. The LA River begins at the confluence of Arroyo Calabasas and Bell Creek at river mile 51. Source: OLIN, 2018.

1.
EXECUTIVE SUMMARY

ABOUT THE GUIDELINES

The goals of the 2020 LA River Master Plan are intended to integrate design and performance objectives in a multi-jurisdictional context. These guidelines will aid designers and engineers in the establishment of a 51-mile connected open space that is a well-organized, functional, and accessible environment reflecting the diverse and shared identities of LA County. To facilitate decision-making and ensure a standard for design, the guidelines present a unified, cohesive identity while promoting best practices and resiliency for the river corridor. Adaptive design considerations and planting palettes for climate change are critical to success. Equally important, the guidelines provide flexibility for site-specific needs and expressions of neighboring communities' cultural identities. With this in mind, a structure is provided to support projects at all scales and help to define the look and feel of the LA River corridor.

Figure 2. The LA River brings people and communities together in more ways than one, as can be seen in this photo of the SELA Arts Festival at river mile 11.7 in July 2018. Source: OLIN, 2018

ABOUT THE GUIDELINES

The document is organized into four chapters, focusing on elements ranging from trails to environmental graphics to habitat to facilities. Rather than requiring one set of fixed solutions for all 51 miles, these guidelines promote the idea of a consistent approach with reach-specific identity within the greater whole. Ecology, habitat, and art should all reflect the physiography or culture of a specific reach of the river. Other elements, such as environmental graphics, access points, and lighting should be unified to ensure connectivity, wayfinding, and equitable access. In all cases, the adjacent communities should be understood in order for improvements along the river corridor to have the appropriate scale and feel for the neighborhood.

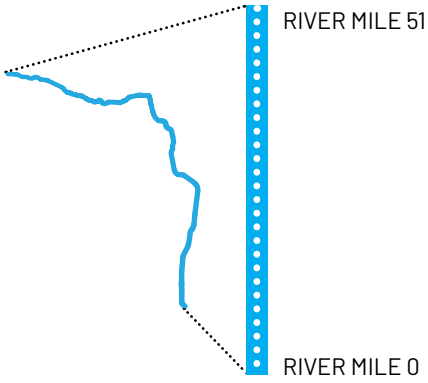
To address the need for site-specific approaches, the design guidelines have been organized through the nine planning frames established in the 2020 Master Plan. The beginning of every chapter has a key map which functions as a visual index for the reader to link to applicable guidelines for each frame of the river. These context-based guidelines will allow the reader to quickly identify key areas or topics of concern related to the reach. Lists, references, and sources that cover the entire river are located at the end of this document.

Design guidelines are not a 'cookbook' for the design process for sites; rather, they are the frame for good project development. The knowledge and experience of landscape architects, engineers, architects, botanists, ecologists, and artists are invaluable in creating spaces that enhance life along the river. The 2020 LA River Master Plan Design Guidelines are a tool for these professionals and reflect the baseline of values for promoting smart design along the river corridor.

THE ROLE OF LA COUNTY

The LA County Flood Control District was established to provide flood risk reduction, water conservation, recreation, and aesthetic enhancement for cities and unincorporated areas in LA County outside of the Antelope Valley. LA County Public Works, which is responsible for the planning and operational activities of the Flood Control District, served as the lead agency for

DESIGN GUIDELINES ARE NOT A 'COOKBOOK' FOR THE DESIGN PROCESS FOR SITES, RATHER THEY ARE THE FRAME FOR GOOD PROJECT DEVELOPMENT



The river ruler is a vertical, straight-line representation of the 51 miles of the LA River.

development of the LA River Master Plan (1996, updated in 2020). The reimagined river envisioned in that plan promotes 51 miles of connected open space, which will require a concerted and sustained effort by many LA County agencies, in cooperation with incorporated cities. The guidelines contained in this book apply to areas of the LA River corridor maintained, operated, or owned by LA County (typically referred to as the right-of-way) and all projects permitted by LA County Public Works along the LA River.

LA RIVER MILES

The LA River is 51 miles long, flowing from mile 51 in Canoga Park within the City of LA to mile zero at Long Beach where the river meets the Pacific Ocean. The river mile system was developed in 2016 to reduce confusion between different jurisdictional reach designations.

Referencing this consistent numbering system is required for all LAC Public Works projects permitted under these guidelines.

RIVER RULER

The LA River is a complex system with many layers of information and data. To better understand the data available for the river and new data that was created as part of the Master Plan process, the LA River Master Plan used LA River Rulers to organize and collect data.

The river ruler is a vertical, straight-line diagram that represents and takes measure of the entire 51 miles of the LA River. Straightening the river simplifies and reinforces its linearity, allowing the eye to quickly perceive how conditions along the river change from one river mile to the next.

The vertical axis of the river ruler represents the 51 miles of the LA River starting at mile 51 in the West San Fernando Valley at Canoga Park to river mile zero at Long Beach

Figure 3. The LA River channel has two different profiles: box and trapezoid. This section of box channel runs through Studio City, near river mile 39. Source: OLIN, 2018.

2.
DESIGN CONSIDERATIONS

THE DESIGN PROCESS

Excellence in design enhances function. From the earliest stages of project development, it is important to consider how a project can be aesthetically engaging while addressing multiple needs of adjacent communities. Design excellence requires an attention to quality of built structures, the landscape, the way buildings and landscapes interact with each other, and how projects interface with the river and surrounding communities. Elevating the quality of design along the LA River will also serve to elevate the level of design across LA County. The design process should include consideration of the LA River channel, the design principles outlined in this chapter, adjacent communities, and the 2020 LA River Master Plan.

Figure 4. Certain reaches of the LA River, such as this segment near river mile 25, are soft-bottom rather than concrete. Source: OLIN, 2018.

Figure 5. Certain reaches of the river, such as this segment at river mile 14, are entrenched rather than leveed. Source: OLIN, 2018.

LA RIVER RIGHT-OF-WAY AND CHANNEL

The 51-mile LA River is an engineered channel designed in response to historic flood events to convey stormwater to the Pacific Ocean as quickly and efficiently as possible. The material, shape, and size of the river changes along its length.

More than 75% of the length of the river has a concrete bed. The river has a "soft bottom," earthen riverbed in the Glendale Narrows, the Sepulveda Flood Control Basin, and the Estuary region. If not maintained, the soft bottom reaches can become heavily vegetated, often with invasive species, which decreases conveyance capacity.

The shape of the LA River channel is predominantly trapezoidal, with sides that flare out as they move up and away from the bottom of the channel. Rectangular sections of the channel, where its sides are completely vertical, are limited to the San Fernando Valley between Sherman Oaks and Burbank and a one-mile stretch near Vernon. To manage additional flood risk, the sides of the channel are often higher than the ground level of surrounding communities, forming levees or flood walls.

The width of the channel generally increases going downstream, from Canoga Park to Long Beach, to account for the increasing accumulation of runoff and changes in the channel's slope. At its narrowest, between Sherman Oaks and Studio City, the channel is about 55 feet wide. At its widest, where the river meets the Pacific Ocean, the channel is more than ten times that width.

The LA River right-of-way includes the entirety of the river channel as well as landside areas immediately adjacent to the channel banks that facilitate continuous operations and maintenance access by the LA County Flood Control District (LACFCD). About 21% of the river's two banks are constrained, with less than the 12 feet of landside area width that the LACFCD seeks to have for routine operations and maintenance. In some areas, particularly south of Compton, the landside area can surpass 100 or 200 feet in width.

THE KIT OF PARTS MATRIX CONNECTS DESIGN COMPONENTS TO THE NINE MASTER PLAN GOALS

PROGRAMMING AND ENGAGEMENT

Each project along the LA River should respond to the needs of adjacent communities. The LA River Master Plan identifies needs along the river for each of the plan's nine goals. The goals can be used to determine appropriate interventions in a particular project location.

Goals of the LA River Master Plan

- Reduce flood risk and improve resiliency.
- Provide equitable, inclusive, and safe parks, open space, and trails.
- Support healthy, connected ecosystems.
- Enhance opportunities for equitable access to the river corridor.
- Embrace and enhance opportunities for arts and culture.
- Address potential adverse impacts to housing affordability and people experiencing homelessness.
- Foster opportunities for continued community engagement, development, and education.
- Improve local water supply reliability.
- Promote healthy, safe, clean water.

Over time, a community's needs may shift, so robust community engagement must be built into all projects.

KIT OF PARTS AND COMMON ELEMENTS

The LA River Master Plan utilizes a kit of parts that includes possible design strategies for sites along the LA River. Each strategy is associated with certain Master Plan goals. The kit of parts is a recommended collection of multi-benefit design components organized within six major infrastructure and urban river typologies. These include: trails and access gateways, channel modifications, crossings and platforms, diversions, floodplain reclamation, and off- channel land assets.

In addition to the project-scaled design components in the kit of parts, smaller common design elements include pavilions, access stairs and ramps, and site furnishing such as lights, hygiene facilities, seating, trash and recycling, water fountains, guardrails, gates, bike racks, environmental graphics, emergency call boxes, and art.

Figure 6. Design strategies can be categorized into six infrastructure and urban river typologies. See Chapter 8 in the LA River Master Plan for more information. Source: LA River Master Plan, 2020.

IMPACT	ACREAGE / LENGTH	OCCUPANT RANGE
XL	> 150 acres or > 10 miles	>5,000
L	40 - 150 acres or 5 - 10 miles	1,000 - 10,000
M	< 40 acres or < 5 miles	100 - 5,000
S	1 - 3 acres / 1 - 5 miles	5 - 500
XS	< 1 acres / < 1 miles	n/a

Figure 7. **The LA River Master Plan proposes five scales of impact for sites along the river: XS, S, M, L, XL. Each scale has varying needs for facilities, amenities, gathering spaces, performance areas, and recreation.**

PROJECT PROGRAMMING

Project programming should be completed for each project based on their anticipated uses, size, and occupancy loads. The LA River Master Plan proposes five scales of sites along the river.

Each scale of project has varying needs for facilities, amenities, gathering spaces, performance areas, and recreation.

Medium (M), large (L), and extra-large (XL) projects in the LA River Master Plan are defined as projects greater than 5 acres, and they may include hundreds of acres. Projects of a smaller acreage may also be included in a larger category based on their ability to serve very high adjacent community needs. For example, a large performing arts center on a single acre of land may positively impact many community needs and, thus, qualify as a large project.

Depending on the scale and typology of the project, it is useful to plan for spaces that can flexibly accommodate smaller day-to-day uses as well as larger events such as festivals or recreation events.

Generally, M projects should accommodate between 100-5,000 occupants.

L projects should accommodate between 1,000-10,000 occupants.

XL projects should have spaces for large gatherings of hundreds, and in some cases thousands of people. They should accommodate more than 5,000 occupants.

PROJECTS OF A SMALLER ACREAGE MAY ALSO BE INCLUDED IN A LARGER CATEGORY BASED ON THEIR ABILITY TO SERVE VERY HIGH ADJACENT COMMUNITY NEEDS

S and XS projects are very different than their larger counterparts. An extra-small project may be as limited as the installation of a bench, sign, light pole, or sculpture. Access points, gateways, and other amenities commonly fall in this category.

XS and S projects, may also take the form of river pavilions, typically on a site of under a quarter acre and a quarter to a full acre, respectively. They have an approximate building square footage range of 250 to 10,500 square feet and have occupancies between five and 500 occupants. Chapter 6, Facilities and Amenities, outlines specific design criteria for the river pavilions, which range in size to accommodate varying activities and programs. Shade Pavilions (Tier I), the smallest pavilions with the simplest programming, should accommodate five to 20 occupants. Rest Pavilions (Tier II) that offer enhanced programming such as restrooms, a snack station, and picnic table, should accommodate 20 to 50 occupants. Gathering Pavilions (Tier III), those with the most substantive facilities and amenities such as a cafe, locker room, and bike rental station, should accommodate 50 to 500 occupants. However, some XS and S projects may have more significant facilities that necessitate increased area and result in a higher occupancy.

Figure 8. **(Top) The LA River can host community performances, such as the one shown in the image by a local high school at the SELA Arts Festival at river mile 11.7.**
Source: OLIN, 2018.

Figure 9. **(Middle) The LA River Campout at river mile 26 is an example of programming that broadens participants' understanding of the LA River.**
Source: Clockshop, The Bowtie Project, 2017.

Figure 10. **(Bottom) The LA River is an important resource to the Indigenous Peoples of Los Angeles. This images shows the Native American Veterans Association's annual Veterans Appreciation and Heritage Pow Wow at river mile 13.**
Source: Marvin Lynchard, 2014.

THE GOAL IS TO CREATE A COMPLEMENTARY APPROACH BETWEEN WHAT IS SHARED AND WHAT IS UNIQUE WITHIN EACH FRAME, NEIGHBORHOOD, AND ENVIRONMENT ALONG THE RIVER

PRINCIPLES OF DESIGN

A UNIQUE AND SHARED RIVER COMMONS

The design of plantings, structures, buildings, and trails should share some common attributes along the river course. For residents and visitors this means it should be apparent when they are in the LA River corridor commons. The goal is to create a complementary approach between what is shared and what is unique along each frame, neighborhood, and environment along the river. The balance between celebrating the unique and providing a common design formality should not be a heavy-handed exercise. There are so many iconic vistas along the river: Sepulveda Basin, Griffith Park, the Glendale Narrows, the historic bridges crossing over the river in downtown City of LA, the rising 6th Street Viaduct, Hollydale Park, the Dominguez Gap Wetlands, and the Long Beach Estuary to name but a few. The shared identity should be a common platform for connecting and celebrating these destinations and future sites of interest.

The most logical way to do this is to create a trail identity that unites and connects just as the river corridor itself does: connective elements such as trail dimensions, path materiality, lighting, artwork, and environmental graphics should create this common identity. By contrast, points of arrival, vistas, and destinations should be inspired by high design ambition, community context, and environmental resilience. Ultimately, the common connection and destinations along the river should reveal a greater understanding of the river itself as a unique and diverse commons serving the people of LA County.

Figure 11. Projects along the LA River should improve ecosystem function and provide educational opportunities. Source: OLIN, 2019.

PROSPECT AND REFUGE

For the river to be connective it must be inclusive, inviting, and useful to everyday life. Design is not a formula, but there are underlying fundamentals that all good design includes. One is to provide places of prospect (views) to see the greater landscape—to observe those around us and natural phenomena—and to be a safe place for us individually and for us, our family, and friends to use and enjoy.

A successful public space is a destination within the public realm that encourages social interaction and a sense of community. We are uneasy in places that are vacant, missing convenient crossings, or have difficult and obscured lines of sight. These environments put us on the defensive and create unease. Every destination and path along the river should be readily accessed and exited within no more than a half mile. Open spaces must be programmed to support a diversity of regular users. The strategies employed may vary and need not be complex, an extraordinary natural view, places to perch and observe activity in comfort and shade, areas to watch active gameplay or see a performance or an all ages adventure playground can all serve as strong attractors. In combination with comfort and convenient access these places will be safe, vital, and attractive.

SAFETY

Of paramount concern is that the river is safe for all and that the feeling of safety is perceptible. To ensure safety along the river the guidelines have developed a framework of environmental design that requires projects to maintain: clear lines of sight, provide minimum standards of lighting uniformity along all routes of circulation and to post clear guidance on avoiding flood and storm hazards from within the channel. Every half mile of the river corridor will provide a station for rest and where adjacent to a neighboring community access to and from the river corridor commons. The entirety of the 51 miles of the LA River shall maintain emergency access for first responders and emergency personnel and maintenance vehicles. Ultimately, the river will be maintained for both the personal safety of visitors of the commons as well as the importance to maintain the channel corridor for the protection of life and property along the entire corridor.

Figure 12. Vendors set up booths within the river channel at the SELA Arts Festival at river mile 11.7. Source: OLIN, 2019.

Figure 13. The industrial land that hems in the LA River, such as this example at river mile 18, is representative of over ten percent of all land within the river corridor. Source: OLIN, 2018.

CULTURAL IDENTITY

The river is a series of unique communities and environments united by the flow of the river. The corridor is envisioned to become a major environmental and cultural asset for the citizens of LA County. All design projects should be informed by the resources, assets and needs provided by the local context of each mile of the river. The river should reflect the diversity and the creativity of LA County where a majority speak a language other than English, is multiracial as well as multicultural. Facilities for the river should acknowledge and be informed by the histories, cultural expressions, and familial uses of communities along the river to maximize local use and authentically reflect the river's diversity.

CADENCE

In order to make the 51 miles of the river accessible and useful to the communities of LA County, reliable access to amenities, services, and destination uses should be established. The planning framework prescribes that these elements occur at regular intervals, a cadence. The intent is to create both equity in access to open space and amenity throughout the river and to improve access and safety while setting reliable expectations for services and facilities along the river.

INTEGRATION OF ARTS AND CULTURE

Incorporating arts and culture along the LA River is essential to creating a thriving, continuous 51-mile arts and culture corridor as outlined in Goal 5 of the LA River Master Plan. Communities along the LA River should have equitable access to arts and culture assets and programming. This is reinforced by a 2017 LA County Arts and Culture report on the Cultural Equity and Inclusion Initiative, which focuses on inclusive cultural and arts programs for all residents of LA County. Many jurisdictions also have a "percent for art" policy that requires private construction or development projects to invest in public art. Further incentives and new programs supporting arts and culture along the LA River will continue to be developed in the future.

The LA River Master Plan suggests that a methodology should be developed for the inclusive mapping of arts and culture in neighborhoods adjacent to the river. This methodology should be participatory and include informal and improvisational community spaces and groups, as well as temporary art installations and recurring community events and festivals. Mapped assets should also include places, people, and events that convey the cultural heritage of riverside communities. An example of comprehensive field mapping is the City of LA Department of Planning SurveyLA Program, which was completed from 2010 to 2017 and identified historic resources for each community plan area of the city.[1] As development and construction takes place along the river, cultural historic resources need to be safeguarded. Mapping these sites is an important way to ensure the historic and social fabric is not lost or if it is threatened, mitigation is provided.

Innovative approaches to art and design are strongly encouraged in this document. Throughout the design process, there are opportunities at each stage to integrate arts and culture. Designers, lead agencies, and partnering organizations can maximize the impact of this integration by engaging artists at the earliest stages of a project and considering arts visibility and communication as crucial components of their proposals and implementation strategies. Early inclusion of artists in the project development process ensures that art is part of the overall project vision and site design rather than being a siloed component added on after construction is complete. Artists bring unique perspectives to the table that can benefit projects. For example, LA Metro integrates its arts and design team into early phases of project planning, allowing for the mapping and understanding of existing cultural assets through the incorporation of arts into community engagement.

Public art can play a role in all scales of projects along the LA River. The flexible and inclusive categories of public art include permanent and temporary installations, cultural facilities and uses, environmental graphics, and community engagement and programming. Access to arts education and other informal arts and culture programming is equally as important as permanent art institutions.

Designers can seek guidance and support from the LA County Department of Arts and Culture, municipal arts departments, community arts agencies, and other arts non-profit organizations to facilitate the development of works of public art that celebrates the diverse cultural heritage of the LA River.

Examples of public art can be both permanent and temporary installations.

Permanent public art examples include, but are not limited to:

- Sculpture: Free standing, wall supported or suspended, kinetic, electronic or mechanical in material or combination of materials
- Murals, portable paintings, panels, pavers, or tiles
- Earthworks, neon, glass, mosaics, photographs, prints
- Site furnishings or fixtures
- Environmental graphics
- Exhibit or performance space: Public gallery/ exhibition space, public performance spaces, public artistic studio spaces, and public art education facilities

Temporary public art examples include, but are not limited to:

- Forms of media including sound, film, holographic, and video systems, hybrids of any media and new genres
- Performing arts: Theatre, dance, music and performance art
- Literary art: Poetry readings and storytelling
- Food culture
- Education programming and arts services
- Special events: Parades, festivals and celebrations
- Community engagement

Figure 14. (Top) The Bowtie Project at river mile 26 has hosted many artist projects, such as the 2014 project "Building: a simulacrum of power" by Rafa Esparza. Source: "The Bowtie Project, https://clockshop.org/project/bowtie/.

Figure 15. (Middle) The LA River can host student art installations and sculptures, as shown in this image at river mile 26. Source: 2016, "ACE Spring Design Studio" by Woodbury University.

Figure 16. (Bottom) Programs such as Turnaround Arts foster art education in schools and communities along the LA River. Source: Turnaround Arts: California, https://bit.ly/2QBK5tt.

Figure 17. **This example of an art installation at a Tier III Pavilion at RM 28.4 portrays a data-based installation that could show real-time water quality through the color of the lights.**

PUBLIC ART CAN PLAY A ROLE IN ALL SCALES OF PROJECTS ALONG THE LA RIVER

The following should be considered for integration of arts and culture along the LA River:

- Projects should incorporate artists and other arts and culture groups at the earliest phases of project development as an integral part of the design team drawing from local artists and cultural assets Art and design can be incorporated into all stages of community engagement.
- Project design teams should consider and highlight the cultural heritage of the site and existing, historic, and indigenous communities for projects along the LA River.

- Opportunities should be explored for art along the LA River that can be integrated with various aspects of a project. It can become a part of and evolve with the infrastructure of the river itself.
- Design teams should select durable materials appropriate for their application,establish strategies for responsible parties, and identify potential funding scenarios. Additionally, these material selections and strategies should distinguish between requirements for temporary versus permanent installations.
- Arts and culture projects along the LA River must be for all. This especially includes current residents of LA River adjacent neighborhoods who currently may not have access to arts and culture programming.
- Site specific criteria and community input should frame a competitive project selection process.
- Arts and culture projects can include programs and residencies for the incubation of youth and community talent, along with other community programming.

ONGOING PROJECT SUCCESS

Almost 25 years ago, LA County developed a transformative plan to re-envision the river as an 'Urban Treasure' and a 'valuable natural asset' that would enrich the quality of life for residents and help to sustain the economy of the region.[2] Since publication miles of trails have been added for pedestrians and cyclists, and the river has emerged as an iconic presence in Angeleno's minds. Today, new concerns have shifted from what was once aspirational into something that brings tangible value and improvement to all communities along the river and those who travel along its banks. The Master Plan assembled today has been constructed from robust data sets that have provided clear metrics for addressing flood risk, water resources, connectivity, and, critically, social health and equity.

Building great projects that meet the goals of the LA River Master Plan is not enough. During project development the on-going success of projects must be a significant consideration. Topics such as life cycle costs, including operations and maintenance funding and responsibility, must be planned for. Other items that can frequently cause issues after project development if not considered in how elements are designed, such as pest and vector control, should be addressed during the design phases. Additional stressors on long-term success may be related to the use of the LA River right-of-way by persons experiencing homelessness. Thinking through all of these elements during the design process is required.

LIFE CYCLE COSTS AND O&M

The LA River flows through various cross-sectional conditions along its 51-mile course including concrete lined and earthen reaches as well as trapezoidal and rectangular section reaches. The typical river right-of-way includes flood management structures such as levees, the channel itself as well as access roads, and various recreational amenities such as bike paths and trails, which are primarily maintained by the United States Army Corps of Engineers (USACE) and the Los Angeles County Flood Control District (LACFCD). In some cases, other entities such as municipalities, non-governmental agencies, or developers provide O&M of the various recreational and habitat amenities.

Maintenance costs must be considered and planned for during project development to determine responsibility for funding the day-to-day operations and maintenance of projects. The responsible agency for maintenance of projects and improvements must be identified for any projects in the LA County Flood Control District right-of-way in order to receive a permit.

Every project permitted under these guidelines requires the submission of a one year maintenance plan and three year monitoring program for the site along with the expected budget for the maintenance. The agency responsible for maintenance must agree in writing to the maintenance plan and budget. See the permitting checklist (on page 34) for full maintenance plan requirements.

In addition to day to day maintenance costs, the long-term needs for rebuilding and repairing projects should be considered by the responsible agency to ensure success. Upon completion of a project, operations and maintenance alone may average 0.1-1% of the capital costs annually depending on the type of project and facility. Replacement costs are in addition to these numbers. Significant replacement of infrastructure, such as levees and floodwalls, while required much less frequently, can be a significant life cycle cost.

THE MASTER PLAN HAS BEEN CONSTRUCTED FROM ROBUST DATA SETS THAT HAVE PROVIDED CLEAR METRICS FOR ADDRESSING FLOOD RISK, WATER RESOURCES, CONNECTIVITY, AND, CRITICALLY, SOCIAL HEALTH AND EQUITY

PERSONS EXPERIENCING HOMELESSNESS

Los Angeles has one of the largest populations of persons experiencing homelessness in the United States, and many of the county's unsheltered residents take refuge within the LA River right-of-way. The presence of homeless encampments can impede operations and maintenance efforts along the river, exacerbate pollution, and discourage recreational users from visiting the river. Those living in encampments also face chronic health risks due, in great part, to a lack of access to sanitation and hygiene facilities. The ongoing success of projects along the LA River largely depends on how communities experiencing homelessness dwelling on the river banks or in the channel are addressed—with such, it is critical that river improvements do not result in spaces of exclusion. Rather, what is needed is an overarching commitment to provide opportunities for sanitation and personal hygiene that are both accessible and humane. The construction and maintenance of pavilions where one can use the restroom, wash their hands, take a shower, and dispose of trash will have a resoundingly positive impact on the health, dignity, and general well-being of all people along the river, as well as the health and safety of the river itself.

Likewise, the LA River should be an environment that reflects active care. Avoid overgrown vegetation along walkways and gateways to convey that the river is well-tended and that its improvements are welcoming. The maintenance of clear sight lines is equally critical for both safety and comfort, as they prevent visual isolation and enable "eyes on the street" (in this case, "eyes on the river"). Utilize palettes of plants that are not harmful to the touch or poisonous to eat to reduce further hazards to all river users, notably young children and pets. Finally, street furniture provides an essential place to rest, and the design of common elements like seating should be varied enough to allow for different types of uses. To endure as a public space that truly serves all, including persons experiencing homelessness, the LA River should incorporate a multiplicity of facilities, large and small, that ensure safety, provide comfort, amplify beauty, and encourage the coexistence of diverse populations.

PEST/VECTOR CONTROL

At the beginning of project development, it is critical to review design ideas with the vector control district of jurisdiction to assure proper mosquito minimization measures are incorporated into the project. Mosquitoes threaten public health by transmitting a number of potentially debilitating, even fatal, diseases. Mosquito minimization measures should include natural predation, mosquito exclusion, and a comprehensive operation and maintenance plan including vegetation management. The system should be designed to facilitate necessary surveillance as well as physical and chemical mosquito control efforts by the vector control agency. A checklist developed by the California Department of Public Health entitled "Checklist for Minimizing Vector Production in Stormwater Management Structures" is available to assist designers, https://www.cdph.ca.gov/. The project should be designed to facilitate necessary surveillance as well as physical and chemical mosquito control efforts by the vector control agency. Projects that fail to incorporate proper mosquito minimization will be subject to costly corrective actions including potential abatement proceedings pursuant to the California Health and Safety Code Section 2000-2007.

PERMITTING

Depending on the project type, location, and site-specific conditions there are many permit requirements to meet in order to plan and develop a project along the LA River.

The most common types of approvals and permits required for projects along the LA River are included below to assist in project development, but project teams should always review the latest information available from each agency at the time of project planning to confirm requirements.

Projects that require discretionary approval; meaning the approval requires the exercise of judgement or deliberation by the reviewing public agency(ies) prior to approving or disapproving a project, require some level of environmental review pursuant to the California Environmental Quality Act (CEQA). Projects that also impact a federal facility, such as the LA River Channel itself, are also subject to the National Environmental Policy Act (NEPA).

Proponents of projects in and along the LA River corridor may also need to consider and plan for:

- Site access through acquisition or easement.
- Municipal permits such as Building and Safety and/or permits for work within the public right-of-way.
- Coordination with rail corridors as much of the river corridor is flanked by rail (SCRRA, MTA, UPRR, etc.).
- Utilities, including connections/hook ups, crossings, relocations.
- Site remediation, including clean up of toxic soils, may require coordination with the EPA, CALEPA, or DTSC.

In addition to the above, there is a consistent suite of permits that may be required for projects in and along the LA River Corridor.

LA COUNTY FLOOD CONTROL DISTRICT (LACFCD) (FCD PERMITS ARE ISSUED BY LA COUNTY PUBLIC WORKS)

A Flood Control Permit is required where the LACFCD owns the land or controls the operations and maintenance of the LA River Corridor, to ensure that the proposed project does not interfere with the LACFCD's operation and maintenance responsibilities. Some of the more common types of Flood Control Permits are:

Access Permit: required for temporary use of LACFCD right-of-way. Examples include community or educational events, volunteer trash cleanup events, or filming.[3]

Connection Permit: required when a private citizen, developer, or agency proposes to connect a drainage system to an existing LACFCD facility. Examples include connecting a small pipe to the rear of a catch basin or a new storm drain connecting to a larger storm drain or channel.[4]

Temporary Discharge Permit: required for the temporary discharge of non-stormwater such as water well start up, construction dewatering, municipal water supply system flushing, swimming pool discharge etc.[5]

Construction Permit: required for encroachment onto and/or alteration of LACFCD right-of-way for new construction. A few examples of permitted activities are storm drain realignment, landscape improvements, parks, bikeway construction, or installation of structural BMP devices.[6]

The LA River Design Guidelines contained within this document must be followed for projects seeking this type of permit. The design of recreational amenities, parks, and plantings for the LA River requires a series of steps and procedures to achieve optimum success, which includes the development of plans and specifications that meet the permit criteria of the LA County Public Works. Project proponents must submit plans for approval by LA County Public Works on a project by project basis. Permittee is responsible for adhering to all requirements. Requirements for jurisdictional reviews and permits procedural issues are outlined in detail on the following pages:

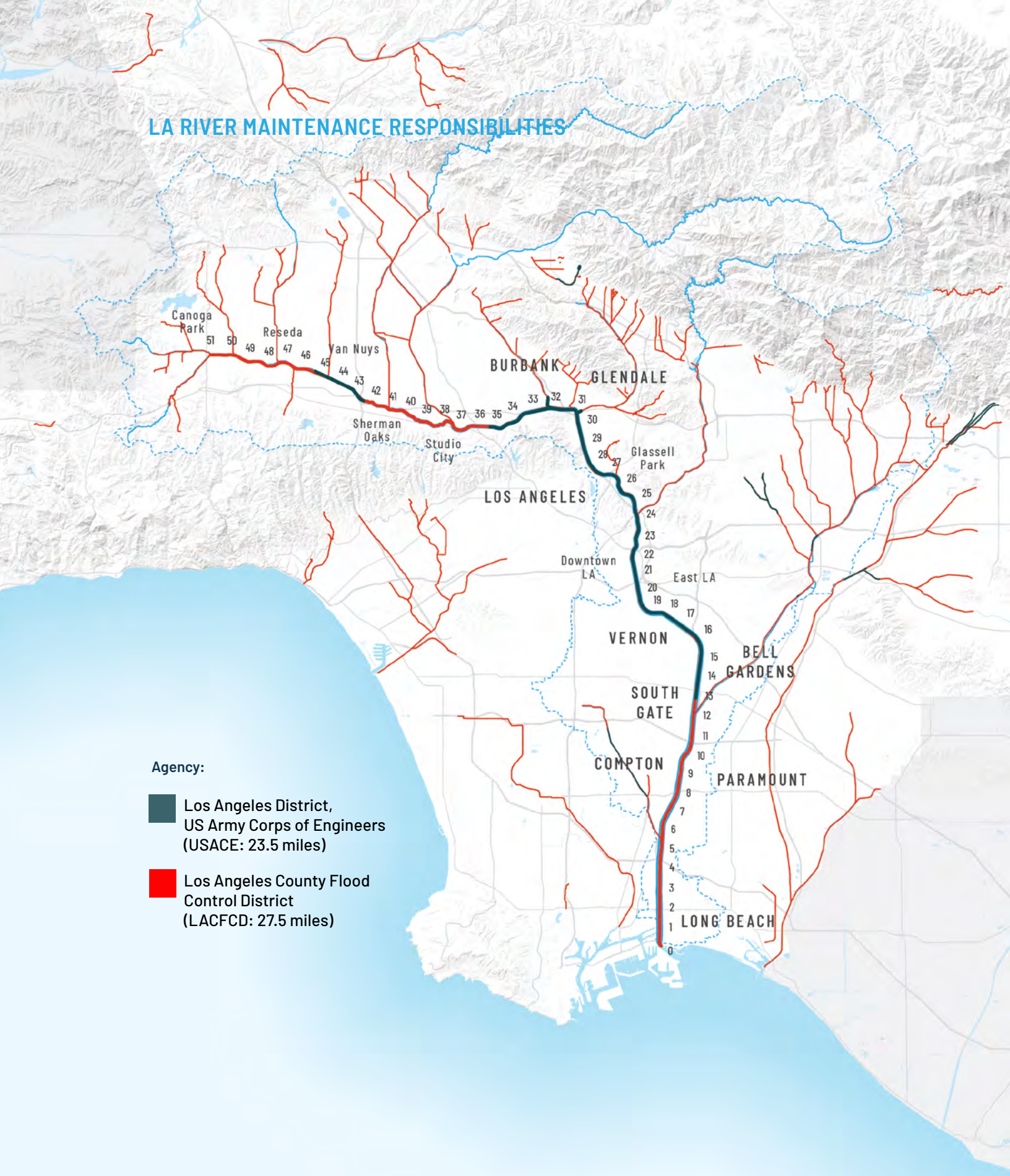


Figure 18. LA River Maintenance Responsibilities. Currently, the LA River and its tributaries are operated and maintained by the USACE or the FCD. This map indicates which entity has jurisdiction in different segments of the river. Source: LA County Public Works, GIS Maintenance Map, 2016.

LACFCD PERMITTING CHECKLIST

Detailed Checklist for LA County Flood Control District (LACFCD)

Background Review

- ☐ Determine river mile location of project and list on all documents associated with the project.
- ☐ Review the LA River Master Plan documents to identify local and site-specific opportunities.
- ☐ Review the LA River Design Guidelines (this document) for applicable requirements.
- ☐ Review LA County Public Works LA River Housing Checklist (document under development during LARMP process—to be completed before publishing this document) to determine if the project will require a housing assessment.
- ☐ Determine location of nearest river pavilion and amenities to determine what is required onsite.
- ☐ Meet with LA County Public Works staff and local municipality staff (as required per site location).
- ☐ Review other relevant documents, such as adjacent city plans.
- ☐ Meet with sponsoring groups (as required).
- ☐ Begin community engagement process.
- ☐ Hire a professional design team (may include landscape architect, engineer, architect, ecologist, artist, botanist, and others depending on project type). (Best Practice: Early integration of all disciplines, particularly designers and artists).

Evaluate Site for Opportunities and Constraints

- ☐ Determine maintenance jurisdiction.
- ☐ Determine all land ownerships and easements/rights-of-way.
- ☐ Contact all agencies involved and owners for concept approval.
- ☐ Identify water source (point of connection) if required and funding responsibility.
- ☐ Conduct site analysis:
  - Assess topographic, hydrologic, and microclimate conditions.
  - Conduct agronomic and biological activity soil test.
  - Determine existing utilities (gas lines, water lines, electric lines).
  - Review applicable codes, which may include, but is not limited to CA Title 24 Building Energy Efficiency Standards, LA County Public Works and/or American Public Works Association (APWA) Standard Plans, LA County Flood Control District Code, Municipal Codes, USACE Policy, LID Ordinance and Manual, LA County Parks and Rec Guidelines.
- ☐ Research adjacent arts and cultural assets determine if project should have an art component.

Conceptual Design Stage

- ☐ Develop a site-specific program (include multi-benefit opportunities as outlined in the LA River Master Plan Kit of Parts)
- ☐ Develop preliminary plant palettes per the Design Guidelines starting on page 218.
- ☐ Develop conceptual planting and grading.
- ☐ Develop conceptual public art program (as required).
- ☐ Prepare section-view illustrations, including topography, planting, and architectural features.

- ☐ Identify irrigation basis of design
- ☐ Submit to LA County Public Works for review.
- ☐ Discuss applicability of plant nursery contract growing for the project.
- ☐ Review O&M requirements for project success and begin to plan for how O&M will be accomplished.

Schematic Design Stage

- ☐ Prepare design and irrigation plans with preliminary details.
- ☐ Consult LA County LID manual and municipality requirements regarding irrigation equipment.
- ☐ Prepare comprehensive plant palettes including species types, quantities, sizes, and installation details.
- ☐ Begin contract growing process (as required).
- ☐ Prepare preliminary cost estimate and project specifications.
- ☐ Complete preliminary site engineering analyses as required for project including stormwater calculations, hydraulic analyses, and site structures.
- ☐ Prepare public art proposal (as required).

Monitoring and Maintenance Program

- ☐ Prepare irrigation schedule.
- ☐ Prepare a 12 month maintenance program for planting.
- ☐ Prepare a 3 year monitoring and maintenance program, including all planting and improvements (pavilions, site furnishings, etc). See pages 96-97, 156-157, 302-305 and 348-349 for technical drawing and specific requirements for trails, environmental graphics, planting, and site amenities.
- ☐ Submit budget for maintenance, and include a written statement of intention to perform and fund maintenance.
- ☐ List agencies responsible for maintaining the project.
- ☐ Prepare O&M for public art proposal (as required).

Technical Drawings and Specifications

- ☐ Coordinate technical drawings with public art (as required).
- ☐ Submit technical drawings and specifications to the county for review and approval. Landscape plans, irrigation plans, and specifications to be prepared by a registered landscape architect licensed to practice in California. Engineering plans, calculations, and specifications to be prepared by a California registered engineer. For structural amenities not shown in the county or APWA standard plans, the designer should provide detailed drawings and design calculations, prepared, signed, and stamped by a California registered civil or structural Engineer. See pages 96-97, 156-157, 302-305 and 348-349 for technical drawing and specific requirements for trails, environmental graphics, planting, and site amenities.
- ☐ Submit maintenance and monitoring programs for both 12-month and 3-years as part of the technical specifications required for project approval.
- ☐ Require underground service alert (Sponsored by the Underground Service Alert of Southern California, a non-profit mutual-benefit organization dedicated to ensuring public safety and that of workers of underground utility lines: www.digalert.org).

As-Built Drawings

- ☐ Submit an updated planting plan, irrigation schematics, site engineering plans, and other applicable as-built record drawings to LAC Public Works. (As built drawings should be prepared by the installing contractor).

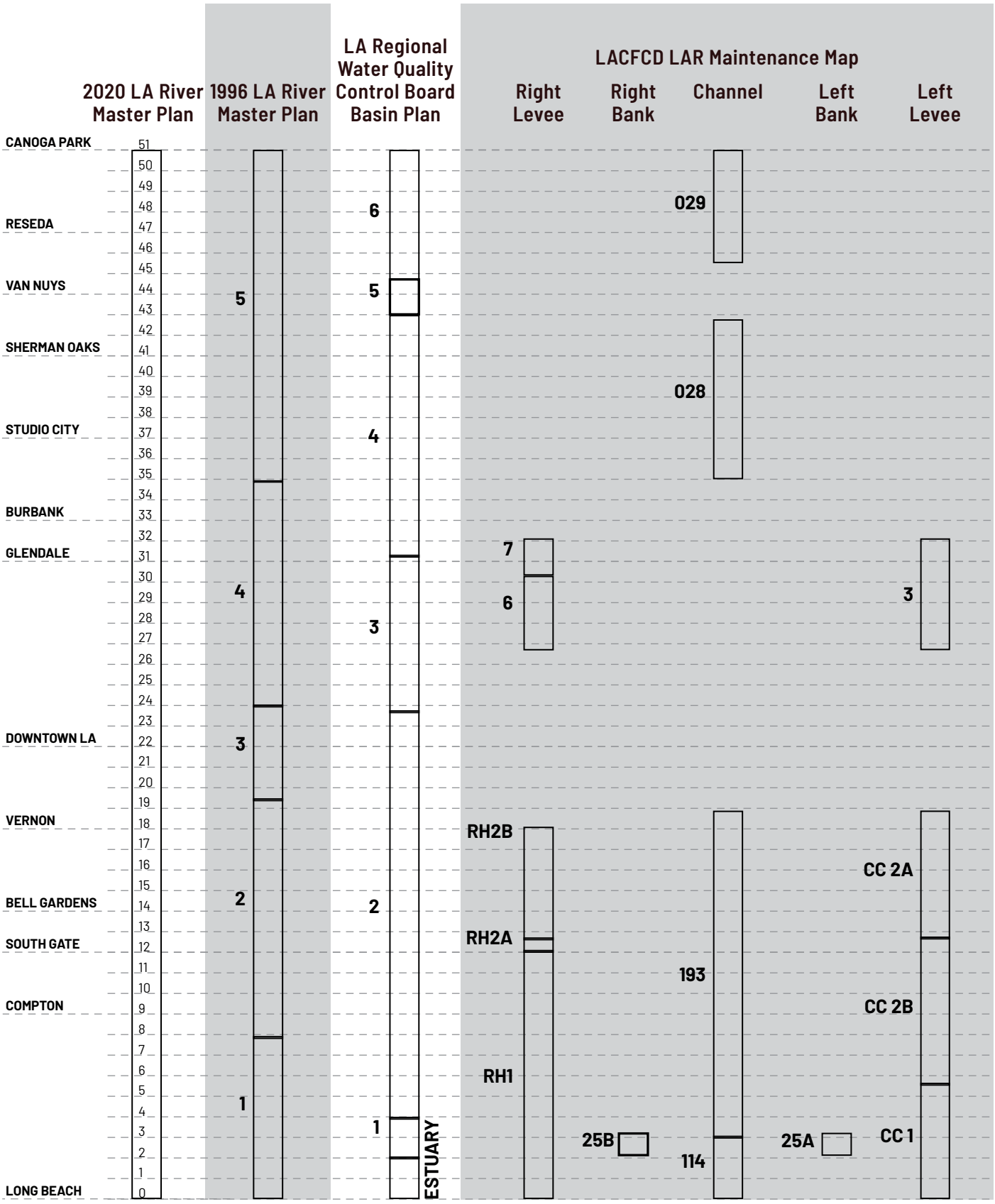
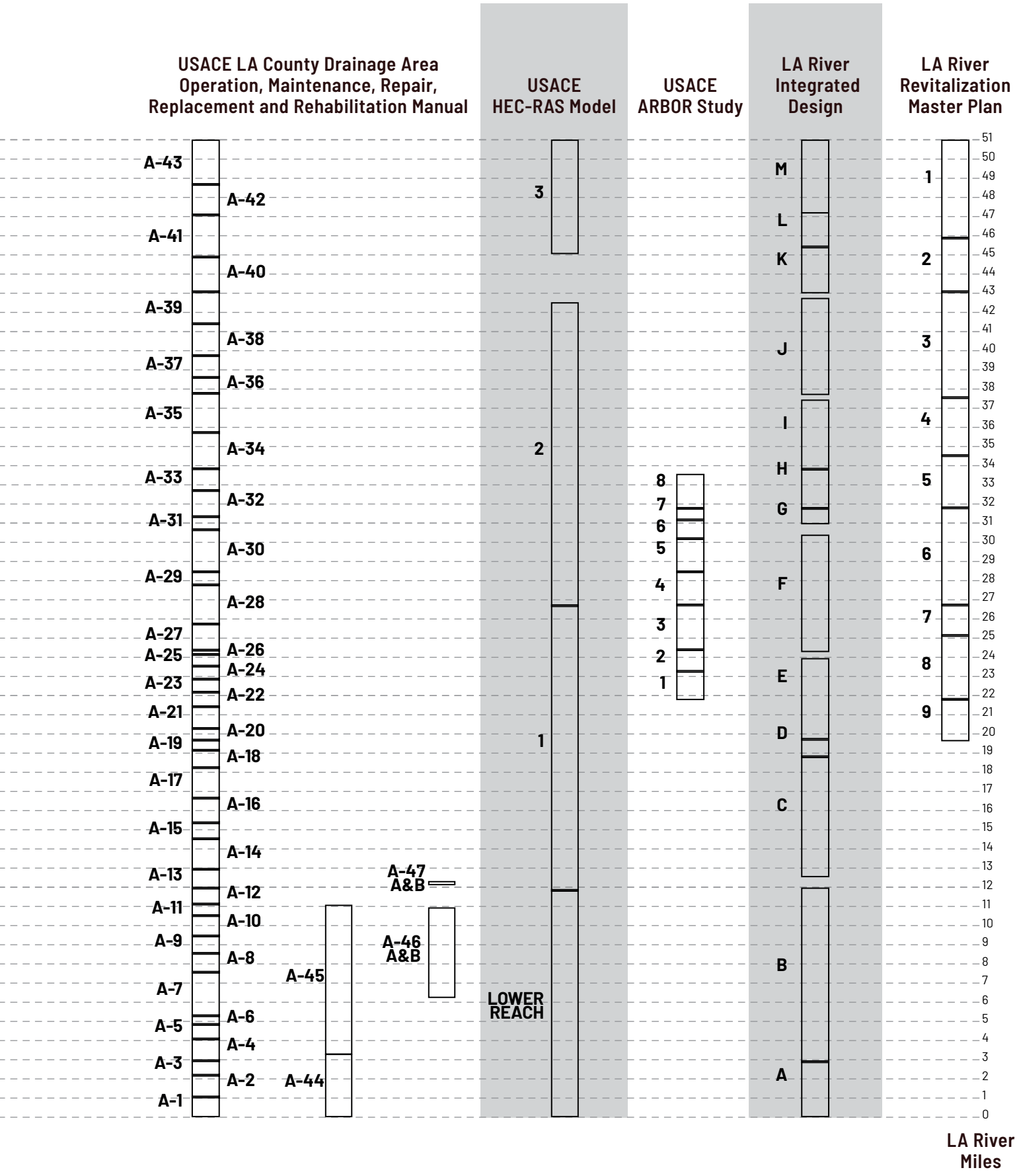


Figure 19. **Various governmental entities use differing methods to define river segments, as shown in this diagram. However, all projects permitted under these guidelines are required to reference the 51 mile LA River numbering system. This diagram is for reference only. Other entities may change their definitions over time, so consult with the applicable entity as needed.** Source: LA River Master Plan, 2020.


USACE LA County Drainage Area Operation, Maintenance, Repair, Replacement and Rehabilitation Manual
USACE HEC-RAS Model
USACE ARBOR Study
LA River Integrated Design
LA River Revitalization Master Plan
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LA River Miles

OTHER PERMITS

US ARMY CORPS OF ENGINEERS (USACE) LOS ANGELES DISTRICT

404: Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged or fill material into waters of the United States (WOUS), including wetlands. Activities in waters of the United States regulated under this program include the construction, modification, or removal of structures and work involving dredging, disposal of dredged material, filling, excavation, or other modification to a WOUS. Proposed activities that modify a WOUS are regulated through a USACE permit review process. The USACE issues both individual and two types of general permits; including nationwide and regional permits that are required before dredged or fill material may be discharged into WOUS. General permits provide a more streamlined application and expedited review process and are applicable for work that is typically more common in nature (e.g., outfall structures) and generally minimal in nature. An individual permit is generally required for more complex projects or projects that may potentially result in significant impacts. Individual permits require a public review and compliance with CWA Section 404(b)(1) Guidelines, promulgated by the Environmental Protection Agency[7] including completion of an alternative's analysis. Both individual and general permit applications need to demonstrate that steps have been taken to avoid impacts to wetlands, streams and other aquatic resources; that potential impacts have been minimized; and that compensation will be provided for all remaining unavoidable impacts.[8] Projects requiring individual permits also need to demonstrate that the Least Environmentally Damaging Practicable Alternative (LEDPA) is selected.

408: USACE, in partnership with local partners, has constructed many Civil Works projects across the nation's landscape, including the LA River. Over time, there may be a need for others outside of the USACE to alter or occupy these projects and their associated lands. In order to ensure that these projects continue to provide their intended benefits to the public, Congress mandated that any use or alteration of a Civil Works project by another party is subject to the approval of USACE. This requirement was established in Section 14 of the Rivers and Harbors Act of 1899 and codified in 33 USC 408, commonly referred to as "Section 408." USACE Section 408 policy, contained in the document Engineer Circular (EC) 1165-2-220 effective September 10, 2018, sets forth the process and criteria USACE uses to review requests to alter USACE Civil Works projects.[9]

US FISH AND WILDLIFE SERVICE (USFWS)

The USFWS reviews and comments on projects pursuant to the Fish and Wildlife Coordination Act, the CWA, and the NEPA. The USFWS's comments focus on the effects of projects on all fish and wildlife resources and the habitats that support those resources. Such projects may be, but not limited to, flood risk management, urban and industrial development, habitat restoration activities, etc. The USFWS also reviews projects for their affects pursuant to the Federal Endangered Species Act (ESA). The ESA, through Section 9, prohibits the take of any species listed as threatened or endangered pursuant to the Act. The USFWS is responsible for issuing permits authorizing the incidental take of threatened or endangered species that is consistent with conservation of that species and exempts the take from the Section 9 prohibitions. When projects or activities require a federal permit, such as a CWA section 404 permit from USACE, Section 7 ESA consultation with USFWS is required. The consultation typically starts as informal consultation during the planning stage. If the informal consultation identifies the proposed project is not likely to affect listed species, consultation between the USACE and the USFWS is considered complete. If listed species may be affected the USACE will request formal consultation with the USFWS, and the USFWS will prepare a biological opinion outlining if the proposed development is likely to adversely affect or take of a listed species. If identified reasonable and prudent alternatives still result in adverse effects or take of a listed species, the USFWS will prepare an incidental take statement that outlines project conditions and exempts the take from the Section 9 prohibitions. If there is no Federal involvement, and the project may result in an incidental take, Section 10 requires a Habitat Conservation Plan (HCP) be prepared as part of an application to obtain an incidental take permit from the USFWS. Similar to the incidental take statement, the incidental take permit exempts the take from Section 9 prohibitions.[10]

NATIONAL MARINE FISHERIES SERVICE (NMFS)

This is the federal agency responsible for the conservation and management of the nation's living marine resources. Projects or activities that may affect marine fish and related habitat within NMFS jurisdiction are reviewed for any potentially harmful effects. These evaluations are conducted under the authority of the ESA, Magnuson-Stevens Fishery Conservation and Management Act, Fish and Wildlife Coordination Act, and NEPA. The purpose of the reviews conducted by NMFS is to ensure that sensitive populations of marine and anadromous fish (such as salmon and steelhead), as well as the aquatic and riparian habitats that support these fish, can survive and recover in the presence of human activities. Through these reviews, the need to conserve and protect fish and habitat is balanced with the need to responsibly utilize natural resources for economic and other purposes. When projects or activities require a federal permit, such as a CWA section 404 permit from USACE, Section 7 ESA consultation with the NMFS, in addition to the USFWS, may be required if applicable. If there is no Federal involvement, and the project may result in an incidental take, Section 10 requires a HCP be prepared and an incidental take permit be obtained through the NMFS, in addition to the USFWS, if applicable.[11]

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW)

1602: The Fish and Game Code section 1602 requires any person, state, or local government agency, or public utility to notify the CDWF before beginning any activity that will:

- substantially divert or obstruct the natural flow of any river, stream or lake; or
- substantially change or use any material from the bed, channel, or bank of any river, stream or lake; or
- 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.

If CDFW determines that the activity may substantially adversely affect fish and wildlife resources, a Lake or Streambed Alteration (LSA) Agreement will be required that is compliant with CEQA.[12]

CALIFORNIA COASTAL COMMISSION

Coastal Development Permit: The California Coastal Act of 1976 requires any person proposing to undertake development in the Coastal Zone to obtain a Coastal Development Permit. The Coastal Zone extends inland anywhere from approximately 500 yards in developed urban areas to five miles in undeveloped areas. If projects are proposed in or adjacent to existing or historic coastal wetland areas, they will require Coastal Development Permits issued by the Coastal Commission.[13] The Coastal Act defines development broadly (with a few narrow exceptions), to include not only typical land development activities such as construction of buildings, but also changes in the intensity of use of land or water, even where no construction is involved. Coastal Development Permits are the regulatory mechanism by which proposed developments in the coastal zone are brought into compliance with the coastal resources planning and management policies of Chapter 3 of the Coastal Act.[14]

LOS ANGELES REGIONAL WATER QUALITY CONTROL BOARD

401: Section 401 of the CWA requires that any person applying for a federal permit or license which may result in a discharge of pollutants into WOUS must obtain a state water quality certification that the activity complies with all applicable water quality standards, limitations, and restrictions. No license or permit may be issued by a federal agency until certification required under Section 401 has been granted.[15] Meaning, that before the Corps can issue a 404 permit, a 401 permit must be obtained from the Los Angeles Regional Water Quality Control Board (LA RWQCB).

PLANNING FRAMES

A series of nine geographical frames assists in understanding where specific site opportunities are located in relation to municipal, hydraulic, and ecological zones. There is no single design solution that is applicable to all 51-miles of the LA River, therefore, it is critical to understand where a site is located in the larger context of the river as well as its local context. The frames allow river champions to take responsibility for specific sections of the Master Plan implementation and work together to bring them into reality.

The nine frames are divided as follows:

Frame 9 - West Valley: City of Los Angeles; river mile 51.0 - 43.1

Frame 8 - Mid Valley: City of Los Angeles; river mile 43.1 - 37.8

Frame 7 - East Valley: Cities of Los Angeles & Burbank; river mile 37.8 - 32.0

Frame 6- Narrows: Cities of Los Angeles, Burbank & Glendale; river mile 32.0 - 24.5

Frame 5 - Heights: City of Los Angeles; river mile 24.5 - 19.5

Frame 4 - North Plain: Cities of Bell Gardens, Bell Maywood Vernon, Commerce; river mile 19.5 - 14.14

Frame 3 - Central Plain: Cities of Compton, Paramount, Downey, Lynwood, South Gate, and Cudahy; river mile 14.14 - 8.4

Frame 2 - South Plain: City of Long Beach; river mile 8.4 - 4.0

Frame 1 - Estuary: City of Long Beach; river mile 4.0 - 0.0

LA RIVER PLANNING FRAMES

9 Frame 9 - West Valley

8 Frame 8 - Mid Valley

7 Frame 7 - East Valley

6 Frame 6- Narrows

5 Frame 5 - Heights

4 Frame 4 - North Plain

3 Frame 3 - Central Plain

2 Frame 2 - South Plain

1 Frame 1 - Estuary

Figure 20. LA River Planning Frames.

FRAME 9: WEST VALLEY

Location: City of Los Angeles; river mile 51 - 43.1

Channel Characteristics: The channel in this frame begins as a soft bottom with riparian edges at Sepulveda Basin, and transitions to entrenched trapezoidal concrete channel at mile 45.5. with a typical width of 180 ft. At mile 51, the channel transitions to an entrenched concrete box channel with a typical width of approximately 60 ft.

Average Channel Slope: 0.2%

Landside Right-of-Way Characteristics: In this frame, the landside right-of-way ranges from 20-30 ft with a few larger tracts in the western portion of Canoga Park that are closer to 40-50 ft in width. The eastern soft bottom portion of the river channel has no landside right-of-way in Sepulveda Basin for approximately two miles (about 25% of the frame).

Notable Features:

- Dense residential context
- Bell Creek confluence at river mile 51 - also the location of Canoga Park High School
- Browns Canyon Wash confluence at river mile 49.8
- Aliso Canyon Wash confluence at river mile 47.3
- Reseda Park from river mile 46.6 to 47.0 along the right bank
- Sepulveda Basin Recreation Area and Wildlife Reserve from river mile 43.1 to 45.5; a significant ecological area

Significant Design Considerations for this Frame:

- Mile 51 at the Bell Creek confluence marks the headwaters of the LA River and projects nearby should consider the significance of this moment of the LA River.
- Projects in this frame have the opportunity to enhance native habitat and connect to other important habitat area in the region, such as the Santa Monica Mountains.
- Sepulveda Basin occurs in this frame, and as a soft-bottomed sediment basin approximately 2,000 acres large, it provides a tremendous opportunity for native habitat and biodiversity.
- Generally surface water in the channel portions of this frame is insignificant, except during rain events.

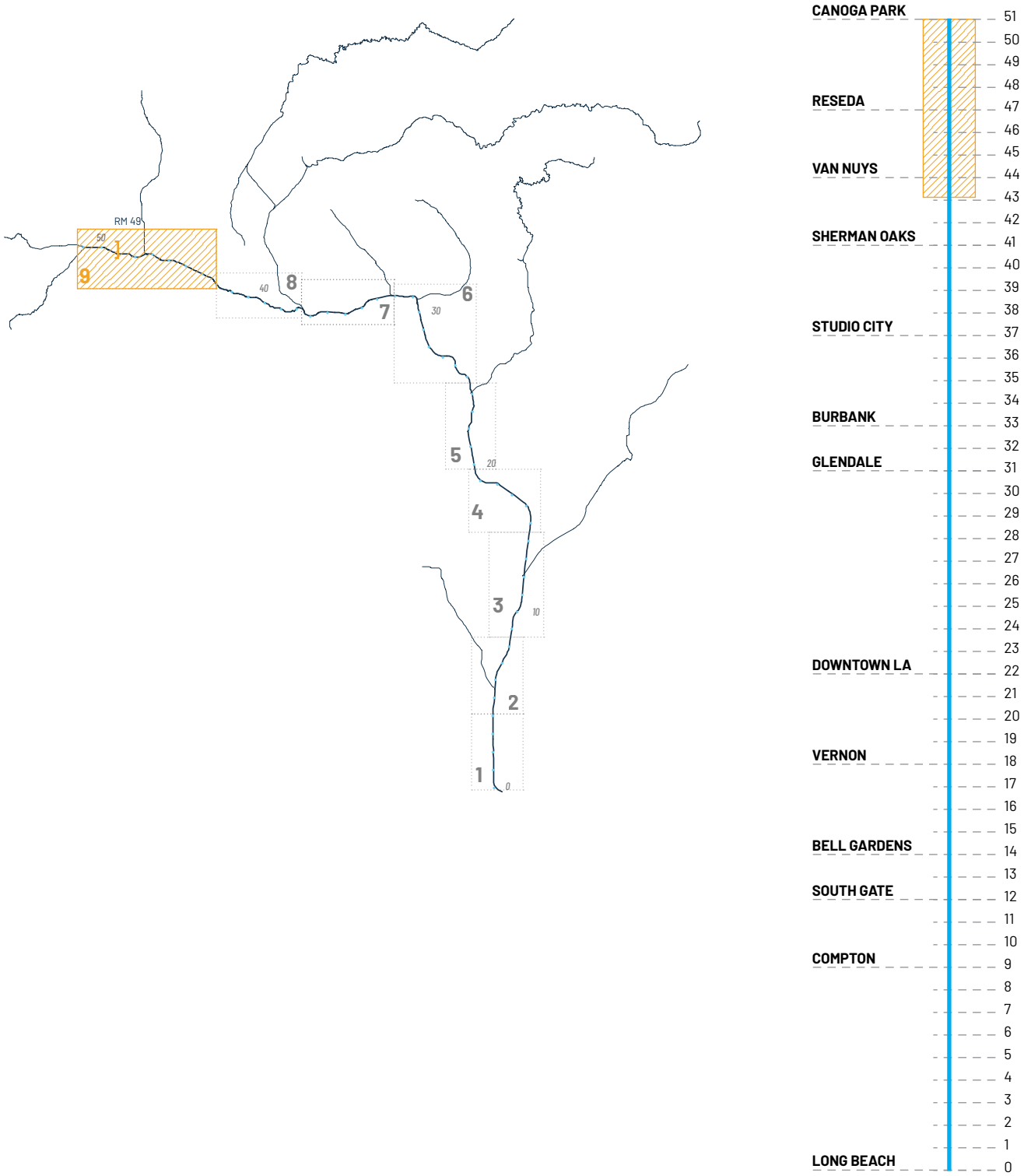


Figure 21. The channel conditions of LA River Planning Frame 9 range from soft bottom to trapezoidal to concrete. Much of the frame occurs in a dense residential context. Source: LA River Master Plan, 2020.

FRAME 8: MID VALLEY

Location: City of Los Angeles; river mile 43.1 - 37.8

Channel Characteristics: In this frame, the channel is an entrenched rectangular box concrete channel with a typical width of 60 ft.

Average Channel Slope: 0.3%

Landside Right-of-Way Characteristics: In this frame, the landside right-of-way ranges from 30-60 ft before terminating at the northwestern edge of the frame where Sepulveda Basin begins.

Notable Features:

- Dense residential context
- Several greenways from river mile 37.8 to 38.6 along the right bank, from river mile 38.7 to 39.1 along the left bank, and from river mile 39.2 to 39.7 along both the left and right banks

Significant Design Considerations for this Frame:

- The sections of the frame with a narrower right-of-way may require using the width of the channel or external land acquisition for projects of larger impact.
- Mutltiuse trails and access for wildlife should both be accommodated, even in tighter right-of-way space. Methods such as habitat ramps into the channel may be considered.
- Connections for wildlife could also be made to the multiple creeks of the Santa Monica Mountains in this area.

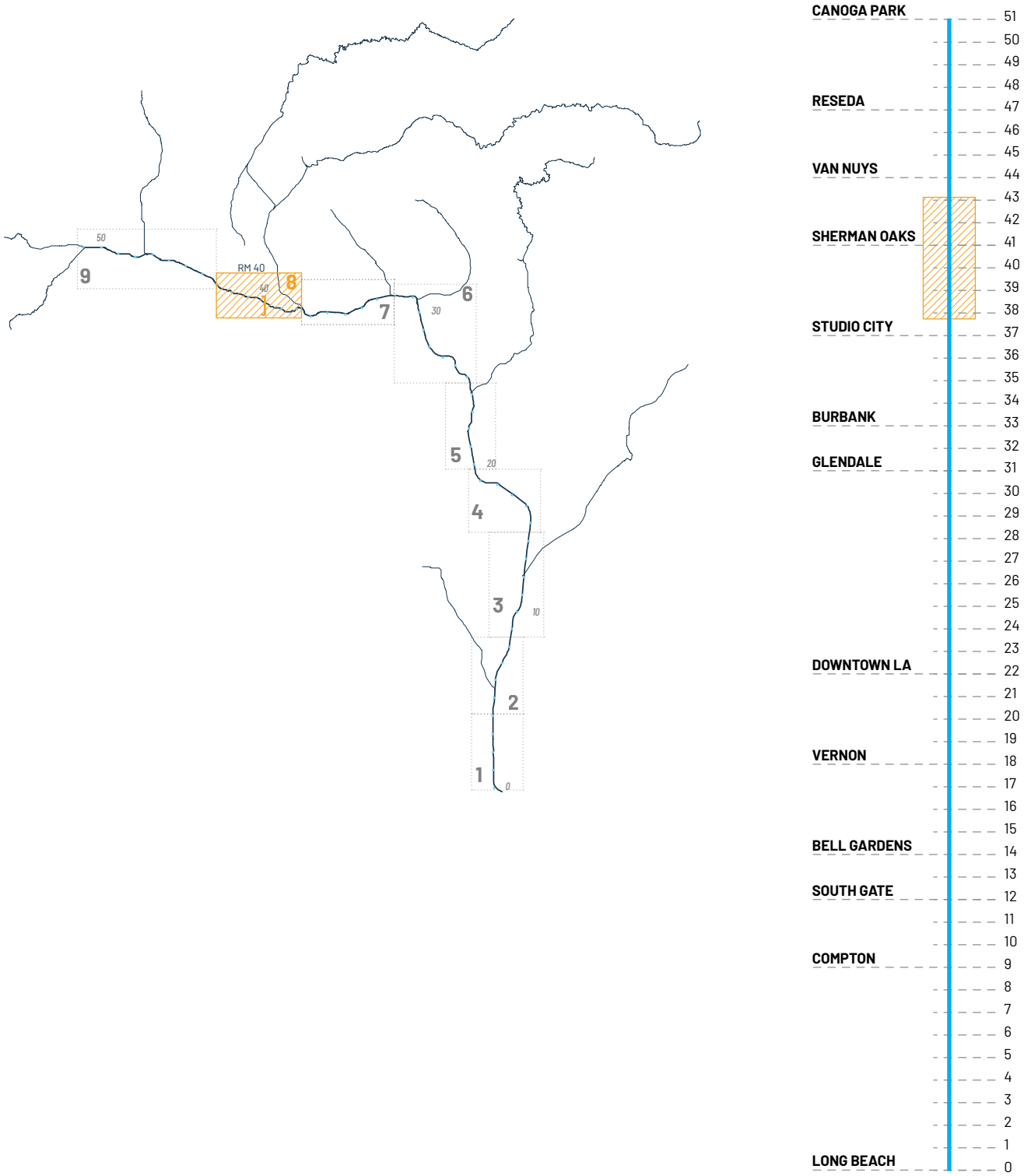


Figure 22. LA River Planning Frame 8 occurs in a dense urban and residential context and the river has a narrow, rectangular box channel section. Source: LA River Master Plan, 2020.

FRAME 7: EAST VALLEY

Location: Cities of Los Angeles and Burbank; river mile 37.8 - 32.0

Channel Characteristics: The channel in this frame is an entrenched rectangular box concrete channel, with a typical width of approximately 130 ft.

Average Channel Slope: 0.6%

Landside Right-of-Way Characteristics: As the channel narrows in Frame 7, landside right-of-way increases to 30-50 ft with a couple of large parcels that extend 200-450 ft into adjacent development. However, there is also approximately a mile on each bank (about 20% of the frame) where there is no landside right-of-way due to Warner Brothers and Universal Studios and the Lakeside Golf Course. The landside right-of-way parcels in this frame are both north and south facing, sometimes on slopes.

Notable Features:

- Dense residential context
- Tujunga Wash confluence at river mile 37.5
- Lakeside Golf Club from river mile 34.6 to 35.6 along the left bank, no ROW
- Warner Bros Studios from approximately river mile 34 to 34.5 along the left bank, no ROW
- Adjacent to Griffith Park from approximately river mile 32 to 34.5 along the right bank
- Sennett Canyon and Creek at river mile 33.5 along the right bank
- Burbank Channel confluence at river mile 32

Significant Design Considerations for this Frame:

- Projects in this frame have the opportunity to enhance native habitat and connect to other important habitat corridors in the region, especially the riparian to upland connection along the right bank with Griffith Park.
- Significant equestrian community in this area would utilize an expanded network of equestrian trails.
- The sections of the frame with no ROW may require using the width of the channel or external land acquisition for projects of larger impact.

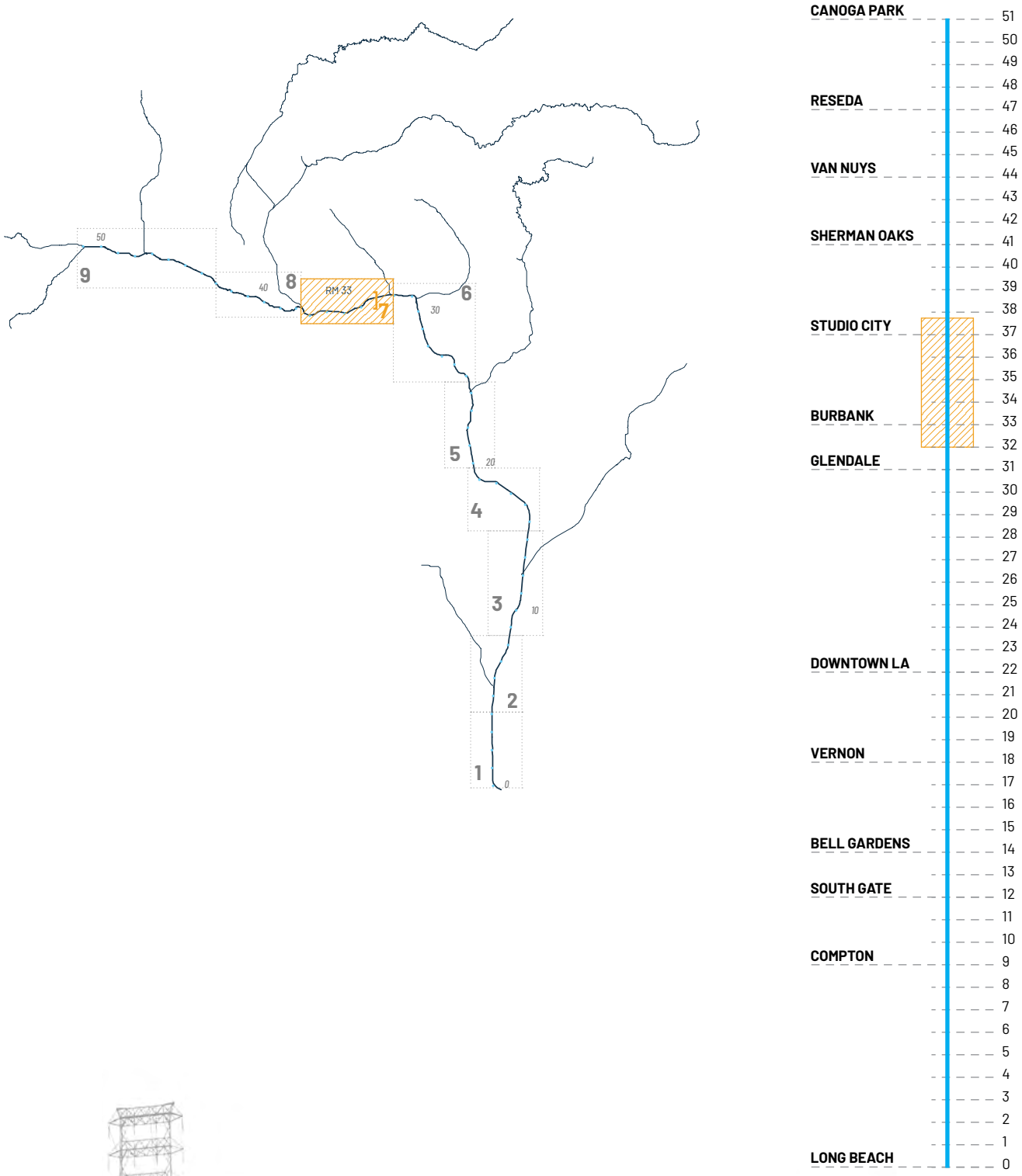


Figure 23. This channel condition of LA River Planning Frame 7 is a rectangular box section. Certain areas of the river have no ROW due to large private land holdings. Source: LA River Master Plan, 2020.

FRAME 6: NARROWS

Location: Cities of Los Angeles, Burbank, and Glendale; river mile 32.0 - 24.5

Channel Characteristics: In this frame, the channel is primarily soft bottom with entrenched trapezoid concrete walls. Typical channel width is approximately 300 ft. The channel bottom becomes concrete for about a half mile stretch as the river turns a corner just north of the Verdugo Wash confluence.

Average Channel Slope: 0.4%

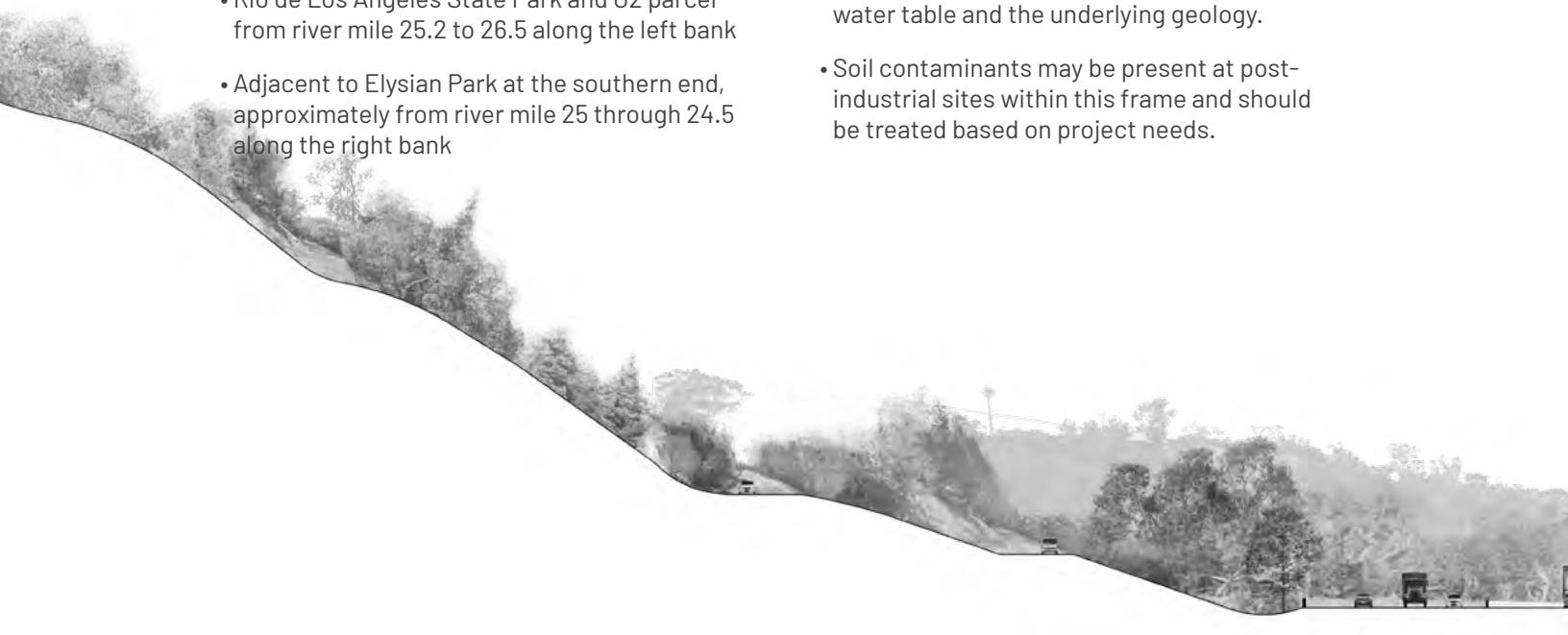
Landside Right-of-Way Characteristics: In this frame, the landside right-of-way ranges between 12-30 ft. There are also some gaps in the landside right-of-way along each bank. It consists of northeast and southwest facing parcels.

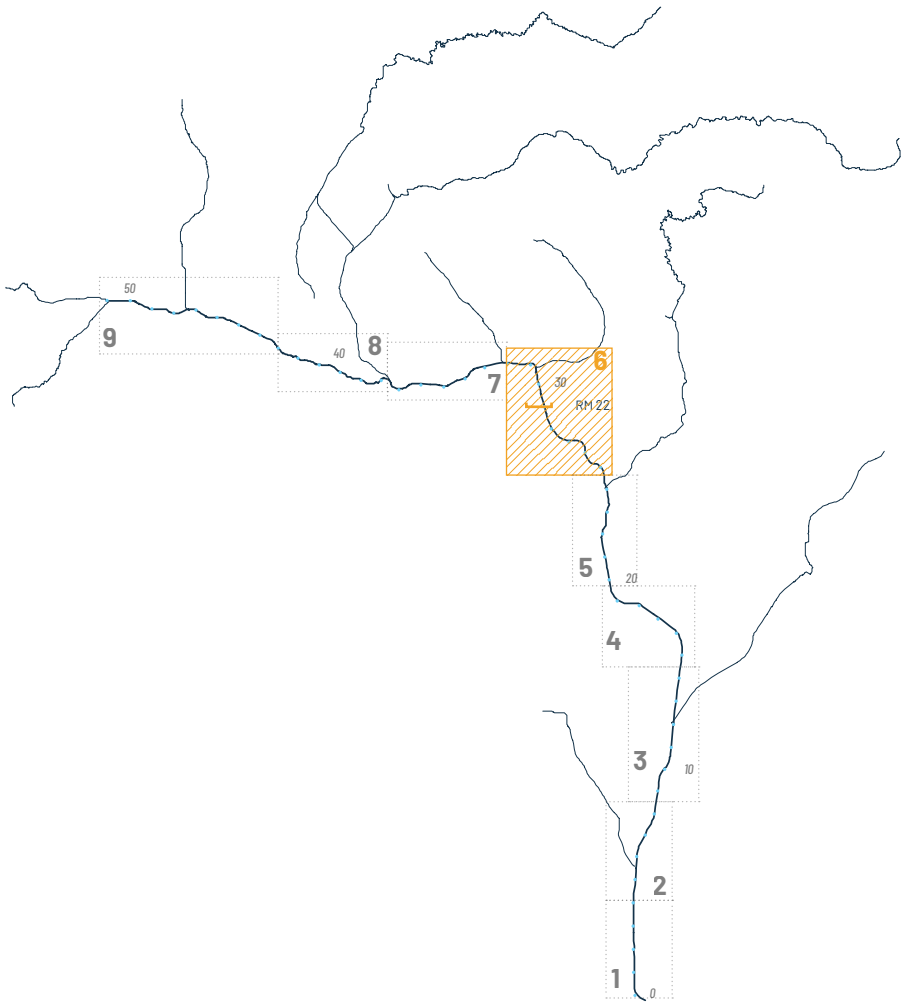
Notable Features:

- Significant ecological area with adjacency to Griffith Park from approximately river mile 28.5 through 32 along the right bank
- Barrier between the river and Griffith Park in this frame due to the 5 Freeway and Ventura Freeway
- Heavy sediment and vegetation are present in the channel
- River trail and park improvements
- Verdugo Wash confluence at river mile 30.6 along the left bank
- Rio de Los Angeles State Park and G2 parcel from river mile 25.2 to 26.5 along the left bank
- Adjacent to Elysian Park at the southern end, approximately from river mile 25 through 24.5 along the right bank

Significant Design Considerations for this Frame:

- Projects in this frame have the opportunity to enhance native habitat and connect to other important habitat corridors in the region (Santa Monica Mountains), although freeway barriers have to be considered in these connections.
- Flooding is a particular concern for residents in this community.
- Significant equestrian community in this area would utilize an expanded network of equestrian trails.
- Surface water is present in the channel bottom of this frame year-round due to a high water table and the underlying geology.
- Soil contaminants may be present at post-industrial sites within this frame and should be treated based on project needs.





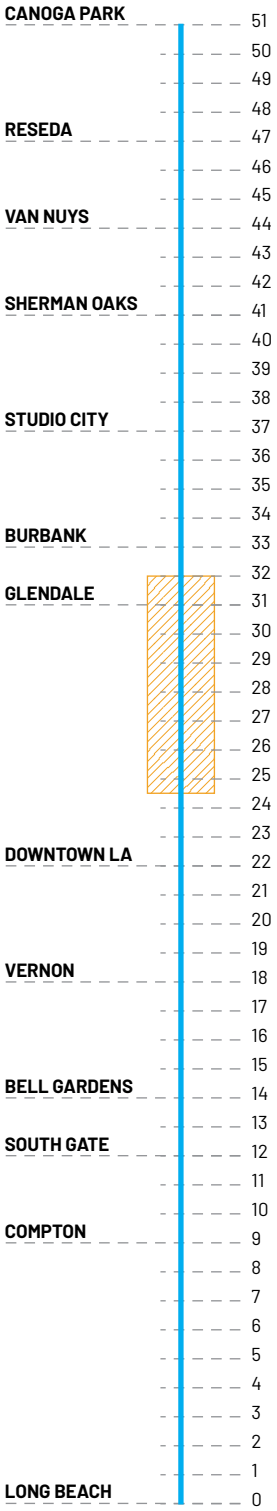


Figure 24. LA River Planning Frame 6 contains soft bottom river profiles and runs adjacent to Griffith Park . Source: LA River Master Plan, 2020.

FRAME 5: HEIGHTS

Location: City of Los Angeles; river mile 24.5 - 19.5

Channel characteristics: The channel in this frame is an entrenched concrete trapezoid section, with a typical width of 225 ft.

Average Channel Slope: 0.4%

Landside Right-of-Way Characteristics: In this frame, the landside right-of-way is typically less than 12 ft wide, widening at the northern edge. It consists of south, east, and west facing parcels.

Notable Features:

- Dense urban context - Downtown Los Angeles adjacent, several notable historic bridges
- High concentration of arts and cultural facilities
- Railroad lines and larger industrial yards along both sides of the river, several former industrial areas
- Los Angeles State Historic Park near river mile 23.5 along the right bank
- Arroyo Seco confluence near river mile 24, where the 110 freeway crosses the LA River

Significant Design Considerations for this Frame:

- Soil contaminants and air pollution mitigation and treatment are especially important in post-industrial sites prevalent in this frame.
- The often narrow right-of-way may require using the width of the channel or external land acquisition for projects of larger impact.
- Railroads and other transportation networks make it challenging to access the river in this frame.
- Surrounding urban development increases the urban heat island effect, so providing shade is critical.

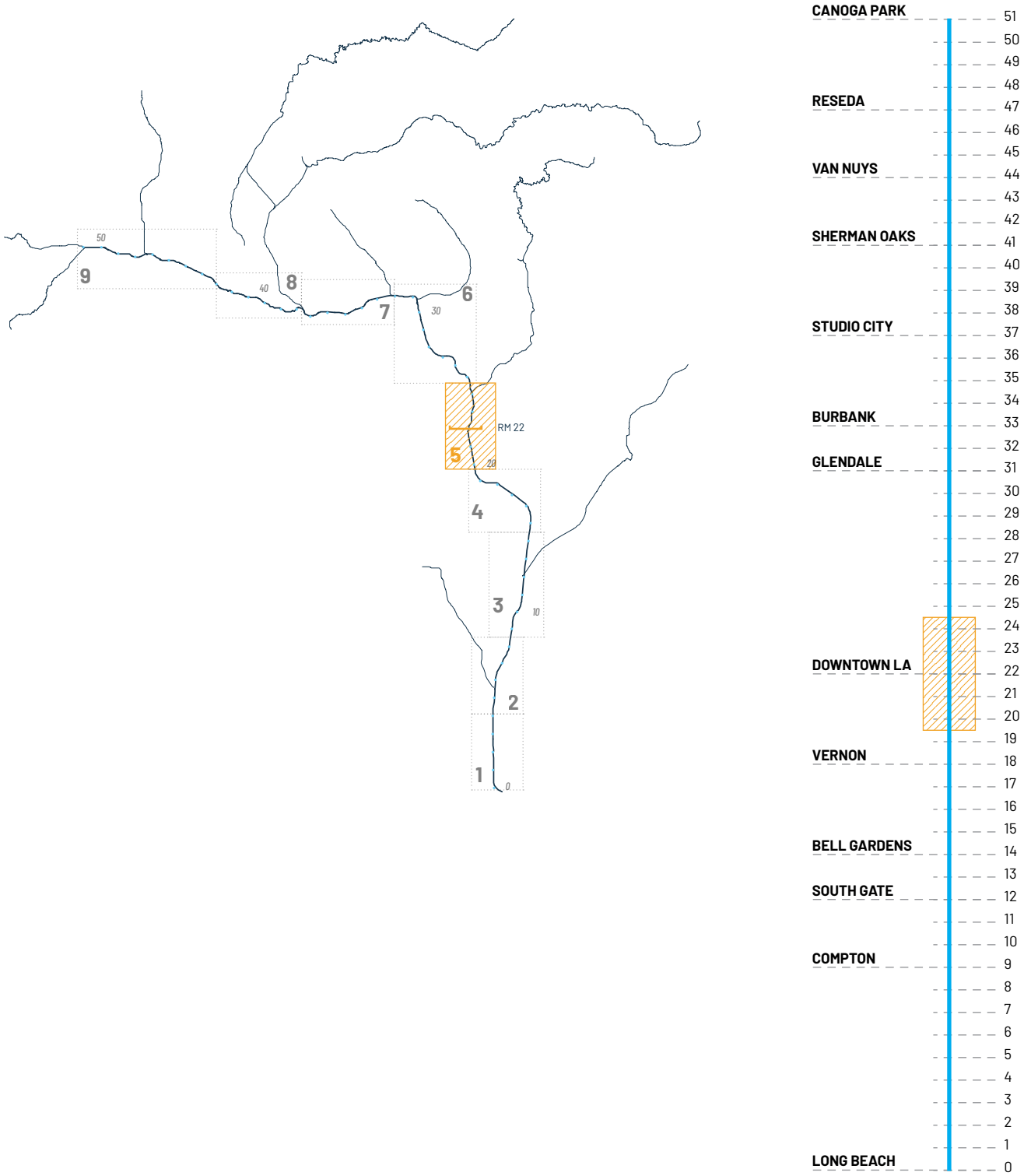


Figure 25. LA River Planning Frame 5 includes the section of the river that runs through Downtown LA, often near railroads or industrial sites. Source: LA River Master Plan, 2020.

FRAME 4: NORTH PLAIN

Location: Cities of Bell Gardens, Bell, Maywood, Vernon, Commerce, Huntington Park; river mile 19.5 - 14.14

Channel Characteristics: The channel in this frame is a concrete leveed trapezoidal section that is approximately 415 ft wide at the southernmost end. It transitions to a concrete entrenched trapezoidal section and then to a concrete entrenched rectangular section at river mile 19 at the northern end, with a width of about 285 ft

Average Channel Slope: 0.2%

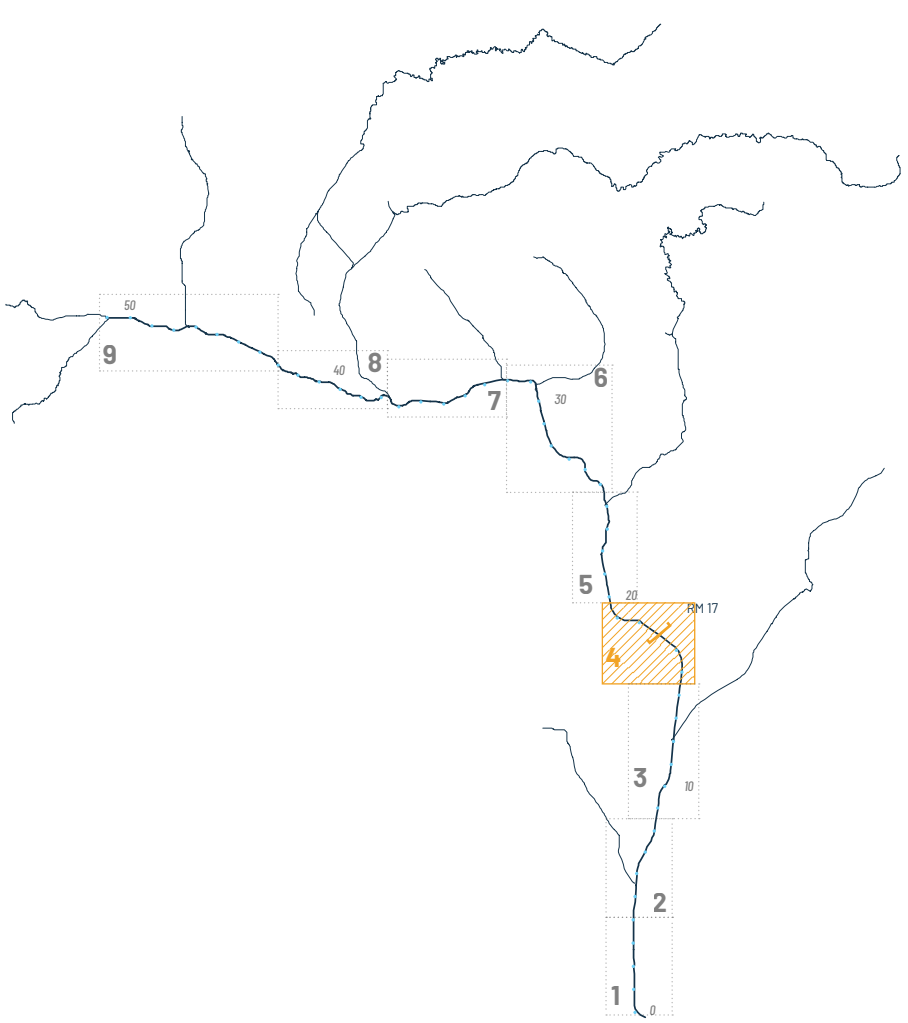
Landside Right-of-Way Characteristics: In this frame, industrial development and several adjacent rail lines limit the landside right-of-way to consistently less than 15 ft. In the northern portion of the frame, there is no landside right-of-way along the right bank. Right-of-way parcels in this frame are south, east, and west facing.

Notable Features:

- Dense industrial context
- Pollution and soil contamination present from heavy industry
- Utility rights-of-way and freight yards along both sides of the river
- Maywood Riverfront Park from river mile 15.7 to 15.8 along the right bank

Significant Design Considerations for this Frame:

- Soil contaminant and air pollution mitigation and treatment are especially important in post-industrial sites prevalent in this frame.
- Utility right-of-way projects require further coordination with power companies, but also provide a significant amount of land for corridor connectivity.
- Very high park needs and industrial land uses limit access to the LA River and healthy open space.
- Access to the river is limited by the 710 Interstate so projects may need to consider how barriers to reaching the river can be navigated.



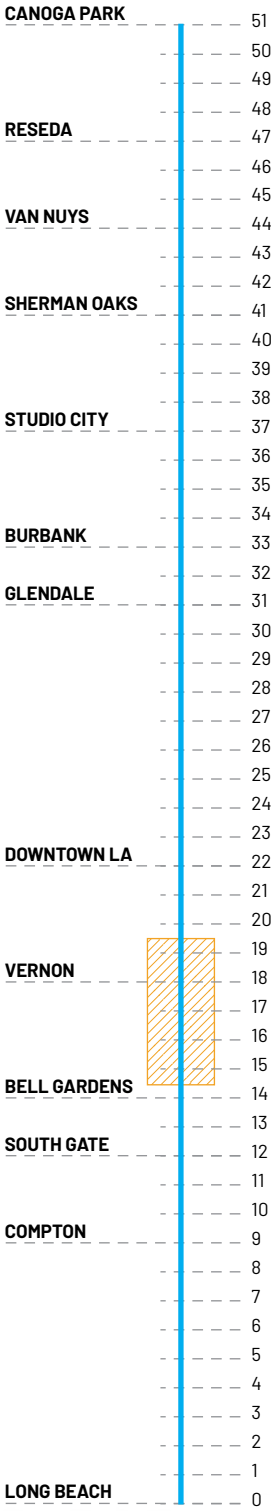


Figure 26. The river widens to a concrete trapezoidal channel in LA River Planning Frame 4, with many sites that have contamination from adjacent industrial land uses. Source: LA River Master Plan, 2020.

FRAME 3: CENTRAL PLAIN

Location: Cities of Compton, Paramount, Downey, Lynwood, South Gate, and Cudahy; river mile 14.14 - 8.4

Channel Characteristics: The channel in this frame is a trapezoidal concrete leveed cross section with an approximate width of 400 ft.

Average Channel Slope: 0.2%

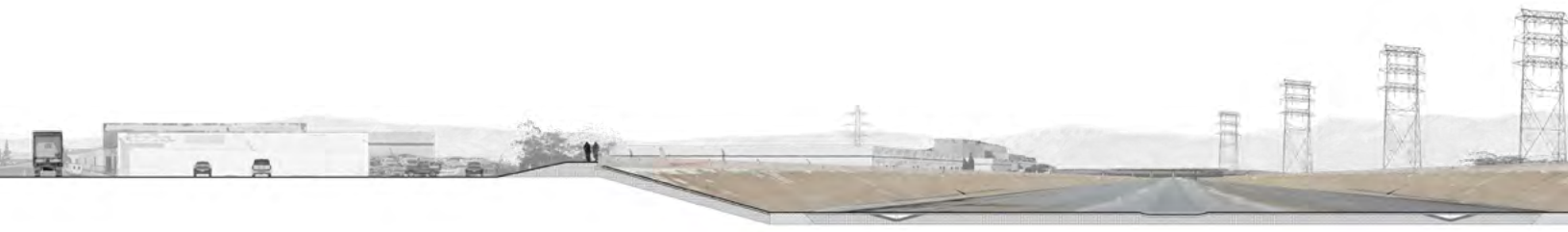
Landside Right-of-Way Characteristics: The landside right-of-way in this frame contains both east and west facing parcels, and is further limited by industrial and residential development, transmission easements, and Interstate 710 and the 105. It exists for extensive lengths at about 15 ft in width. However, there are large 200 ft wide tracts of the right-of-way incorporated into recreational park space (Ralph C. Dills and Hollydale Parks along with portions of the LA River Trail). Dense residential context, east and west facing parcels along levee of varying widths, areas typically 15 ft wide, in addition to utility corridors.

Notable Features:

- Dense residential context
- Utility ROWs along the left bank of the river
- Rio Hondo confluence at river mile 12.0 along the left bank
- Hollydale Park from river mile 11 to 11.5 along the left bank
- Ralph C. Dils Park from river mile 9.5 to 10.0 along the left bank

Significant Design Considerations for this Frame:

- Utility ROW projects require further coordination with power companies, but also provide a significant amount of land for corridor connectivity.



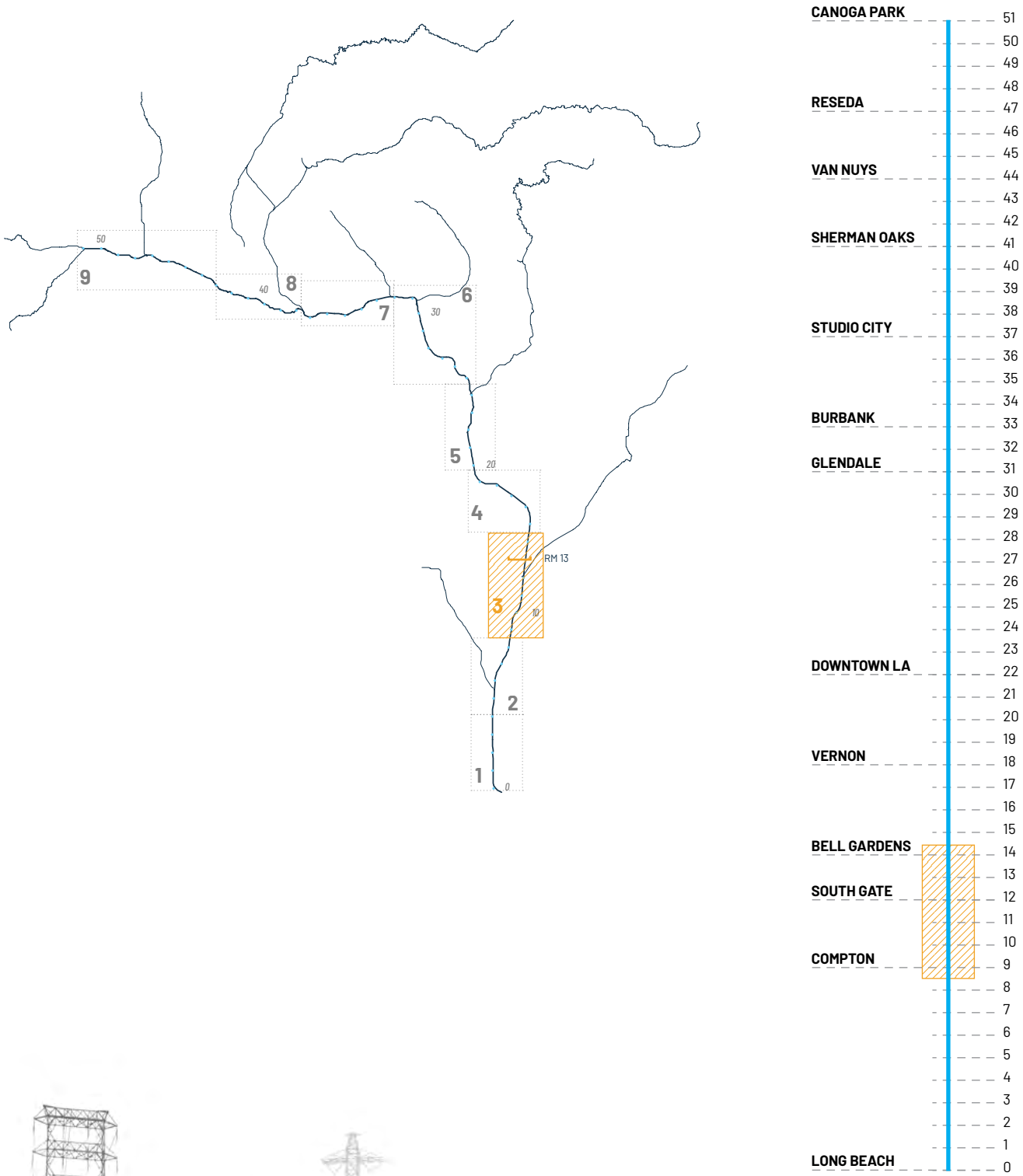


Figure 27. LA River Planning Frame 3 includes the section of the river that runs through South Gate, and often includes power lines from major utilities. Source: LA River Master Plan, 2020.

FRAME 2: SOUTH PLAIN

Location: City of Long Beach; river mile 8.4 - 4.0

Channel Characteristics: The channel in this frame is a trapezoidal concrete leveed cross section with an approximate width of 350 ft.

Average Channel Slope: 0.1%

Landside Right-of-Way Characteristics: This frame has some of the widest right-of-way parcels along the LA River. The parcels are east and west facing parcels along the levee. The landside right-of-way is widest in the southern portion of the frame, at widths of over 200 ft on each bank. Industrial and residential development, transmission easements, and Interstate 710 and the 91 Freeway cut into the landside right-of-way in the northern portion of the frame. The landside right-of-way is on average 50 ft wide.

Notable Features:

- Important bird habitat area
- Freshwater year round
- Utility ROWs along both sides of the river
- De Forest Park from river mile 6.8 to 7.5 along the left bank
- Dominguez Gap Wetlands from river mile 4.8 to 5.8 along the left bank
- Compton Creek confluence at river mile 5.4 along the right bank

Significant Design Considerations for this Frame:

- Significant equestrian community in this area would utilize an expanded network of equestrian trails.
- Algae mats on the concrete channel bottom provide an important food source for migrating birds.
- The widest portions of the landside ROW provides opportunity for significant habitat areas.
- Utility ROW projects require further coordination with power companies, but also provide a significant amount of land for corridor connectivity.

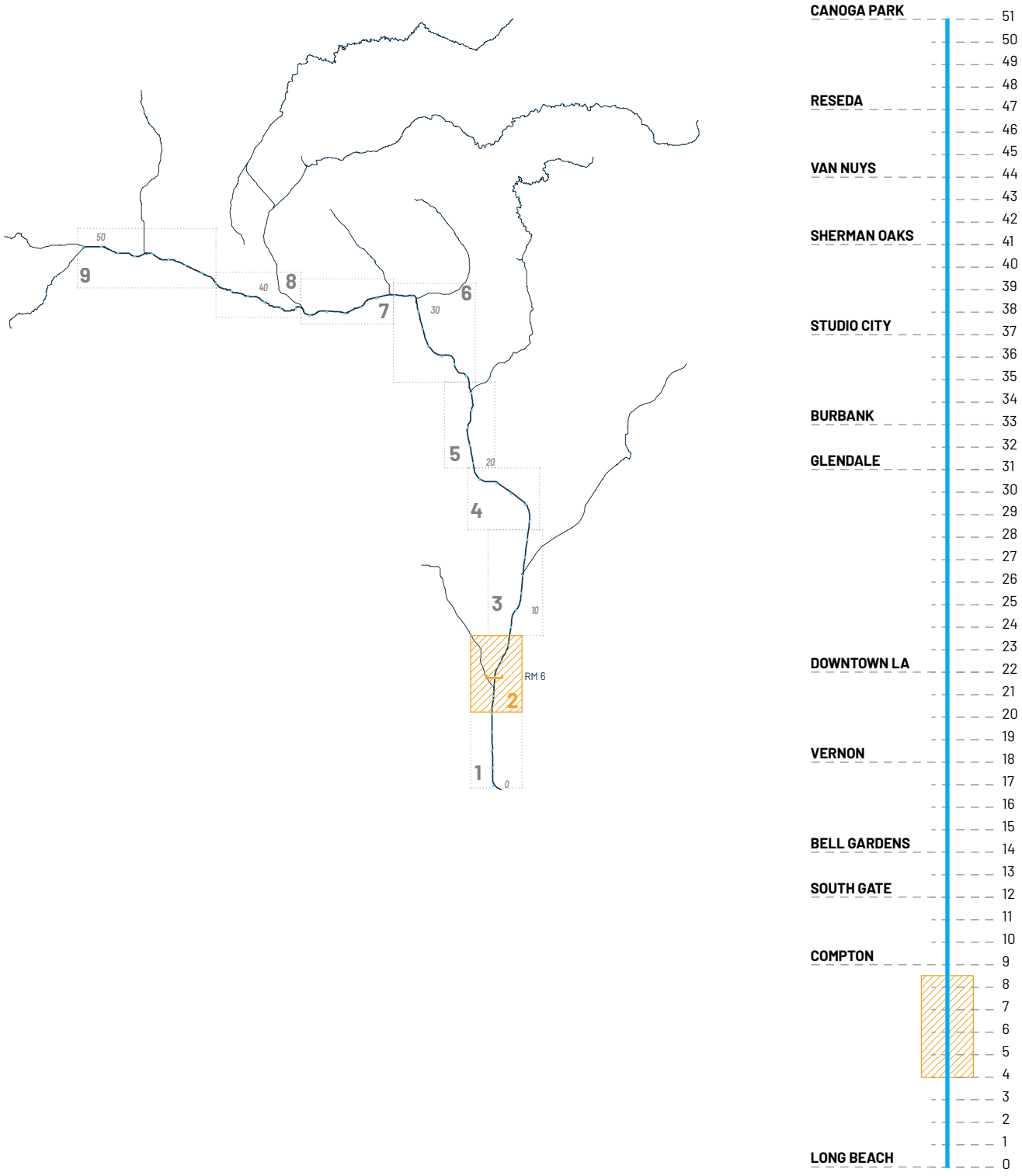


Figure 28. The channel in LA River Planning Frame 2 has a trapezoidal concrete section. There is a significant equestrian community that uses trails along this portion of the river. Source: LA River Master Plan, 2020.

FRAME 1: ESTUARY

Location: City of Long Beach; river mile 4.0 - 0.0

Channel Characteristics: The channel in this frame is a leveed trapezoidal concrete cross section with a width of approximately 400 ft. The soft channel bottom with year-round water transitions at mile 3 to a concrete bottom section with hard rip-rap sides, with a typical width of 585 ft.

Average Channel Slope: < 0.1%

Landside Right-of-Way Characteristics: This frame contains east and west facing parcels along levee, with areas that vary from approximately 15ft to 100-150ft wide.

Notable Features:

- Estuary (including projections for sea level rise)
- Important bird habitat area
- Brackish water year round
- Present fall line is at Willow Street
- Wrigley Greenbelt from river mile 2.9 to 4.0 along the left bank
- Santa Cruz Park, Golden Park, and Cesar Chavez Park from river mile 0.3 to 0.8 along the left bank, bisected from the river by West Shoreline Drive.
- Shoreline Aquatic Park and the Queen Mary at river mile 0

Significant Design Considerations for this Frame:

- This frame is in closest proximity to the ocean and Port of Long Beach, with unique site conditions for projects along the LA River.
- Projects here are potentially subject to high amounts of salt spray and salt content in the water and soil. Material and plant selections should be able to tolerate these conditions.
- Raised banks along the channel bottom allow for planting and should be managed as to not encourage the spread of invasive species.
- The wide ROW parcels, year-round presence of water, and proximity to the ocean provides opportunities for the creation and enhancement of valuable coastal habitat such as wetlands and nesting grounds.
- Sea level rise may occur in coming decades in this frame.

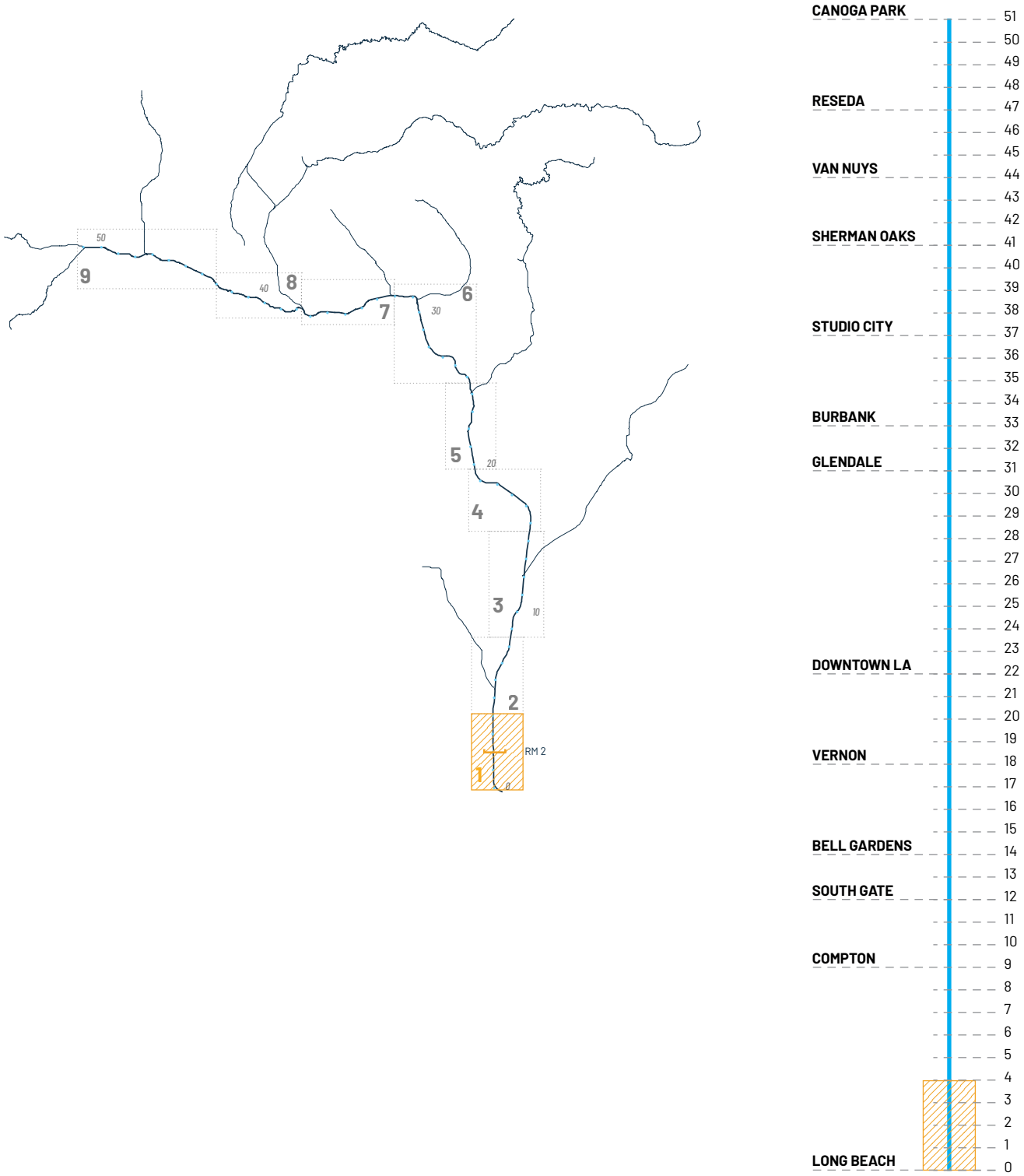
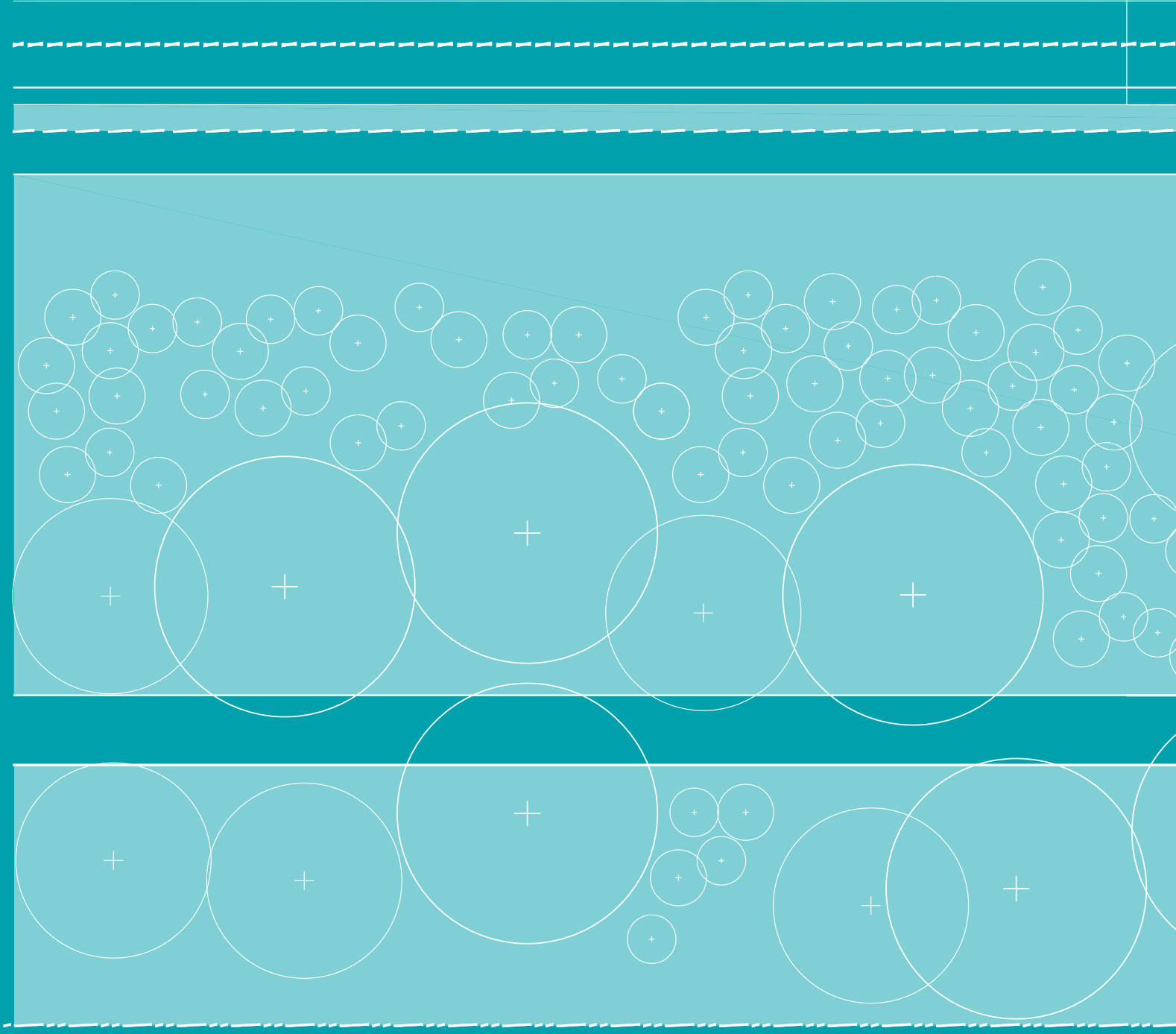
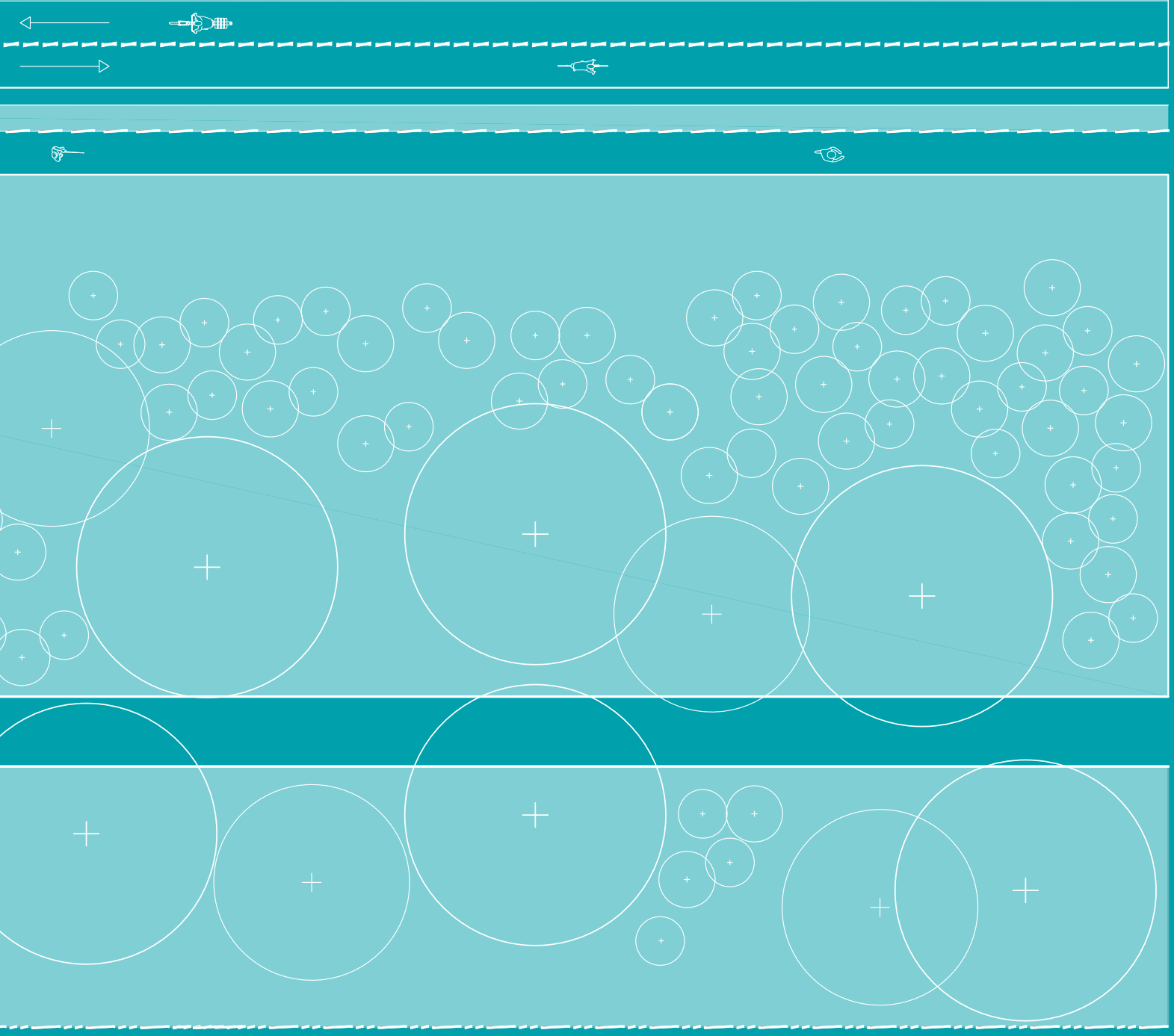


Figure 29. The estuary in LA River Planning Frame 1 contains brackish water and is a significant bird habitat. Source: LA River Master Plan, 2020.





SECTION II:
DESIGN GUIDELINES

Figure 30. LA River Access. Access points, trails, and public transportation stops along or adjacent to the LA River.
Source: LA River Master Plan, 2020.

3.
ACCESS AND MOBILITY

BUILDING AN INCLUSIVE MULTI-MODAL NETWORK FOR THE RIVER

The LA River is intended to be a resource for use by all people in LA County. To be this resource, the river must be accessible and usable. In community meetings and surveys during the LA River Master Plan process, people indicated that walking and biking are the two activities they participate in the most along the river, with combined participation more than all other activities combined. However, ease and availability of access to trails along the LA River is highly variable.

Trail guidelines ensure a degree of consistency in experience from one segment of the LA River trails to the next. Whether LA County Public Works or one of its partners implements a segment of trail, it should meet the same minimum standards. The more regular and frequent access is to trails along the LA River, the more people from surrounding communities will be able to take advantage of these amenities. With increased visibility of access points and consistency of experience, more people will become aware of the river and the experience of using any part of the river will become more familiar. As trails along the LA River become better connected to other trails in the county network, the value of the river trail will increase exponentially, opening up destinations that people can reach by getting on the river trails and making the LA River a destination by trail for more of the county. Better connections to transit will enable those without cars the opportunity to take advantage of the river and increase the viability of multi-modal trips. Finally, the addition of amenities such as water fountains or benches at regular intervals will make the experience more pleasant for both the casual recreation user and the seasoned commuter (see Chapter 6 for further discussion on amenities).

WHAT'S IN THE CHAPTER

The following pages contain the dimensional and material guidelines for multi-modal trails connecting to and along the LA River. This chapter will provide information regarding right-of-way scenarios, gateways, and bridges among other aspects related to access and mobility. The designer or engineer shall be responsible for ensuring the implementation of these guidelines is compliant with prevailing building codes and regulations. Consult the checklist at the end of the chapter to ensure the correct guideline items are followed.

Figure 31. Chapter 3 of this document covers items related to access and mobility along the LA River.

THE LA RIVER TRAIL SHOULD CONNECT TO OTHER TRAILS ALONG THE LENGTH OF THE RIVER TO CREATE A NETWORK OF TRAILS ACROSS LA COUNTY FOR CYCLISTS, PEDESTRIANS, AND EQUESTRIANS

MULTIUSE TRAILS

A primary goal of the LA River Master Plan is to create 51 miles of connected open space with equitable access, including trails, gateways, and access points. The LA River Trail should connect to other trails and paths along the length of the river to create a mobility network across LA County for cyclists, pedestrians, and equestrians. The LA River Trail should always seek to accommodate as many user types as safely possible, although all types of users may not always be accommodated based on specific projects and site conditions. Additionally, operations and maintenance vehicles need to access the right-of-way.

The various trail conditions along the LA River should be designed with their intended use in mind. Each type of trail user has different needs in terms of width and materiality.

SEPARATED USES: EQUESTRIAN, PEDESTRIAN, AND BICYCLE

In a condition where ample right-of-way space is available, the pedestrian, bicycle, and equestrian trails should give each user group a dedicated passageway with buffers in between the trails. In this scenario, the condition of the buffer spaces between the paths is important. The vegetated buffers should be at least three feet wide. The trail widths shall be dictated by their expected usage and informed by the site conditions. A 12 feet minimum width is required for either the pedestrian or the bicycle trail to accommodate the service/maintenance vehicles.

When there is not enough space to separate all three trail uses, the pedestrian and bicycle trails should be adjacent to one another and a vegetated buffer or trail divider should be used to separate those uses from the equestrian trails. A 12 feet minimum width is required of the pedestrian and bicycle trails to provide access for service/maintenance vehicles.

ADJACENT USES: EQUESTRIAN, PEDESTRIAN, AND BICYCLE

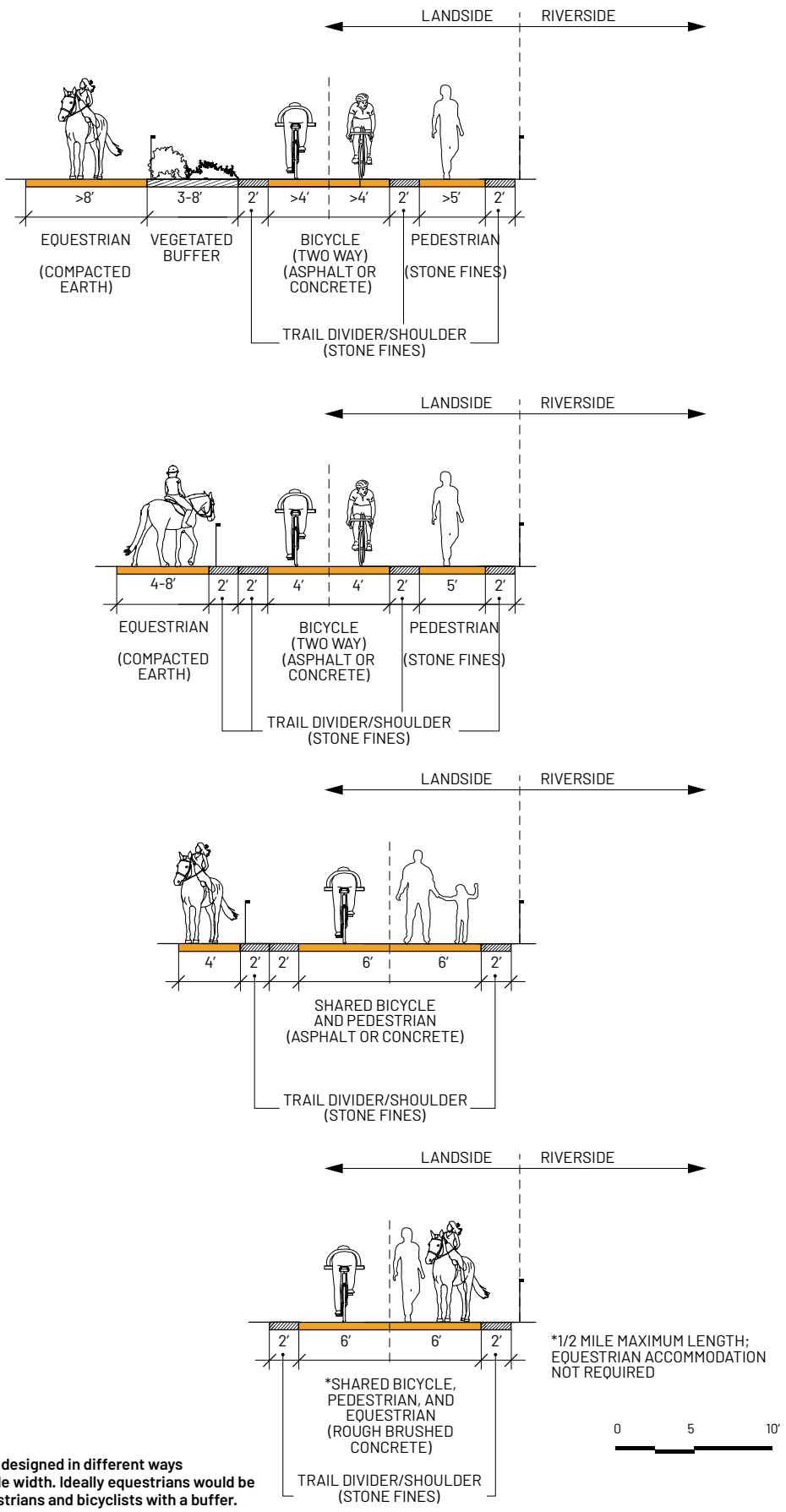
Where there are more space constraints in the LA River right-of-way, pedestrian and bicycle trails may need to be directly adjacent or share a trail. These two trails can coexist next to one another as long as there is correct striping and clear signage designating the trail uses. The combined width must be a minimum of 12 feet in order to provide access for service and maintenance vehicles.

COMBINED USES: EQUESTRIAN, PEDESTRIAN, AND BICYCLE

In some instances along the river where there is the tightest right-of-way, the most efficient trail option is a single trail that is designed to be used by pedestrians, bicyclists, and equestrians. Clear trail environmental graphics and striping must be present. For equestrian uses, rough brushed concrete paving should be installed and a recommended length of half a mile maximum. The width of this multiuse trail must be a minimum of 12 feet in order to provide access for service and maintenance vehicles.

MULTIUSE TRAIL COMBINATIONS

PREFERRED



MINIMUM

Figure 32. Multiuse trails can be designed in different ways depending on available width. Ideally equestrians would be separated from pedestrians and bicyclists with a buffer. Dimensions illustrated for bikes are based on the County of LA Bike Plan.

COMPONENTS OF MULTIUSE TRAILS

Figure 33. **Pedestrian, bicycle, and equestrian trail components vary in width and are most often used in combination with one another, but they may also be implemented as standalone trails in certain projects. Dimensions illustrated for bikes are based on the County of LA Bike Plan.**

ALL PEDESTRIAN AND BICYCLE TRAILS MUST HAVE 2' OF SHOULDER ON EACH SIDE IN ADDITION TO THE TRAIL WIDTH

TRAIL COMPONENTS

PEDESTRIAN TRAILS

Pedestrians make up the largest user group of the river. The main paths of travel should be linear and efficiently designed for active transport. Paths that are for passive uses may meander. The pedestrian trails should range anywhere from 4 ft wide (for secondary/recreation use only) up to the preferred 12 ft wide where there is a need to share the share with other types of users. Two foot shoulders should also be provided on either side of the path. Regardless of usage, there must be clear visibility to the surrounding paths for safety.

BICYCLE TRAILS

Bicycle trails along the entirety of the river should be designed to meet Caltrans Class I minimum standards with a design speed of 20mph. These trails should allow for four foot lanes of two-way traffic with two foot shoulders on each side. Clear environmental graphics and striping must be included for safety (see "Bike Trail Paint" in Chapter 4 for more details).

EQUESTRIAN TRAILS

Where possible, equestrian trails should be kept separate from other trails. Equestrian trails should range from four ft wide, where low usage is expected, to 12 feet wide where high, two-way usage occurs. Where applicable, they should provide safe access across the river bed and to other recreational areas. Equestrian trails exist adjacent to the river in several frames. Linking these facilities in the future would provide equestrians with greater opportunities for all day rides or longer trail loop systems not currently available.

When there is not enough space to accommodate all uses, the first priority remains to create a connected LA River Trail. Design teams shall determine a method to maintain pedestrian and bicycle connections regardless of constraints.

RIGHT-OF-WAY COMBINATIONS

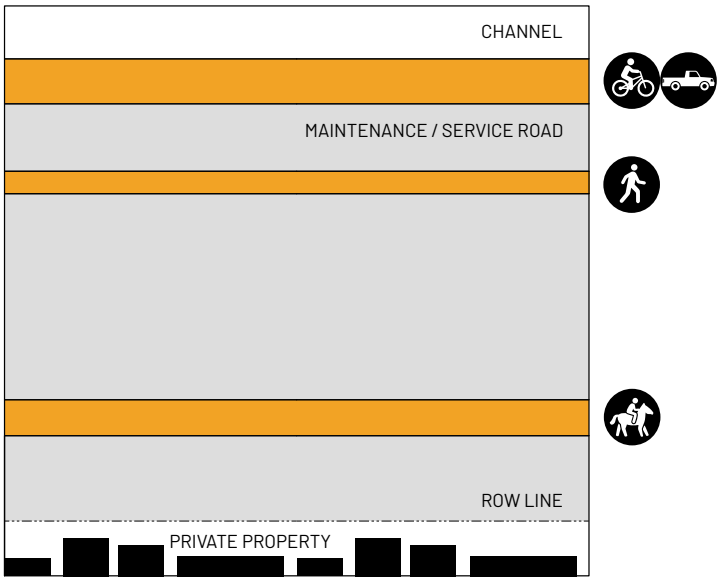
The design and location of trails is primarily affected by the channel configuration, the US Army Corps of Engineers (USACE), City of Los Angeles, or LA County (LAC) right-of-way widths, maintenance requirements of flood control and auxiliary uses, and utility easements.

The right-of-way conditions along the LA River vary substantially in each frame. LA County Public Works and the USACE maintain various segments of the river channel. In order to access and maintain the river, these right-of-way contain service roads, both paved and unpaved, along the top of the channel. These service roads are used by LAC and the USACE crews to: inspect the channel, clean out weir structures on an annual basis at various locations, and respond to emergency situations. The location of the service road varies depending on the right-of-way condition. In general, there are 4 different sizes of right-of-way:

- Extra Large (>12 ft, extends beyond base of levee)
- Large (>12 ft, along entrenched condition)
- Narrow (approximately 12 ft)
- Very Narrow (< 12 ft)

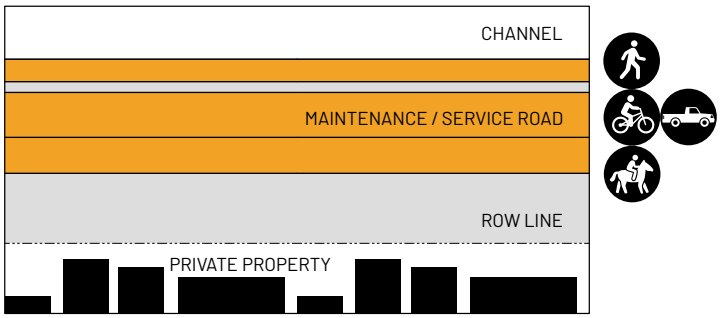
Within each of the different right-of-way conditions, the trails and service roads are organized in different ways. Along some sections of the river, the service road runs along both banks and in some sections on one bank. Through the industrial parts of downtown LA and in the San Fernando basin, no room is currently provided for service roads.

RIGHT-OF-WAY TYPOLOGIES



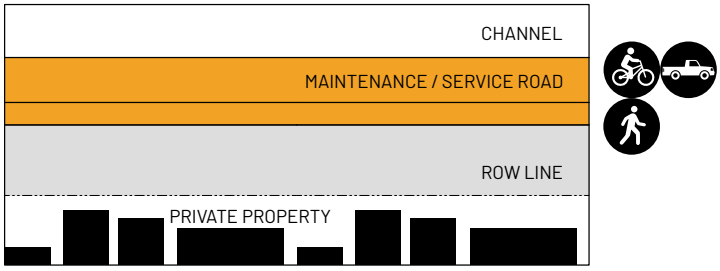
EXTRA LARGE RIGHT-OF-WAY

See Figure 35 on page 72.



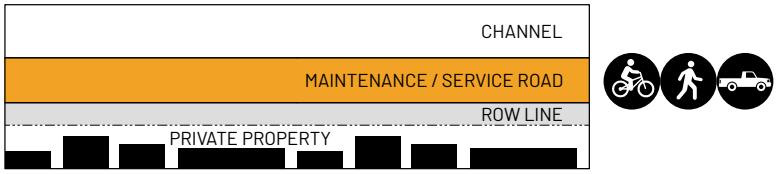
LARGE RIGHT-OF-WAY

See Figure 36 on page 73.



NARROW RIGHT-OF-WAY

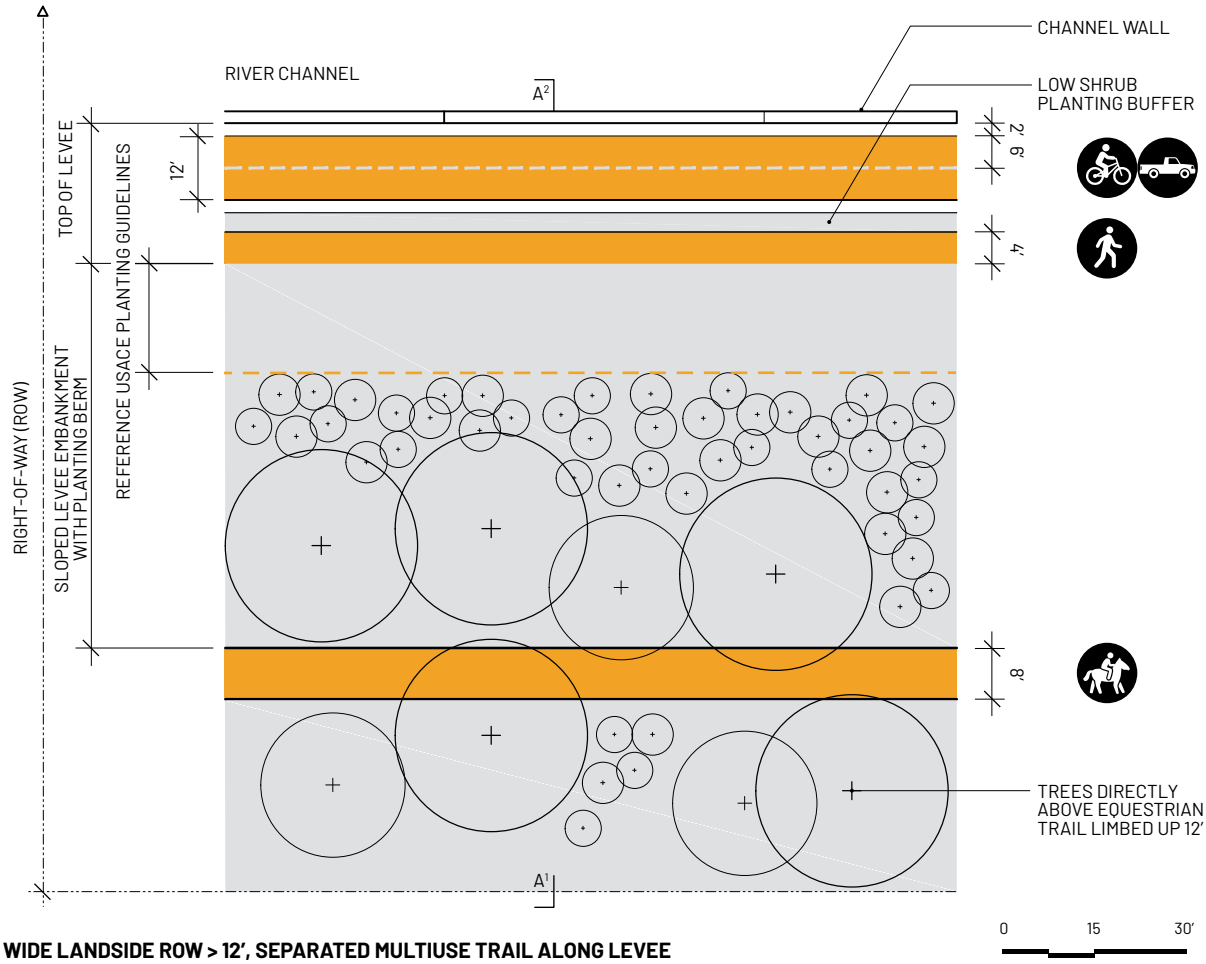
See Figure 37 on page 74.



VERY NARROW RIGHT-OF-WAY

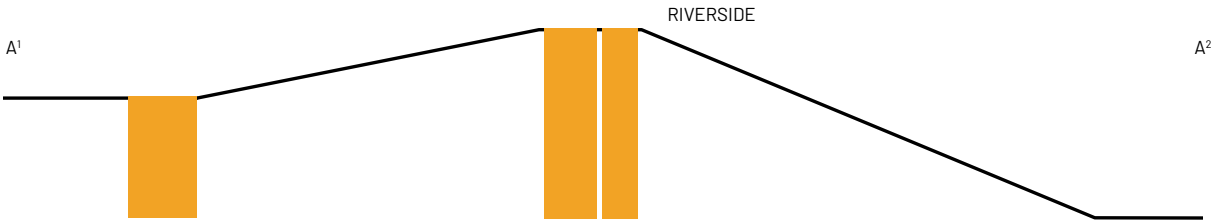
See Figure 38 on page 74.

Figure 34. Right-of-way conditions vary greatly along the 51 miles of the river. In general, there are four typologies that represent the majority of conditions along the river.



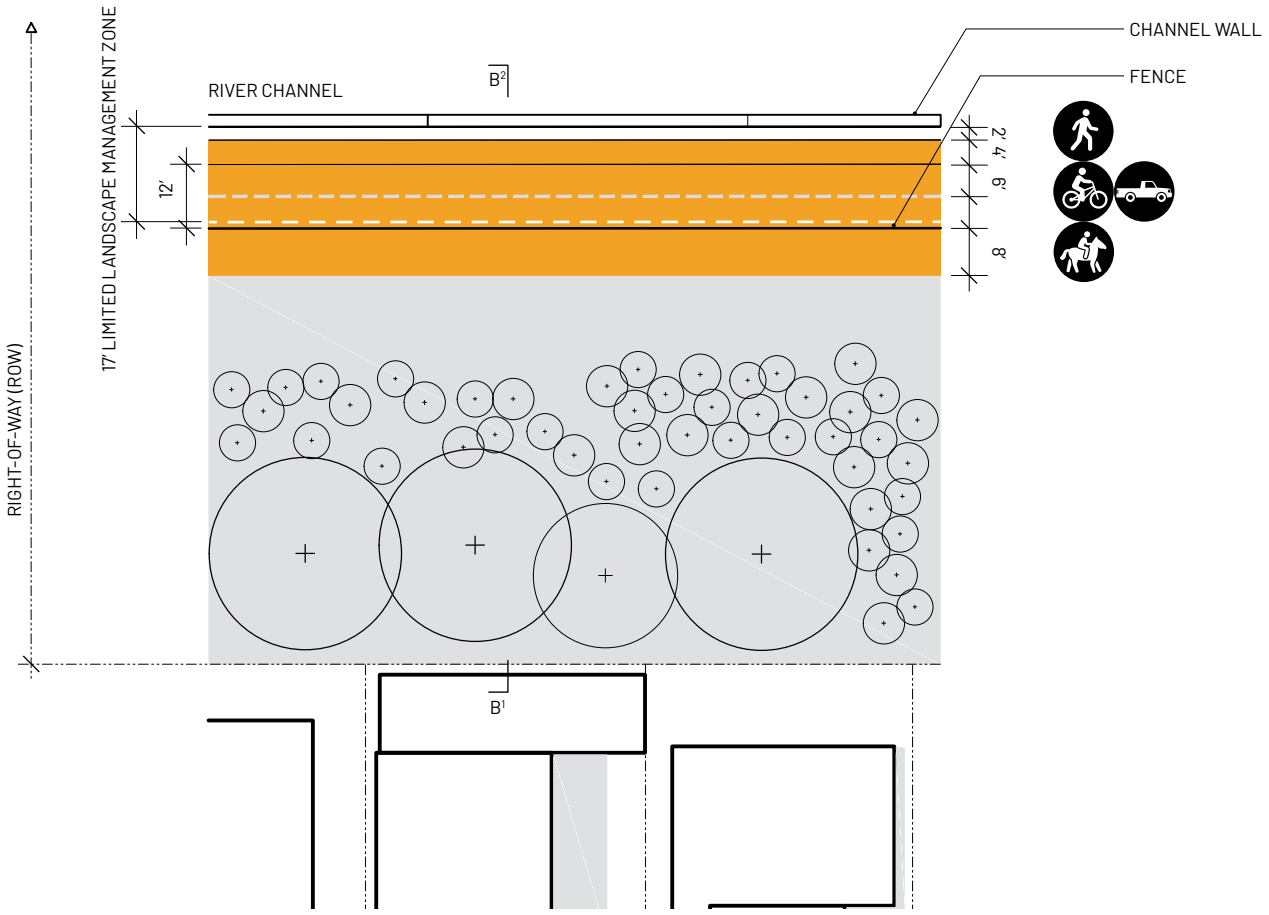
WIDE LANDSIDE ROW > 12', SEPARATED MULTIUSE TRAIL ALONG LEVEE

Figure 35. A wide landside ROW would allow for the separation of trail types. This presents the possibility to have wide trail dimensions and highest safety measures. This figure represents one possible configuration of this typology.



TRAILS IN WIDE RIGHT-OF-WAY AREAS

Areas with large rights-of-way along the LA River should utilize that space to separate the different trail typologies. To promote safe usage, bicycle, pedestrian, and equestrian trails should have their own designated trails with adequate buffers or trail dividers. Special consideration should be given to areas where different types of trail users intersect, such as access points and bridge crossings.



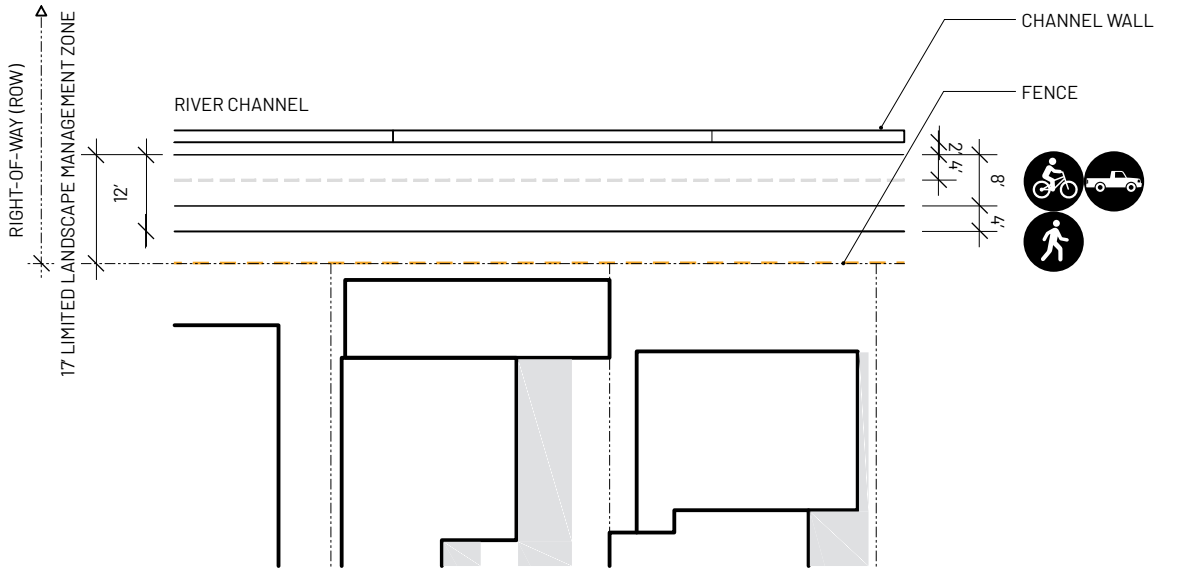
WIDE LANDSIDE ROW > 12', CONSOLIDATED MULTIUSE TRAIL ALONG ENTRENCHED CHANNEL

Figure 36. Trails may be consolidated when a wide landside right-of-way (ROW) is present. When the trails are consolidated, more land becomes available for parks, planting, and habitat. This figure represents one possible configuration of this typology.

TRAILS IN NARROW RIGHT-OF-WAY AREAS

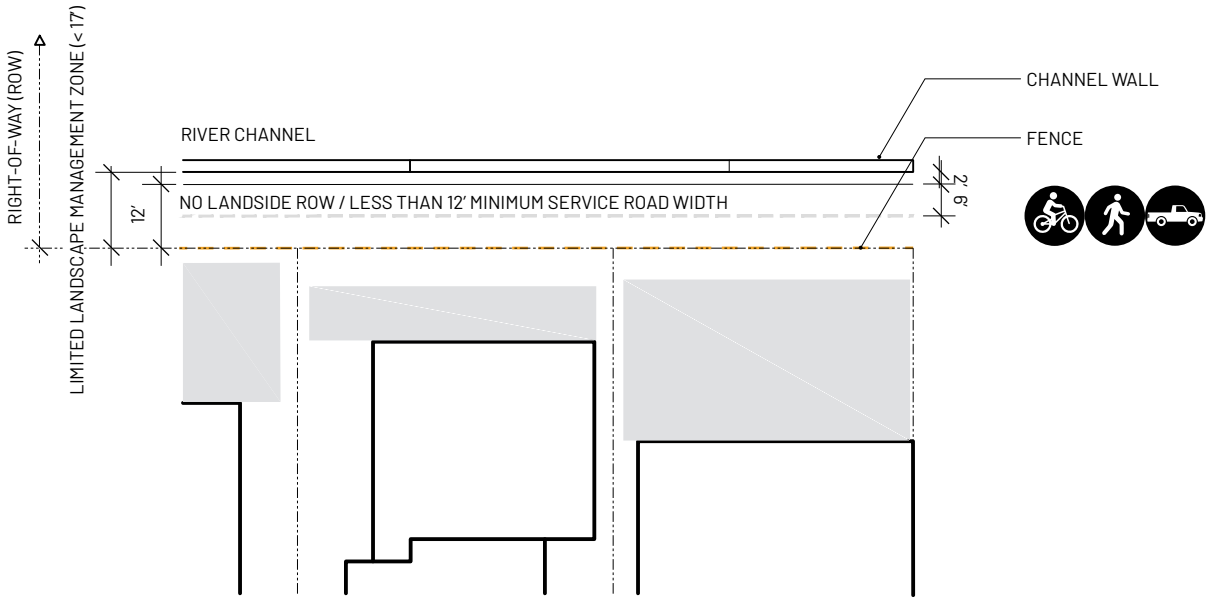
Connectivity of the trail network along all 51 miles of the LA River is critical, therefore, in areas where the right-of-way is narrow, innovative methods to create connectivity should be explored, such as cantilevers, bridges, elevated trails, and platforms. When necessary, paths can be shared by cyclists, pedestrians, and equestrians.

RIGHT-OF-WAY CONDITIONS VARY GREATLY ALONG THE 51 MILES OF THE LA RIVER. THE FIGURES ABOVE REPRESENT ONE POSSIBLE CONFIGURATION OF THE RIGHT-OF-WAY



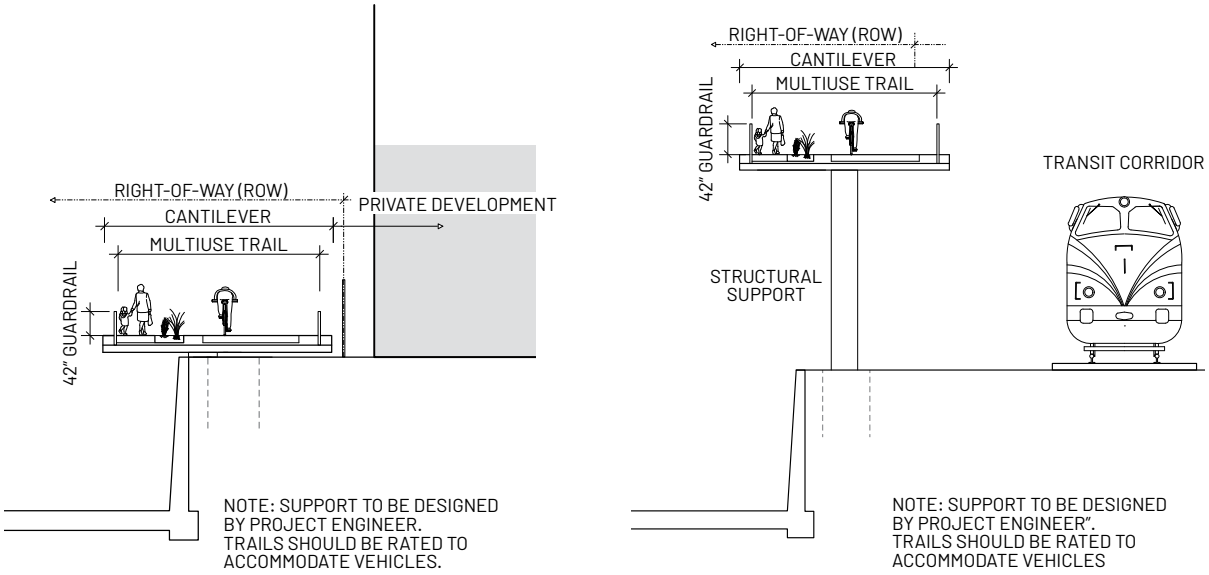
LANDSIDE ROW = APPROX. 17', MULTIUSE TRAIL

Figure 37. Narrow landside rights-of-way (ROW) allow for the separation of pedestrian and bike trails. However, they do not allow room for separate equestrian trails. In this condition, room for buffer planting is present, allowing separation between the trail users and the property owners. This figure represents one possible configuration of this typology.



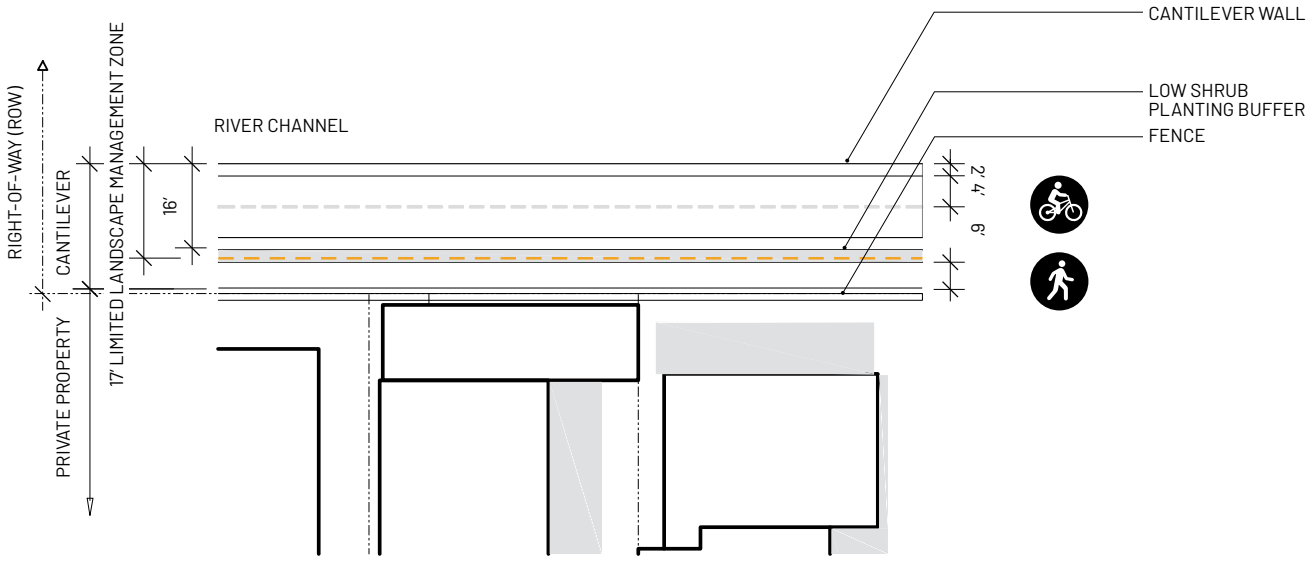
LANDSIDE ROW = 14', MULTIUSE TRAIL

Figure 38. Narrow landside rights-of-way (ROW) allow for the separation of pedestrian and bike trails. However, they do not allow room for separate equestrian trails. This figure represents one possible configuration of this typology.



NO LANSIDE ROW, CANTILEVERED OR ELEVATED MULTIUSE TRAIL

Figure 40. The cantilevered and elevated trails allow pedestrians and cyclists to utilize the right-of-way (ROW) when there is not enough room between the channel and adjacent property, infrastructure, or utilities. Guardrails on both sides of the trail help keep users safe. This typology could stay open during storm events and offer elevated views. This figure represents one possible configuration of this typology.



NO LANSIDE ROW, CANTILEVERED MULTIUSE TRAIL

Figure 39. For instances where the is no landside rights-of-way (ROW), a cantilevered condition can create space for an accessible multiuse trail. This figure represents one possible configuration of this typology.

MULTIUSE TRAILS IN WIDE ROW: BEST CASE SCENARIO

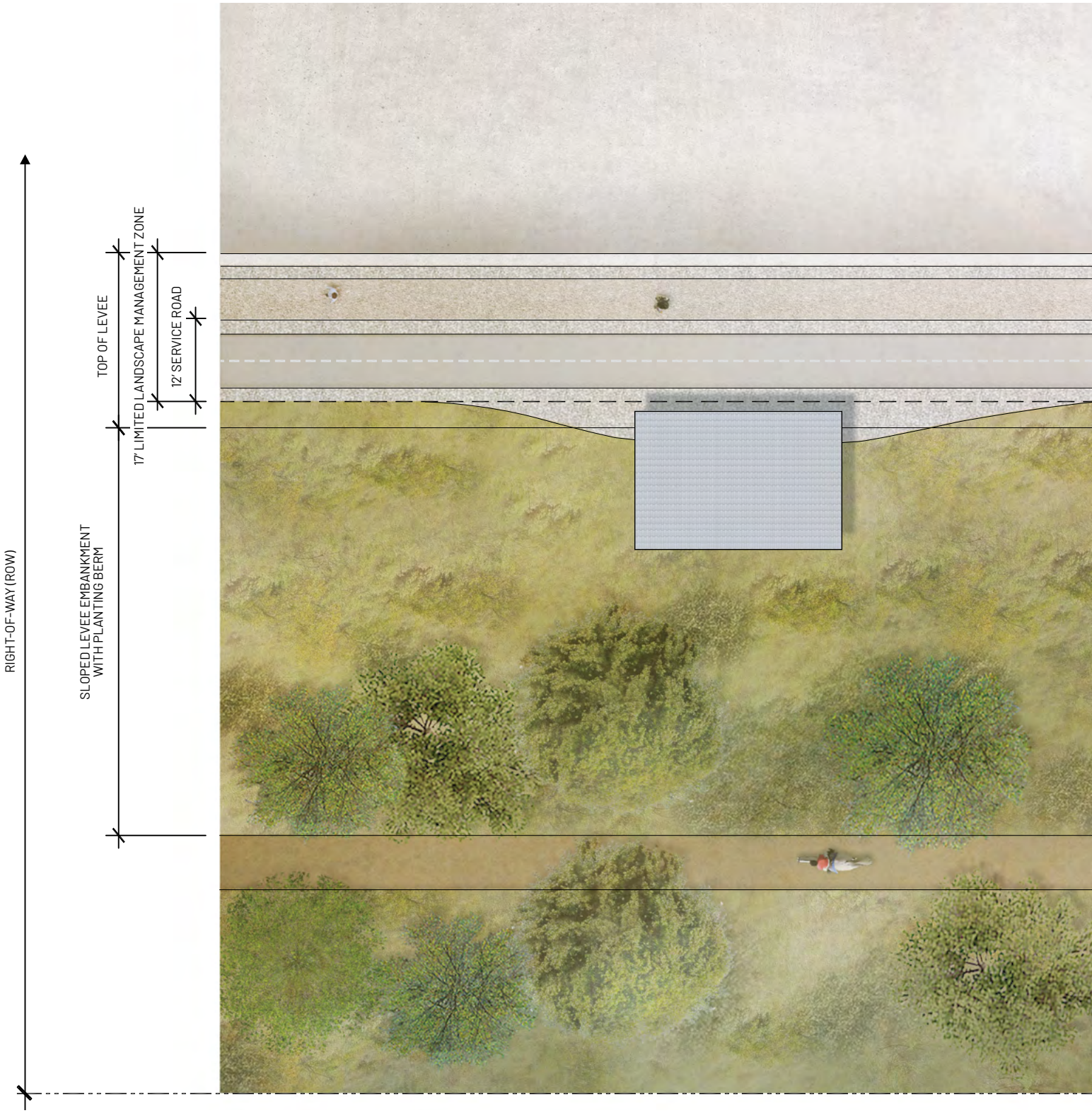
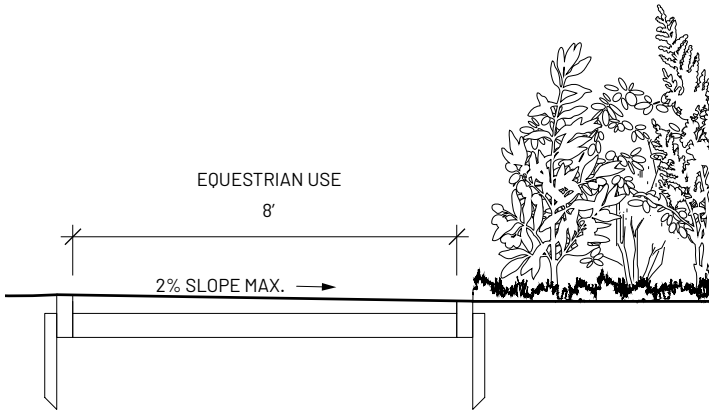


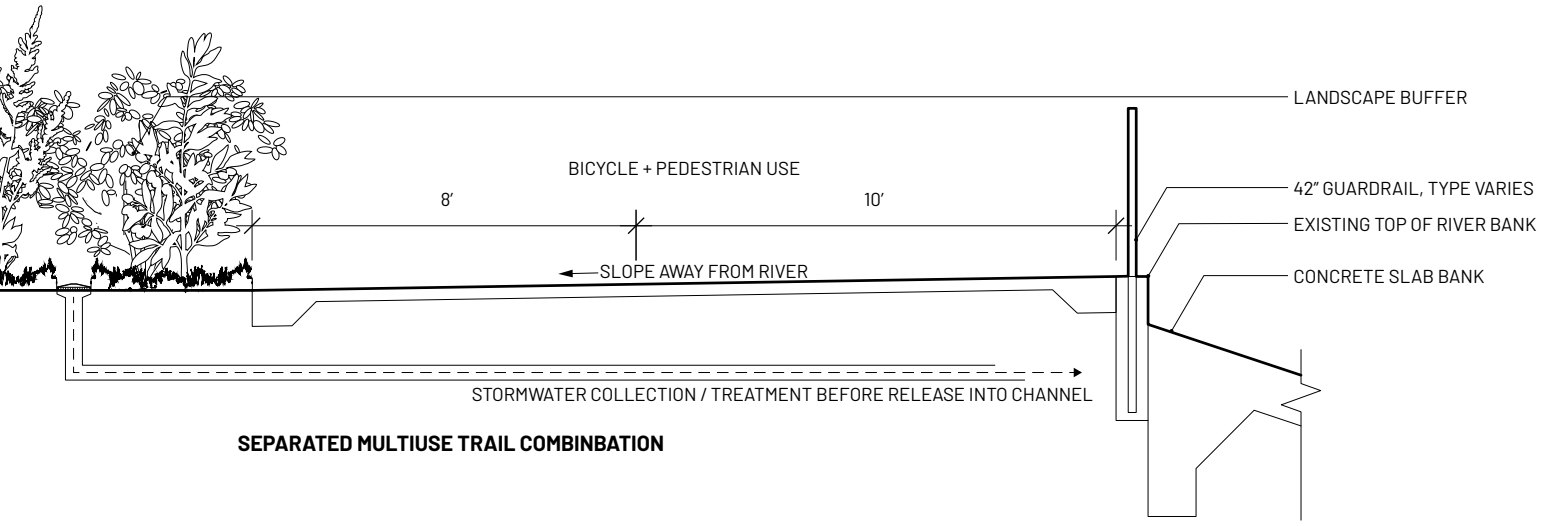
Figure 41. **Wide landside rights-of-way (ROW) allow for the separation of trail types with vegetated buffers. This figure represents one possible configuration of this typology.**

6' PEDESTRIAN PATH
2'
4' BIKE LANE
2' SHOULDER
8' EQUESTRIAN TRAIL
0
10
20'

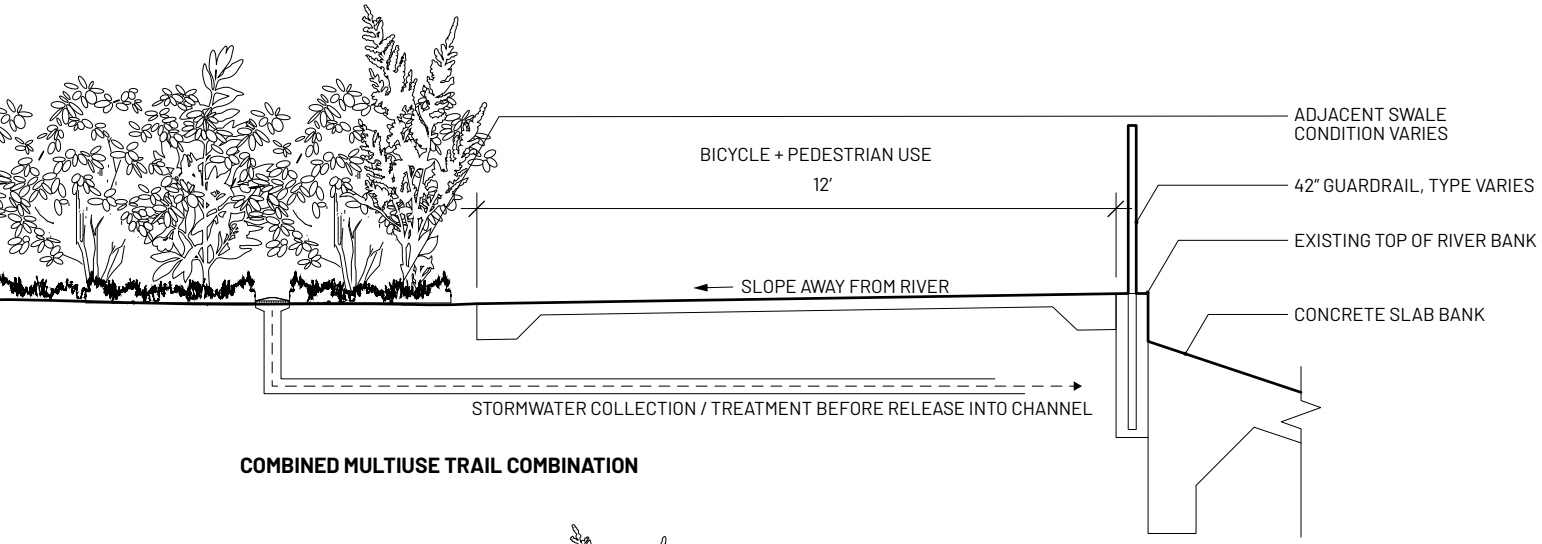
TRAIL ASSEMBLIES

The relationship between the trails and their adjacent conditions should be considered when designing and constructing along the LA River. While the trail widths vary based on the combination of usage type and materiality, there are design principles that should be followed universally where possible. To improve water quality, trails should generally slope away from the river channel and filter runoff prior to discharge into the channel. In some circumstances, such as elevated or cantilevered paths, underpasses, and tight right-of-ways, this condition may not be preferred.

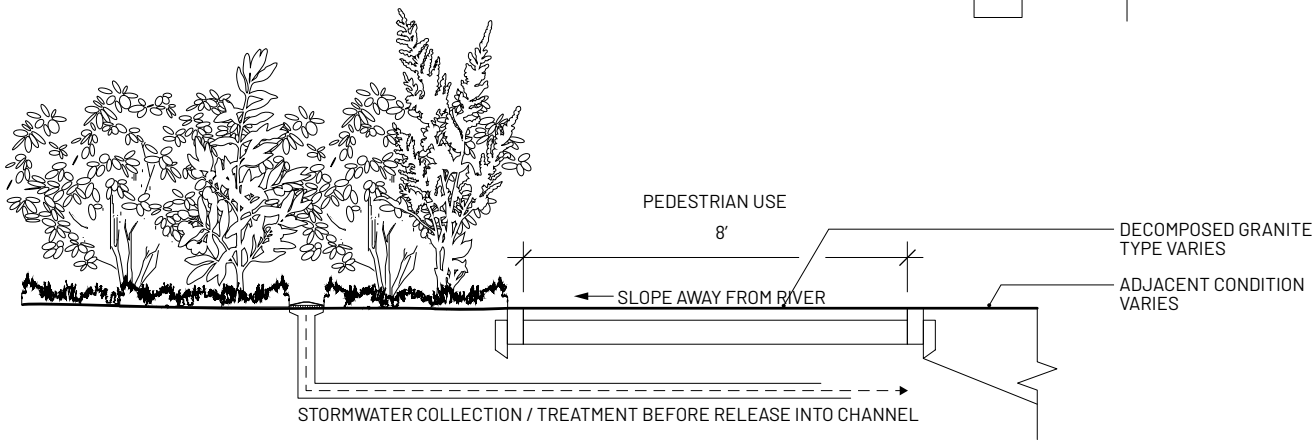




SEPARATED MULTIUSE TRAIL COMBINBATION



COMBINED MULTIUSE TRAIL COMBINATION

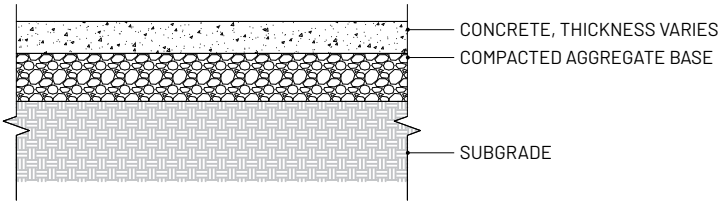


PEDESTRIAN USE TRAIL

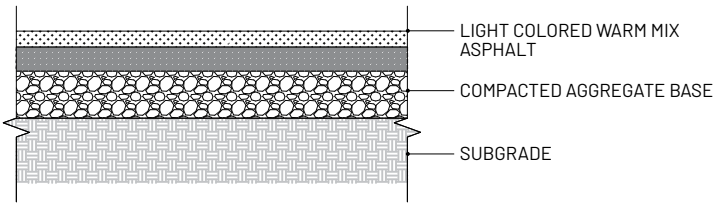
0 2 4 8′

Figure 42. Where possible, trails should slope away from the river and to a landscape drain or infiltration zone. That water should then be filtered and conveyed into the river.

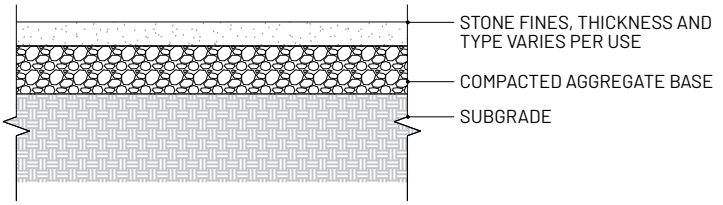
PAVING TYPOLOGIES



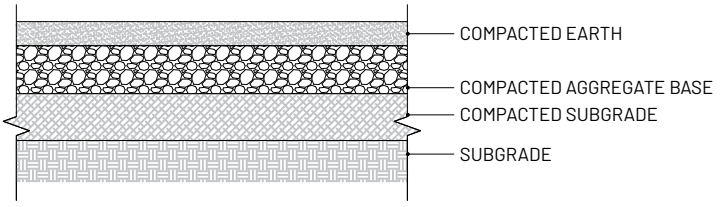
CONCRETE



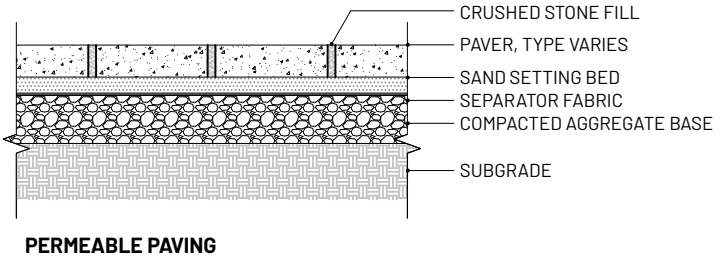
ASPHALT



STONE FINES + DECOMPOSED GRANITE



COMPACTED EARTH



PERMEABLE PAVING

PAVING EXAMPLES

Figure 43. Paving types are not limited to those above and vary based on the intended use. Paving material thicknesses and sub-base dimensions vary according to use. Any geotechnical conditions should be studied and reviewed by a licensed State of California Civil engineer.
Source: All images OLIN, 2019.

USED FOR

- Maintenance and service roads
- Bicycles
- Pedestrians
- Equestrians (must be rough brushed)

- Maintenance and service roads
- Bicycles
- Pedestrians

- Pedestrians

- Maintenance and service roads
- Equestrians

- Pedestrians
- Gathering spaces

PAVING MATERIALS

There is no single perfect material for trails along the LA River. Cyclists perfect smooth continuous surfaces such as asphalt or concrete whereas pedestrians typically prefer more forgiving surfaces such as bonded stone fines and equestrians a larger aggregate.

When possible, these "ideal" surfaces should be used; however, all design conditions, material thicknesses/assemblies, and colors should be reviewed by design professionals for site specific considerations. Additionally, paving has the potential to feature artwork.

Concrete: A durable paving material that consists of aggregate and cement over a compacted aggregate base. Suitable for maintenance roads and bicycle and pedestrian trails.

Asphalt: Durable and relatively inexpensive paving material that consists of aggregates held together by asphalt cement over an aggregate base. Can withstand heavy loads of a maintenance vehicle, while also being a suitable material for bicycle trails. A light-colored, low VOC warm mix must be used to offset the urban heat island effect.

Stone Fines and Decomposed Granite (DG): A stable, natural-looking paving material consisting of crushed rock that can be found in a variety of different colors and granular sizes. A larger granular size is recommended, as fine DG becomes slippery when wet. Where erosion is a concern, DG should be protected with a resin-binder and should not be used on sloped areas greater than 3% unless a drainage system is installed.

Compacted Earth: This inexpensive method should be primarily used for equestrian trails when no other option is available since erosion and wear can be a maintenance problem. Care should be taken to stabilize the path with a well-graded aggregate base.

Permeable Paving: Crushed stone fill between paving, or open, coarse aggregate held together by asphalt concrete or cement. Problems can occur with silting which reduces permeability if surfaces are not cleaned and maintained regularly to allow maximum water percolation.

WHERE TO SITE FENCES, GUARDRAILS, AND RAILINGS

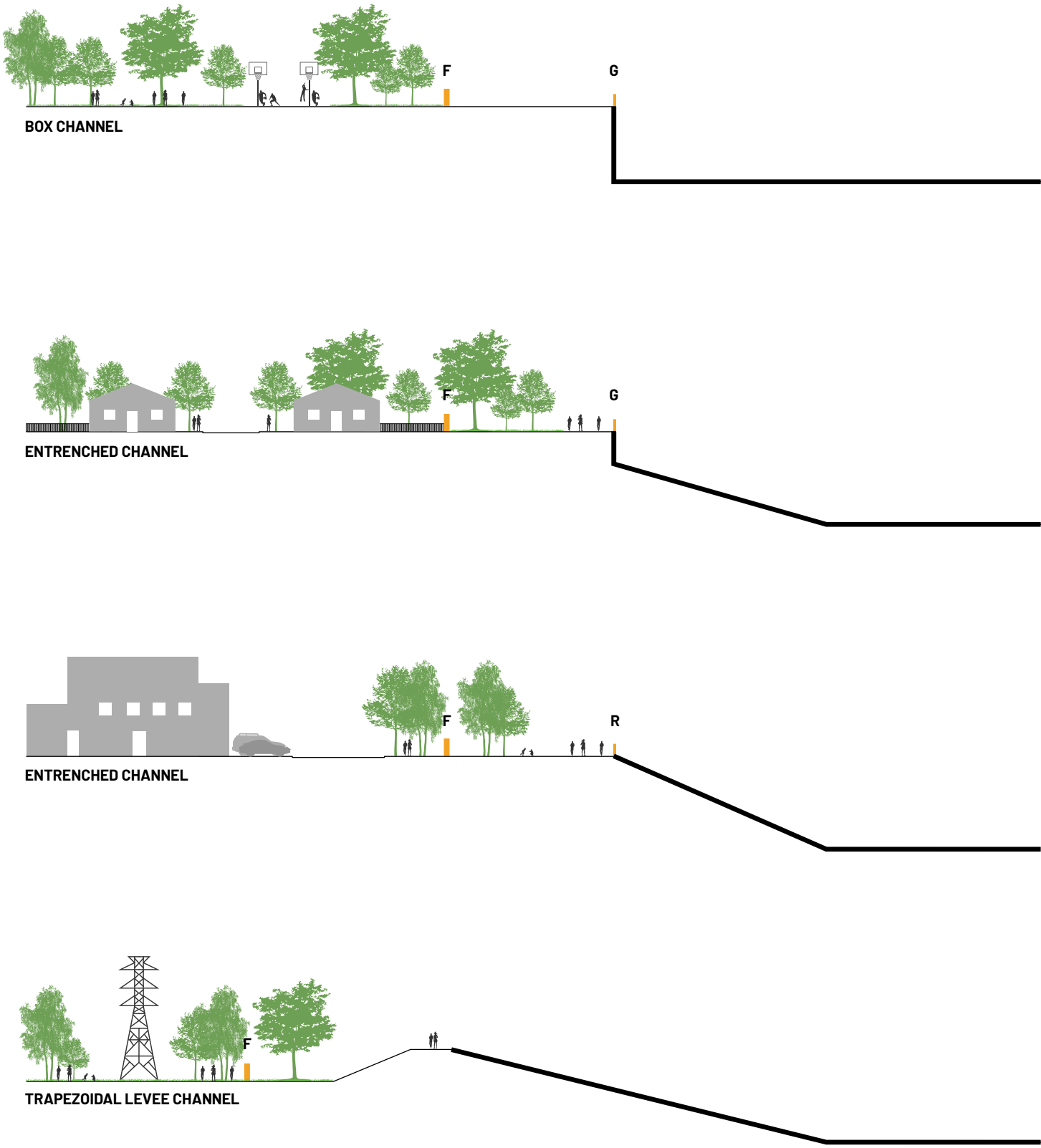


Figure 44. **Fences, guardrails, and railings should be utilized in the correct locations along the river. These locations are dictated by channel characteristics, user access, adjacent land uses, and programming.**

FENCES, GUARDRAILS, RAILINGS, AND GATES

Use of the river corridor for public activities requires the re-evaluation of fencing in terms of function, aesthetics, and the perception of safety vs. real hazard. Fences to keep the public away from the channel are not applicable to an open space corridor, except where public safety is a concern.

In some areas along the LA River, vertical drops require guardrails for fall protection. In other areas, a simple railing may be recommended where steep slopes are adjacent to paths of travel. Opportunities exist to provide the appropriate type of fencing for a variety of proposed recreational uses and to remove fencing that is redundant or does not meet a multi-objective approach to river management. This includes situations that utilize a fence to disconnect the river from adjacent parks and other public open spaces rather than provide the parks an opportunity to function as part of the river corridor by gating the park entrance.

The reduction of fencing along the LA River is reliant on:

- The reduction of public hazards
- The implementation of other types of buffers and barriers
- Safety/warning notification system including a comprehensive environmental graphics system (see Chapter 4)

Safety from flood waters is critical along the LA River. Flood channels within LA County are gated for public safety, so that access can be prohibited during flood conditions. Gates are to be placed at access points and major arterials and are to be connected to adjacent fencing. Vehicular and pedestrian gates must have the ability to close and lock. The design of new projects should maintain a level of safety while promoting a welcoming and connected open space river corridor.

FENCE, GUARDRAIL, RAILING, AND GATE DEFINITIONS

Fence: A barrier for public safety along LA County watercourses at least 60 inches high off the adjacent surface.

Guardrail: A barrier at least 42 inches high near the open sides of elevated surfaces that minimizes the possibility of a fall. Guardrails should follow the latest code and ADA requirements (such as restrictions on openings).

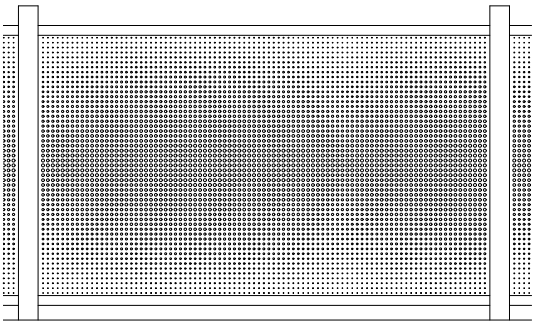
Railing: A barrier that separates trail uses or provides a visual separation but is not required by code.

Gate: An aperture along a fence to provide access while maintaining public safety.

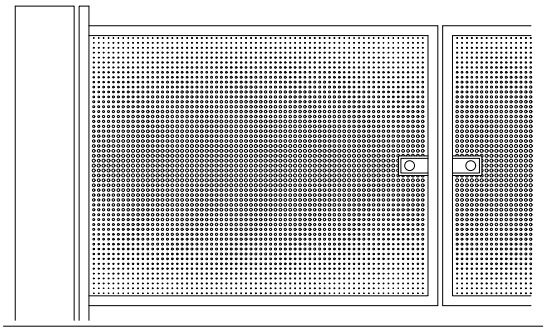
Figure 45. The terms above are defined as used in this document.

FENCE OR GUARDRAIL TYPOLOGIES

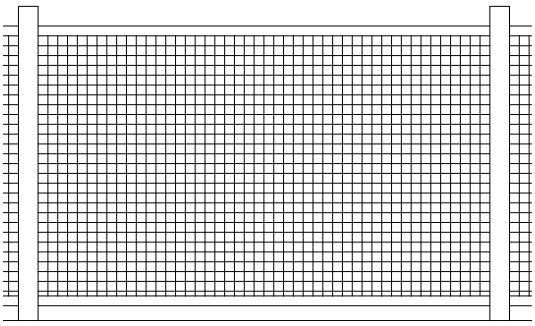
CORRESPONDING GATES



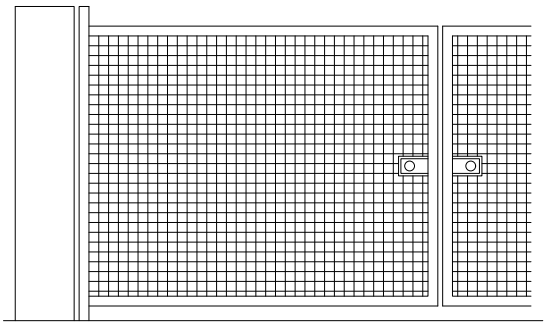
CUSTOM METAL



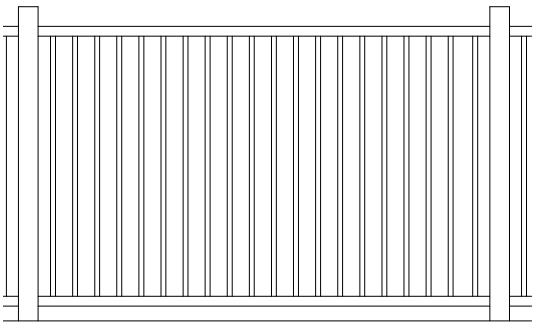
CUSTOM METAL GATE



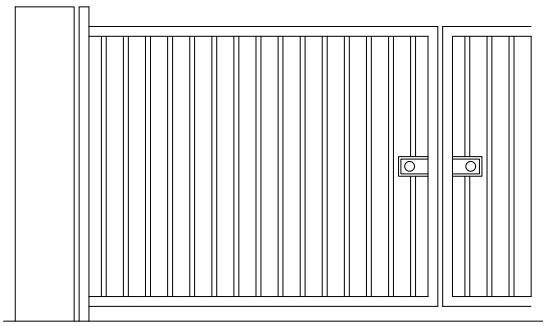
WELDED WIRE



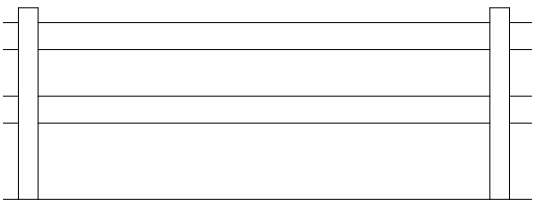
WELDED WIRE GATE



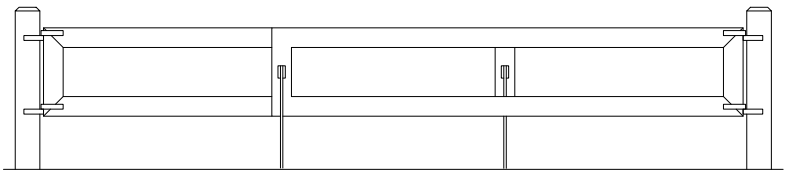
TUBULAR STEEL



TUBULAR STEEL GATE

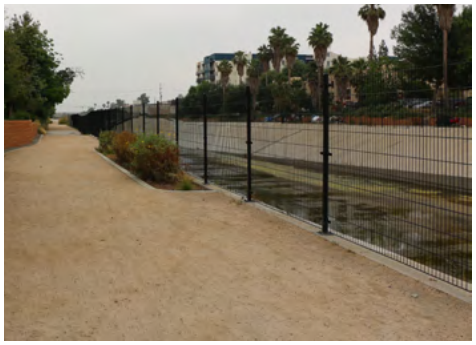


LODGEPOLE SPLIT RAIL (FOR TRAIL SEPARATION)



EQUESTRIAN GATE

Figure 46. Fence, guardrail, or gate type is determined by location on the river and the intended use.

FENCE EXAMPLES	USED FOR
	• Prominent trail access points • Gateways • Statement art piece
	• Adjacent to Channel • Adjacent to Parks
	• Adjacent to Channel • Adjacent to Parks
	• Maintenance and service roads • Equestrian trails • Trail dividers

MINIMIZE THE USE OF CHAINLINK FENCING AND DO NOT USE IN HIGH-VISIBILITY AREAS

Figure 47. Fence types along the LA River vary due to intended uses and adjacent elements. Source: (Top) OLIN/ Sahar Coston-Hardy, 2013. All other images OLIN, 2019.

GATEWAYS ARE PLACED ALONG THE RIVER AT KEY MOMENTS WHERE MAJOR ACCESS POINTS, ADJACENT PROGRAMMING, AND LA RIVER COMMUNITIES INTERSECT

GATEWAYS

Gateways represent instances along the river to welcome, inform, and allow users to utilize the LA River Trail. They are access points at key moments along the river, and are usually identified by a visual marker, either through a large specimen tree, environmental graphics (see Chapter 4), or another kind of community artwork or cultural expression. Gateways call attention to the presence of the river and the access through their design and can also provide educational opportunities for visitors. While all gateways are access points, not all access points are gateways. Typically, gateways are placed along the river at moments where major access points, adjacent programming, and LA River communities intersect. Gateways represent a great opportunity to connect adjacent communities to the river and create a neighborhood identity based on the LA River.

There are three different scales of gateways that can be implemented depending on site conditions. All of the gateways must include the following items, no matter the type:

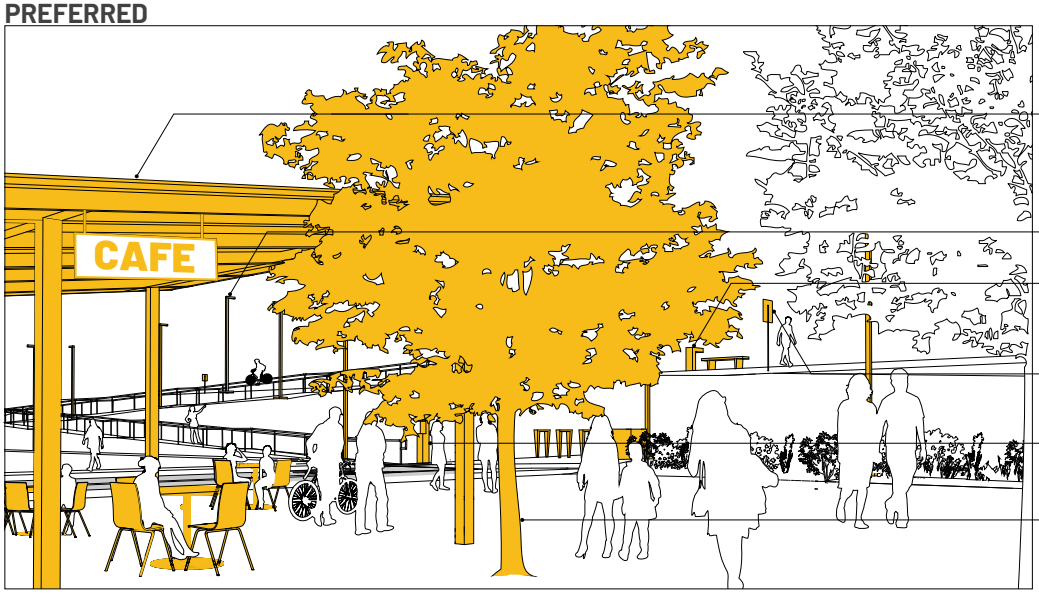
- Ample lighting for safety
- ADA accessibility
- Environmental graphics

Preferred
Preferred gateways have a large or eye-catching visual maker and a gracious entrance (landside right-of-way larger than 17'). They include the most complete suite of amenities, including but not limited to, a Tier II or III river pavilion (see Chapter 6), environmental graphics (see Chapter 4), and native planting and specimen or shade trees (see Chapter 5).

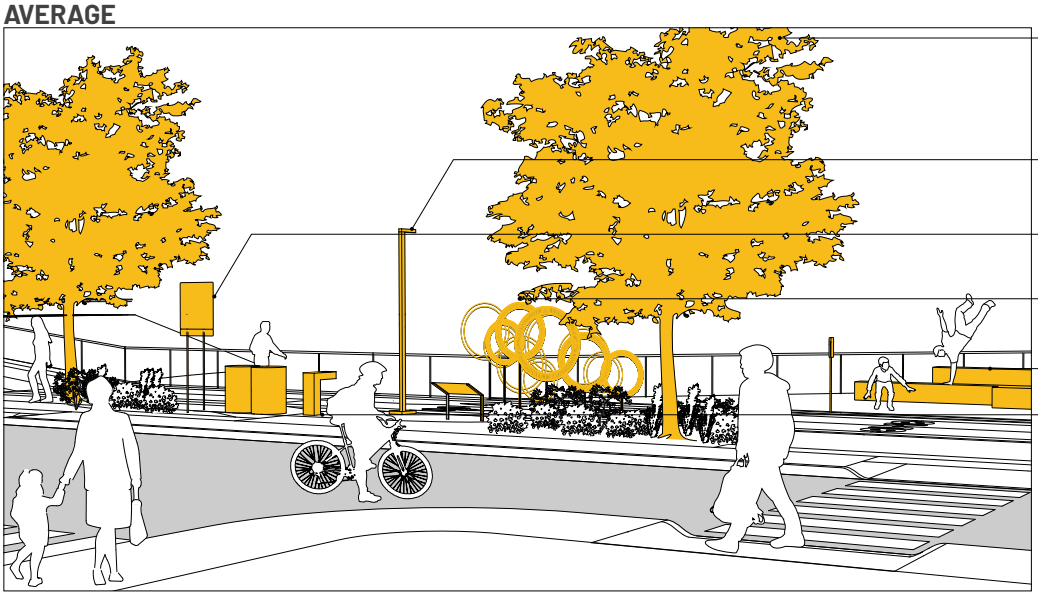
Average
Average gateways include a distinctive visual marker or artwork at its entrance and occur in areas that have a narrower landside right-of-way than the preferred gateways (approx. 12'-17'). These gateways can include a Tier I river pavilion (see: Chapter 6), artwork, stormwater BMPs, and a native vegetation buffer to designate the LA River access point.

Minimum
The minimum gateways provide an enhanced access point to the LA River in narrow landside right-of-way. Environmental graphics are often the primary visual markers for these gateways, and allow users to locate themselves on the river and educate themselves about different facets of the river. These gateways can also include site furnishings, stormwater BMPs, and a native vegetation buffer to welcome users to access the river.

PREFERRED



AVERAGE



MINIMUM (NARROW)

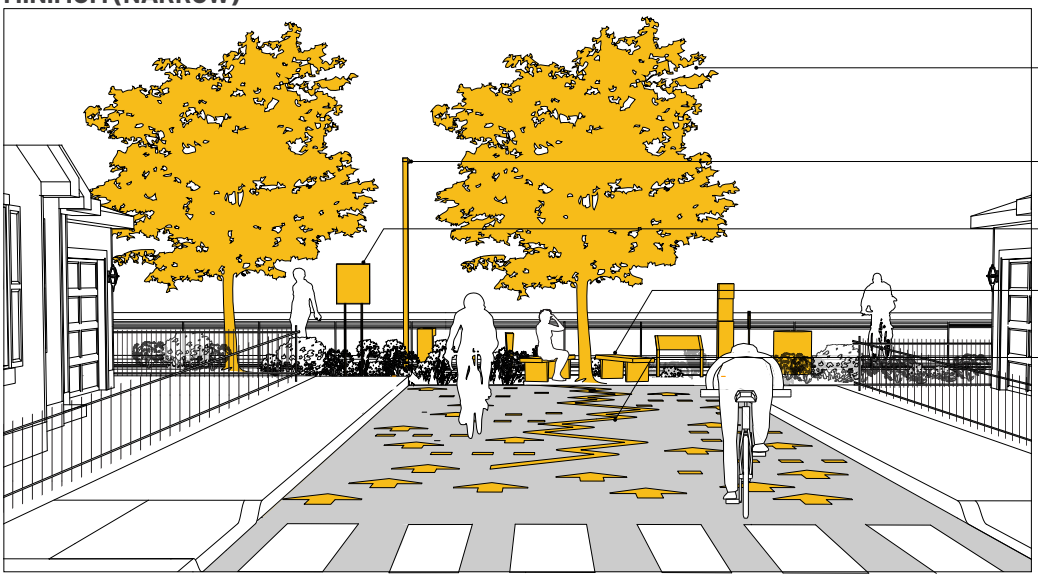


Figure 48. Gateway conditions vary depending on the space available. Gateways signify entrances to the LA River Trail and vary from trail access points with clear environmental graphics and minimum site-specific amenities to access points with pavilions and programming.

TRAIL INTERSECTIONS SHOULD BE CAREFULLY CONSIDERED IN THE DESIGN OF BRIDGES TO ENSURE SEAMLESS CIRCULATION BETWEEN DIFFERENT KINDS OF USERS

BRIDGES

Connectivity across the LA River is just as important as connectivity along it. Where feasible, bridges should be implemented to connect all users to the river and the adjacent neighborhoods. While the overall look and structure of these bridges will be different based on the location and intended use, there are certain elements that should be present in all instances.

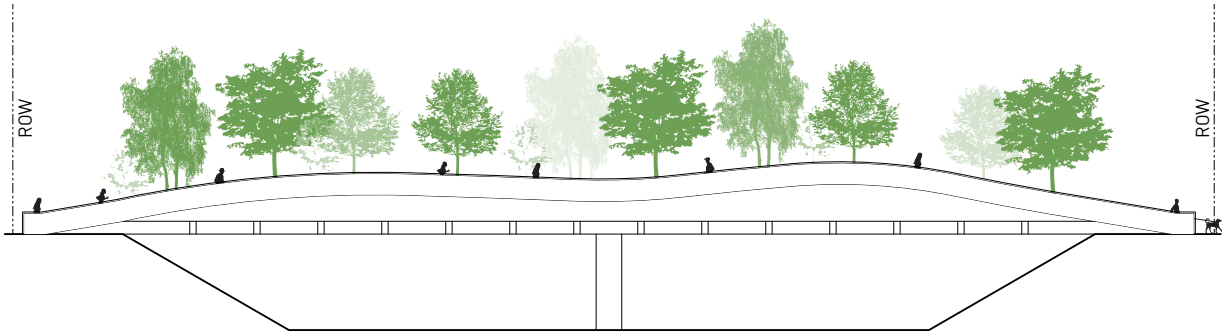
Ideally, a bridge would be able to connect all users of the LA River corridor, including habitats and animals. Where the construction or investment of a land bridge is not possible, equestrian, bicycle, and pedestrian trails should be connected across the river. At a minimum, bicycles and pedestrians should be able to cross to enjoy amenities and destinations along both sides of the river. Guardrail heights should follow the standards put forth in the applicable codes as stated in the LACFCD Permitting Checklist in Chapter 2.

Wherever a bridge is implemented, connections to the correct trail systems and users is paramount. Trail intersections should be carefully considered in the design of bridges to ensure seamless circulation between different kinds of users. For example, when building an equestrian bridge, that bridge should connect users to a corresponding equestrian trail. In all instances of crossing, ample environmental graphics and striping must be included to warn users of a crossing. The specific design, materiality, and form of each bridge should be developed for intended use and on a project-by-project basis. Bridges also provide an opportunity for artwork.

All bridge proposals should be studied for hydraulic impacts on the flood capacity of the channel and shall aim to convey at a minimum the 1% annual chance flood event, including freeboard. Bridge height and width should also consider future climate and channel condition.

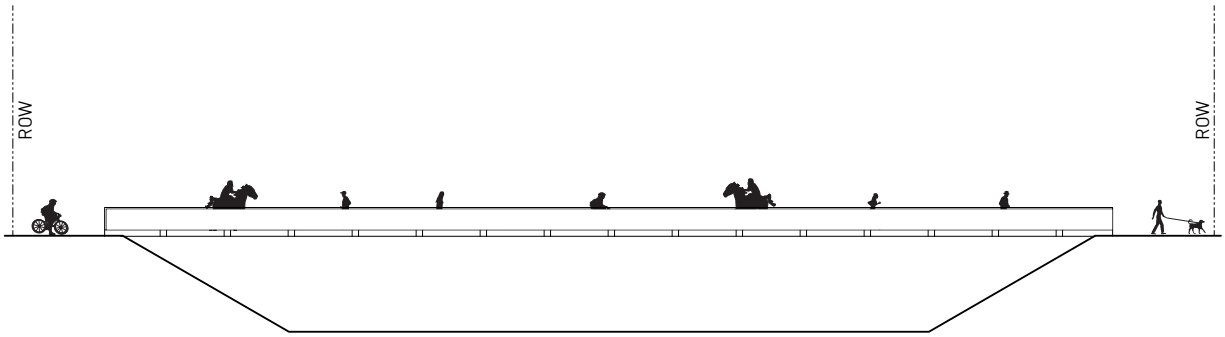
BRIDGE TYPOLOGIES

PREFERRED



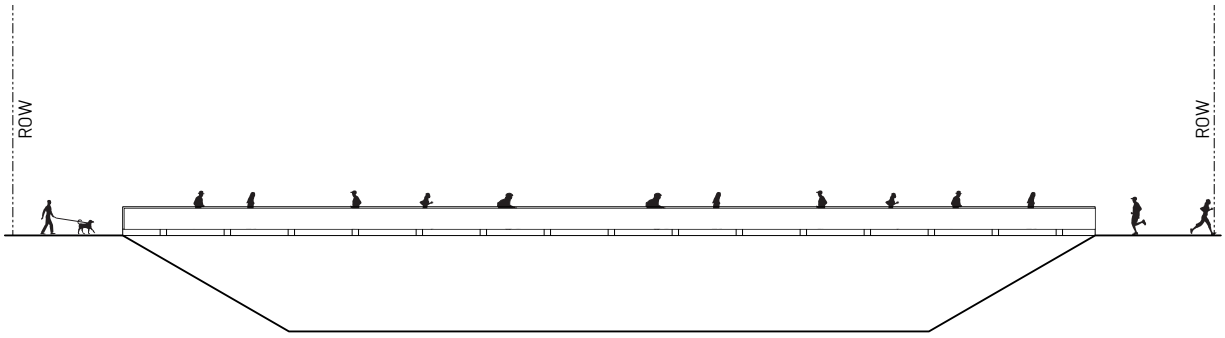
LAND BRIDGE/HABITAT CONNECTIONS + MULTIUSE TRAIL BRIDGE

See Figure 50 on page 90.



MULTIUSE TRAIL BRIDGE

See Figure 51 on page 90.

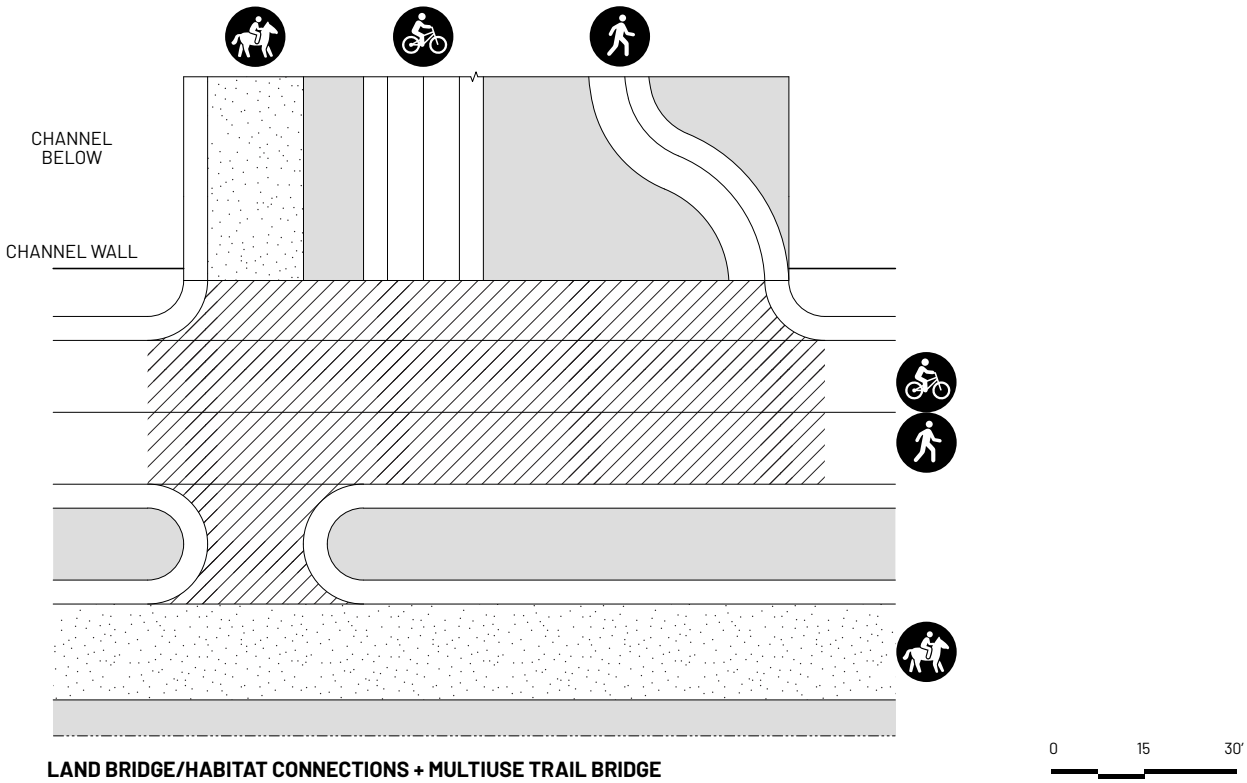


PEDESTRIAN + BIKE TRAIL BRIDGE

See Figure 53 on page 91.

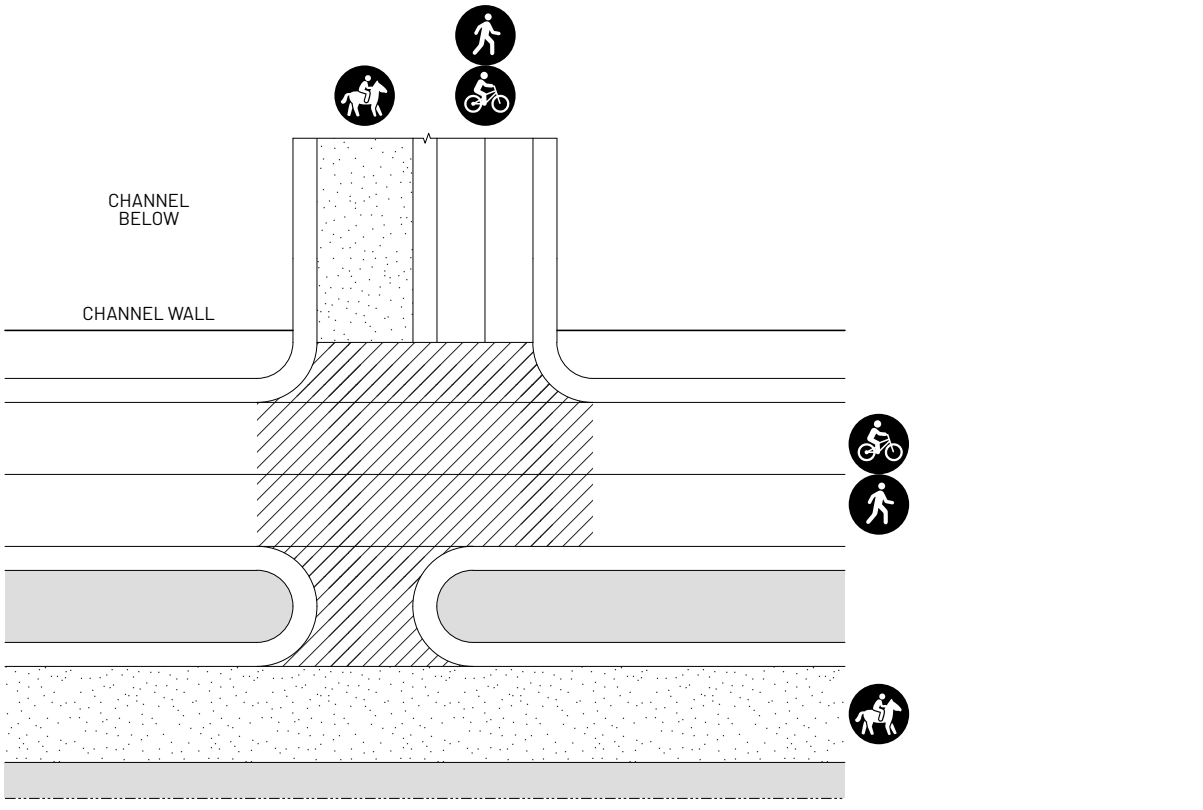
MINIMUM

Figure 49. Bridge crossings are unique to the use of the bridge. The design, materiality, and form of each bridge should be determined based on the intended use. All bridge proposals shall be studied for hydraulic impacts on the flood capacity of the channel.



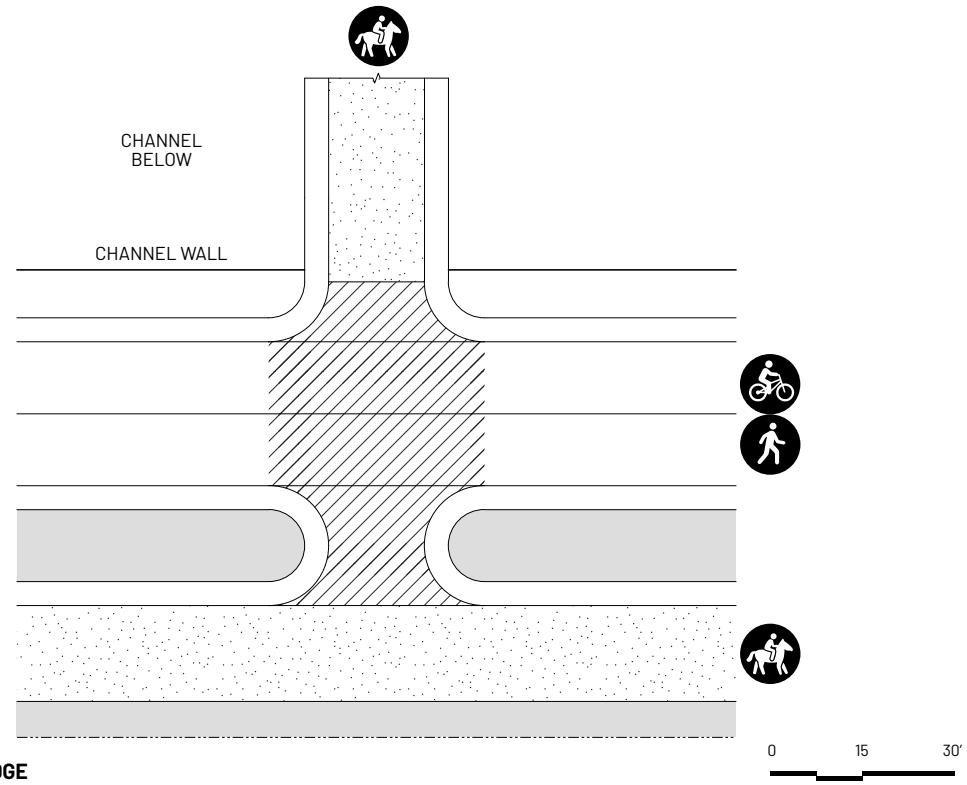
LAND BRIDGE/HABITAT CONNECTIONS + MULTIUSE TRAIL BRIDGE

Figure 50. **Land bridges create habitat and movement opportunities through varied planting and topography. Pedestrian, bicycle, and equestrian paths should be a minimum of 12' wide between railings. When possible, slope bridge paths to a maximum of 5%. If sloped up to 8.33% or more, provide landings and railings as per ADA requirements for accessible ramps. Cross-slope should be a maximum of 2%. Use clear centerline striping and environmental graphics, developed with a project's specific needs, to warn trail users of a bridge crossing and provide a clear connection to equestrian trail.**



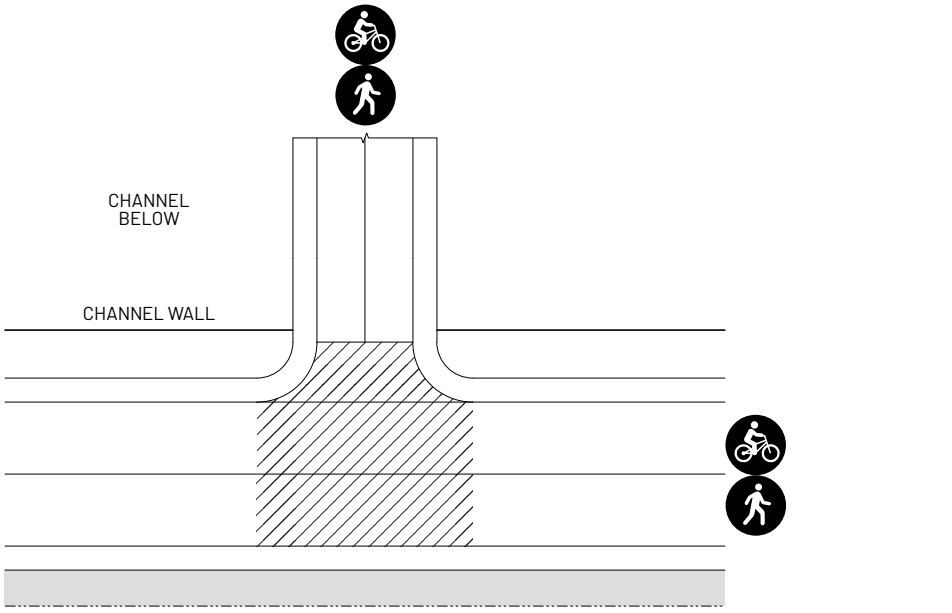
MULTIUSE TRAIL BRIDGE

Figure 51. **Pedestrian, bicycle, and equestrian paths should be a minimum of 12' wide between railings. When possible, slope bridge paths to a maximum of 5%. If sloped up to 8.33% or more, provide landings and railings as per ADA requirements for accessible ramps. Cross-slope should be a maximum of 2%. Use clear centerline striping and environmental graphics, developed with a project's specific needs, to warn trail users of a bridge crossing and provide a clear connection to equestrian trail.**



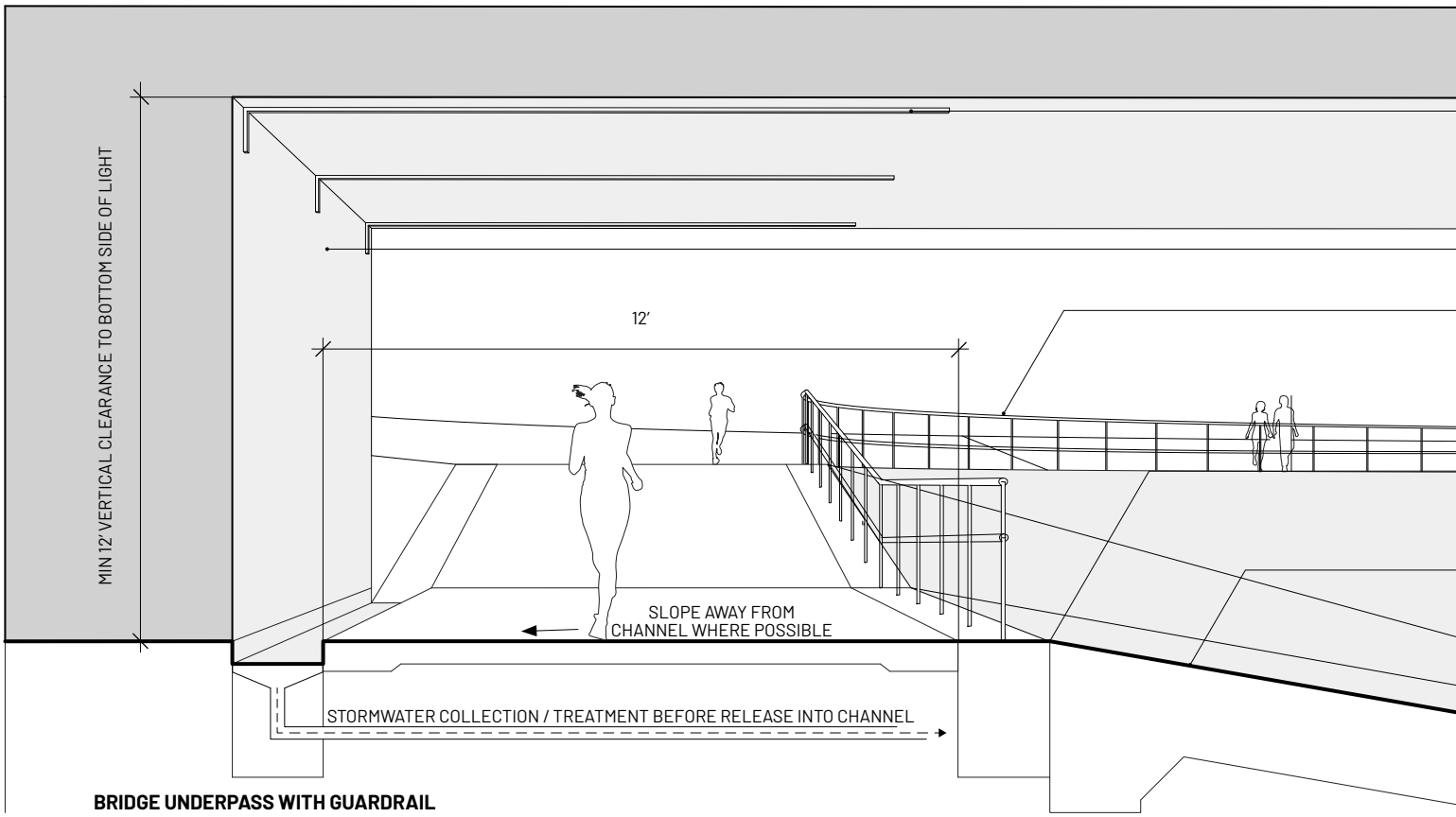
EQUESTRIAN TRAIL BRIDGE

Figure 52. Equestrian bridge to be a minimum of 12' wide between railings. When possible, slope equestrian bridge paths to a maximum of 5%. If sloped up to 8.33% or more, provide landings and railings as per ADA requirements for accessible ramps. Cross-slope should be a maximum of 2%. Use clear centerline striping and environmental graphics, developed with a project's specific needs, to warn trail users of a bridge crossing and provide a clear connection to equestrian trail.



PEDESTRIAN + BIKE TRAIL BRIDGE

Figure 53. Pedestrian and bicycle paths should be a minimum of 12' wide between railings. When possible, slope bridge paths to a maximum of 5%. If sloped up to 8.33% or more, provide landings and railings as per ADA requirements for accessible ramps. Cross-slope should be a maximum of 2%. Use clear centerline striping and environmental graphics, developed with a project's specific needs, to warn trail users of a bridge crossing.

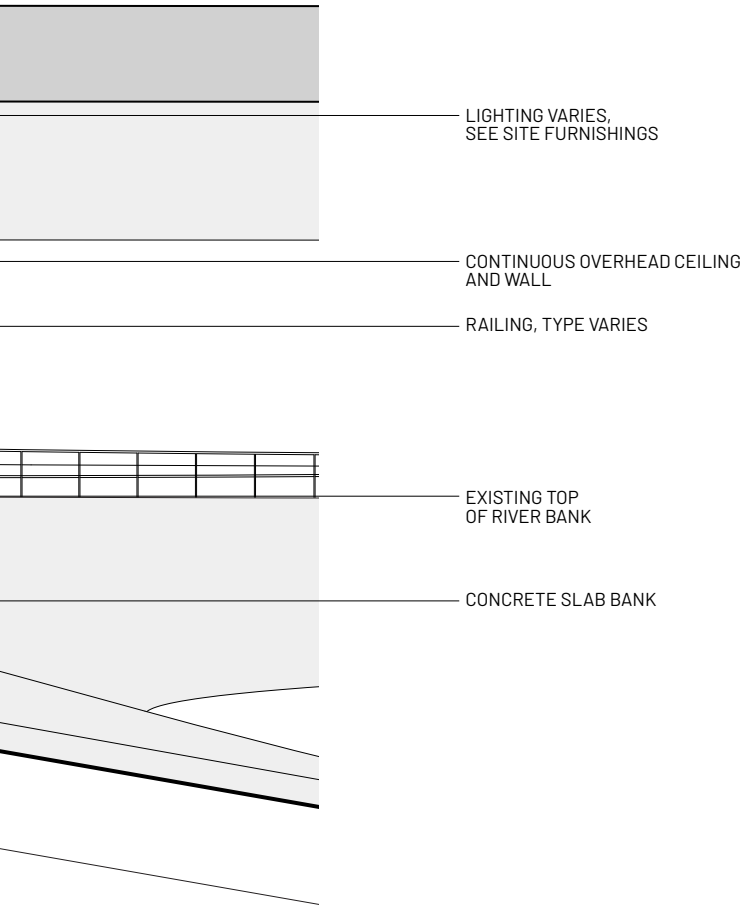


BRIDGE UNDERPASS WITH GUARDRAIL

Figure 54. Lighting, safety, grading, and opportunities for art are key design considerations at underpass locations.

0 1 2 4'

THE SLOPE OF THE TRAIL AT ANY UNDERPASS OR OVERPASS SHOULD BE BETWEEN A MAXIMUM OF 5-8%, WITH LANDINGS PER ADA REQUIREMENTS



RIVER TRAIL BRIDGE UNDERPASS

Trails that run parallel to the river often pass under or over existing or proposed bridge crossings. At these crossings, the slope of the trail at any underpass or overpass should ideally be less than 5%, but no more than 8.33%. The trail should follow the standards outlined in the multiuse trails section. It may be necessary to separate users from the river with a guardrail depending on the riverside condition and local jurisdiction requirements. Ample lighting must be provided in all underpass conditions to ensure visibility and to create a safe trail experience. Opportunities for art can also be considered to create a bright and welcoming space. Where possible, stormwater treatment should be included so that the trail slopes away from the river so that any rainfall drains to a shallow gutter that runs along the bridge footing. This allows for water to be transferred to a treatment location before being released back into the river. Special consideration can be given for underpasses with tight right-of way conditions.

All underpass conditions shall be designed with continuous surfaces, without notches above and on the side, to prohibit the use of the spaces between structural members.

ACCESS AND MOBILITY CHECKLIST

Reference the LACFCD and Public Works Permitting checklist on page 36 for an overview of project permitting and applicable codes.

Detailed Technical Requirements Checklist for Access and Mobility

Trail Assembly

- ☐ Connect all trails to the LA River trail system as outlined in the LA River Master Plan 2020 Update.
- ☐ Slope all trails at a maximum of 2% away from the river to encourage runoff collection.
- ☐ Slope all trails, where feasible, into a vegetated area that is designed to collect, retain, and infiltrate stormwater runoff.

Paving

- ☐ Do not use dark surfacing, such as black asphalt, along the trail as it intensifies the urban heat island effect.
- ☐ Only use low VOC, warm mix asphalt when asphalt surfacing is specified.

Fences and Gates

- ☐ Use the correct type of fence, guardrail, or railing for the location.
- ☐ Where possible, do not use chain link fencing anywhere on the river. Chain link fencing should not be used in highly-visible areas/
- ☐ Treat all metal fencing with corrosion-resistant coatings such as powder coating. Special attention should be paid to mitigate zinc-leaching materials.

Access Points

- ☐ All access points must have the following:
  - Lighting see Chapter 6
  - Environmental graphics Chapter 4
- ☐ Where feasible, add or relocate bus stops to existing or proposed river trail access points.

Gateways

- ☐ All Gateways must have the following:
  - Lighting see Chapter 6
  - ADA access
  - Environmental graphics see Chapter 4
- ☐ Tier III gateways should include the following:
  - Vegetation buffer
  - Community expression or art
  - River Pavilion see Chapter 6

Bridges

- □ Bridges should be a minimum of 8' wide.
- □ Slope bridge path up to a maximum of 5% on main paths.
- □ Use environmental graphics to warm users of trail and bridge intersections.
- □ Connect bridge paths of travels to appropriate multiuse trails. (For example, connect equestrian bridges to adjacent equestrian trails).

Underpasses

- □ Allow a minimum 10' clearance at underpasses.
- □ Add lighting to ensure visibility.
- □ Design smooth straight surfaces along underpasses, without notches, to prohibit the use of the spaces between structural members.
- □ Add art or community expression to underpass walls (if required).

Detailed Maintenance Program Checklist for Access and Mobility

Paving

- □ Inspect paving on a regular schedule for cracks, potholes, or erosion.

Fences and Gates

- □ Inspect fencing and guardrails for vandalism or weathering.
- □ Reduce use of fencing and deploy only where necessary for safety.

Gateways, Bridges, and Underpasses

- □ Identify inspection requirements for gateways, bridges, or underpasses.
- □ Treat materials to deter graffiti and vandalism.

Figure 55. Environmental graphics help to define river gateways, as shown in this Shade Pavilion example at river mile 14.7.

4.
ENVIRONMENTAL GRAPHICS

ENVIRONMENTAL GRAPHICS ALONG THE RIVER PROMOTE ACCESSIBILITY, SAFETY, AND COMMUNITY EXPRESSION

The Environmental Graphics Guidelines for the 2020 LA River Master Plan Design Guidelines have been developed with a common set of values for their design and proposed use. These guidelines create a framework for consistent wayfinding and promote a unique identity for the LA River. They aim to be accessible to all. Legibility and graphic clarity are critical for the success of all wayfinding elements. The sign designs detailed in this chapter have a simple, timeless aesthetic while allowing for community expression and art at gateways and other special instances. Environmental graphics can be integrated, where appropriate, into the design of architecture and public art rather than consisting exclusively of stand-alone signs. Wayfinding from bike routes and pedestrian streets is also crucial for directing people to the river itself. The programmed sequence, placement, and content of information conveyed through wayfinding elements should be carefully calibrated using established environmental graphic design 'best practices' to optimize clarity and avoid visual clutter as pedestrians or cyclists approach and enter the LA River right-of-way.

WHAT'S IN THE CHAPTER

There are eight categories of environmental graphics: informational, regulatory, confirmation, interpretive signs and displays, directional, mile markers, pavement markings, and large scale icon graphics. This chapter includes a suite of LA River environmental graphics which outlines which categories are required at a minimum for different scales of projects (XS-XL, as defined in the Chapter 1 programming section and the 2020 LA River Master Plan Update) at various distances leading to and within the site. Further, there is a permitting matrix that identifies what features each category should or should not have, such as which environmental graphics should always be bilingual.

Wayfinding signs must comply with the Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD) guidelines. All mile markers must use the 51-mile river mile numbering system with the mouth at river mile 0, and the headwaters at river mile 51.

Figure 56. Chapter 4 of this document covers items related to environmental graphics that are present on and along the LA River.

STANDARD DESIGN FEATURES

All environmental graphics share common design features such as the terminology for the "LA River", the heron logo and icon, the use of open-source Barlow font, and the recommended high contrast background to text color ratio. Accessibility, legibility, and compliance with the American with Disabilities Act (ADA) are baseline criteria to be followed by environmental graphics. Further, symbols for amenities or trails should be consistent across all environmental graphics, and should be an MUTCD symbol if one exists for the amenity depicted.

ACCESSIBILITY

Various best practices guide the suite of environmental graphics to make them legible and meaningful to all users along the LA River. It is important to consider the design of multi-modal environmental graphics. Designs that engage only one sense, such as sight, limit the audience's experience. Best practices for accessible design consider the ranges of eyesight, hearing, touch, and cognition, for example, difficulty with distinguishing sounds from background noises or difficulty focusing or staying on task. The inclusion of braille or audio components to environmental graphics is encouraged and should be considered on a project by project basis.

Americans with Disabilities Act (ADA) Sign Guidelines

ADA requirements generally apply to environmental graphics along routes that are designated as a path of travel. It is important to reference the latest ADA requirements as they are updated over time.

ADA requirements for the minimum type size on a sign are determined by how high the sign is hung off the ground and how close a viewer can approach and read it. For example, if a sign is hung between 40 inches and 70 inches off the ground, and the viewer can approach within six feet of it, the minimum size of the type, which is based on the height of a capital letter "I", should be 5/8 inch. For every additional foot beyond six feet that a viewer cannot approach the sign, the size of the font needs to increase by 1/8 inch. Visual characters should not be any lower than 40 inches from the ground. ADA requirements for single or double posts for freestanding signs depends on the placement of the sign along a path of travel, the height it is hung, and the amount the sign overhangs each post. For example, a sign that has overhangs a single post more than 12 inches should have two posts and be hung a maximum of 27 inches or a minimum of 80 inches off the ground.[16] Always check the latest requirements.

Contrast and Color

Many individuals experience color differently, and the least variance in human perception of color is in tonal contrast. Maintaining sufficient tonal contrast is important for accessible communication of information in environmental graphics.[17] See page 103 for the required background color (to be used against white) and for the recommended contrast ratio.

Language

The LA River travels through many diverse neighborhoods. Primary languages spoken by adjacent neighborhoods must be considered when creating bilingual environmental graphics. Languages such as, but not limited to, Spanish, Chinese, Khmer, Tagalog, Russian, or Korean are all examples of languages that can be used for translations of environmental graphics. Symbols and clear graphic design can also be used for communication without the need for translations. The following should be considered for bilingual signs:

- In order to better differentiate between different languages on the same sign, varying text weights is recommended. In some cases, English text will appear in bold, with the translated text at a thinner font weight either next to or below the English text. This will help the viewer to more easily and quickly digest the content that is intended for them.
- Translated text should appear in the same font and color of the English text. Where non-Latin fonts are used, choose a font that is clear and simple with no serif or no stylistic modifications (Google Noto Fonts is recommended and available for free in over 75 non-Latin languages)
- Translations should be proofread by native speakers of the language and/or community members before use.

CHARACTER HEIGHT REQUIREMENTS

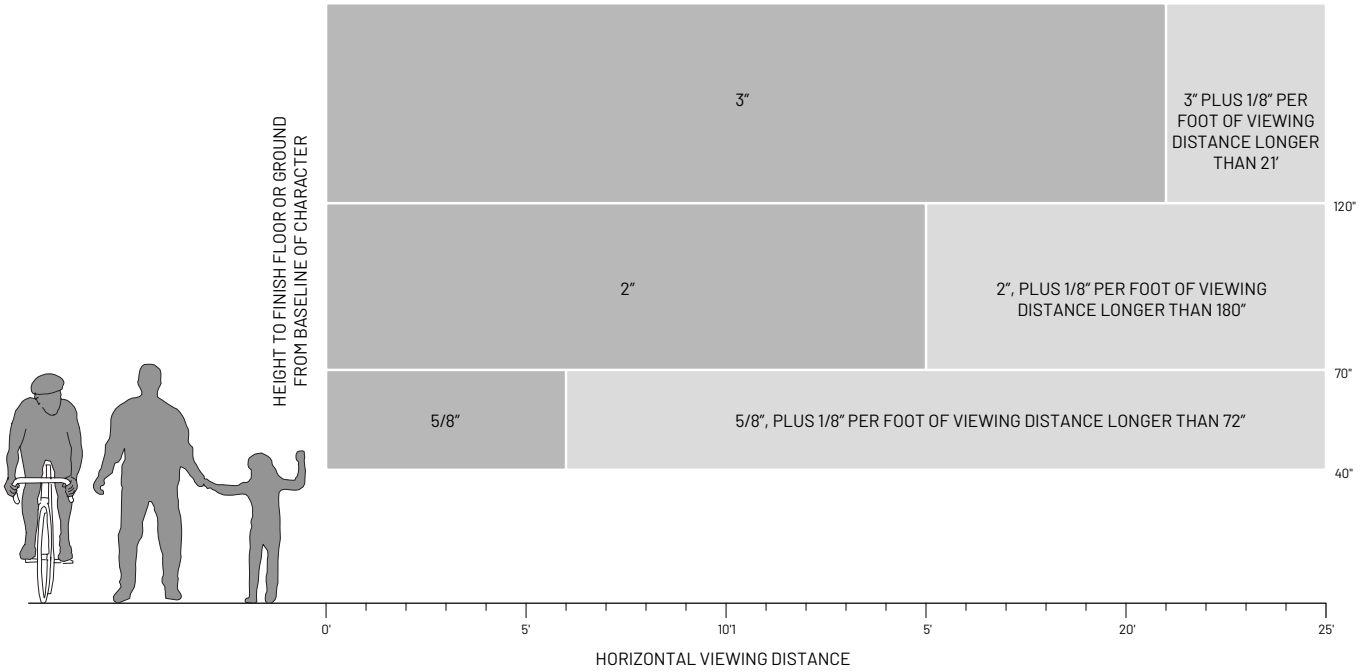


Figure 57. Character height required for ADA accessibility is based on horizontal viewing distance. Designers should check the latest ADA standards for updates. Source: Standards from U.S. Department of Justice. (2010). 2010 ADA Standards for Accessible Design. Washington, DC: U.S. Department of Justice.

SIGN POST REQUIREMENTS FOR OVERHANG ON CIRCULATION PATHS

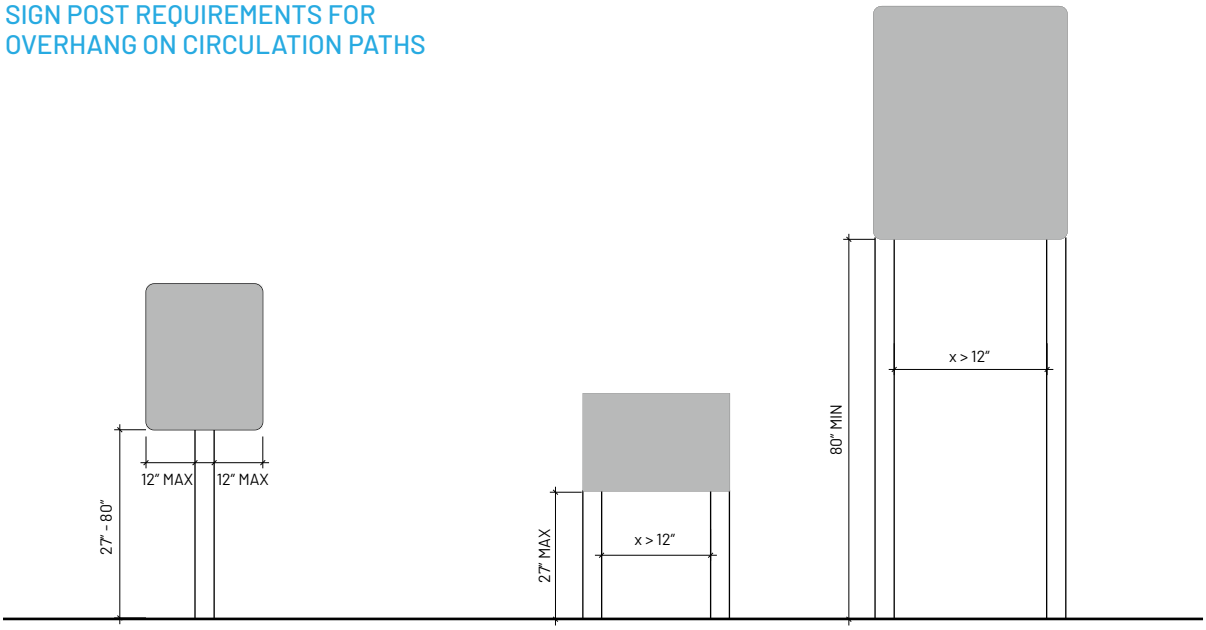


Figure 58. Single or double posts are required for signs directly overhanging on circulation paths depending on the height they are hung and the amount of sign protruding beyond the post. Designers should check the latest ADA standards for updates. Source: Standards from U.S. Department of Justice. (2010). 2010 ADA Standards for Accessible Design. Washington, DC: U.S. Department of Justice.

- Translations should always appear on the same sign as the English text.
- Where feasible, use standardized or universal symbols to communicate without the need for text translations.

Symbols

For consistency, symbols for trail use or other amenities should follow the symbols used Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD). Reference the latest MUTCD documents as updates are incorporated over time. In cases where the symbol needed is not available from MUTCD, a new symbol can be designed but should be similar in style and weight as MUTCD symbols.

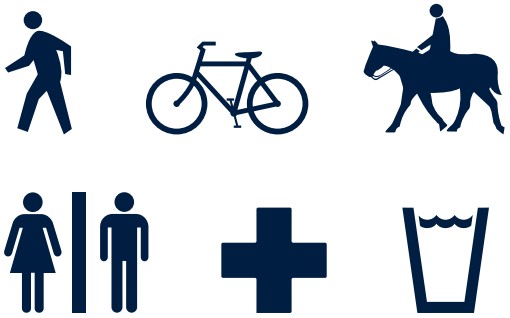


Figure 59. Manual on Uniform Traffic Control Devices (MUTCD) symbols, such as the ones for pedestrians, cyclists, equestrians, restrooms, first aid, and drinking water, should be used on signs where possible. Source: 2009 MUTCD Edition with Revisions 1 and 2, 2012.

Icon and Logo

To reinforce an identity for the LA River, the heron graphic and icon should be used consistently. The icon of the heron on a riverbank within a circle should be used wherever a logo for the LA River is needed. This is useful when many logos are aligned in a row, or where there is limited space on a sign. The heron graphic is suited for large scale environmental graphics and other identifying environmental graphics, such as Informational Signs.

Additionally, the term "LA River" is to be used on all environmental graphics instead of "Los Angeles River" or "L.A. River".

Figure 62. When a symbol is needed that is not available from MUTCD, another symbol in a similar style and weight to MUTCD standards should be used. Examples include of symbols for gender-neutral restrooms, river crossings, a river confluence, and wetlands. Source: (Left) Title 24 of the California Code of Regulations, California Building Code, 2016; all other symbols River LA.

Figure 60. The heron icon should be used when a logo for the LA River is needed, such as on a sign. Source: Edited for the LA River Master Plan, 2020 from the LA River Sign Guidelines, 2003.

Figure 63. The heron graphic should be used for large scale environmental graphics or other identifying environmental graphics. Source: LA River Master Plan, 2020.

LA RIVER

Figure 61. The terminology and font on all environmental graphics should be "LA River" in Barlow.

Font
All fonts to be used in the LA River Environmental Graphics should be Barlow, an open-source font. Exceptions are allowed for large scale icon graphics and other artwork. While Barlow does offer a wide range of different styles, semi-bold through black thicknesses offer the easiest readability and are the recommended styles.

Colors
White and Pantone 282 C are the primary colors of all signage and environmental graphics in the LA River guidelines. The color contrast between the selected blue and white is 16:1, well above the suggested minimum of 7:1. Color matching of Pantone 282 C across all fabrication is the responsibility of the fabricator, and is important to maintain consistency through the whole suite.

BARLOW STYLES

THIN
THIN ITALIC
EXTRA-LIGHT
EXTRA-LIGHT ITALIC
LIGHT
LIGHT ITALIC
REGULAR
REGULAR ITALIC
MEDIUM
MEDIUM ITALIC
SEMI-BOLD
SEMI-BOLD ITALIC
BOLD
BOLD ITALIC
EXTRA-BOLD
EXTRA-BOLD ITALIC
BLACK
BLACK ITALIC

PANTONE 282 C

WHITE

STANDARD FEATURES OVERVIEW

- Background Color: Pantone 282 C and white
- Font: Barlow
- Contrast Ratio: 7:1 minimum
- Heron: Use required icon for logos. Use required graphic for other environmental graphics
- Symbols: Use MUTCD symbols where one exists
- Nomenclature: Always use "LA River"

Figure 64. Barlow is an open-source typeface designed by Jeremy Tribby and is available from Google Fonts. "Semi-bold" through" black" thicknesses are recommended for environmental graphics intended to be read from a distance or while traveling at a fast speed.

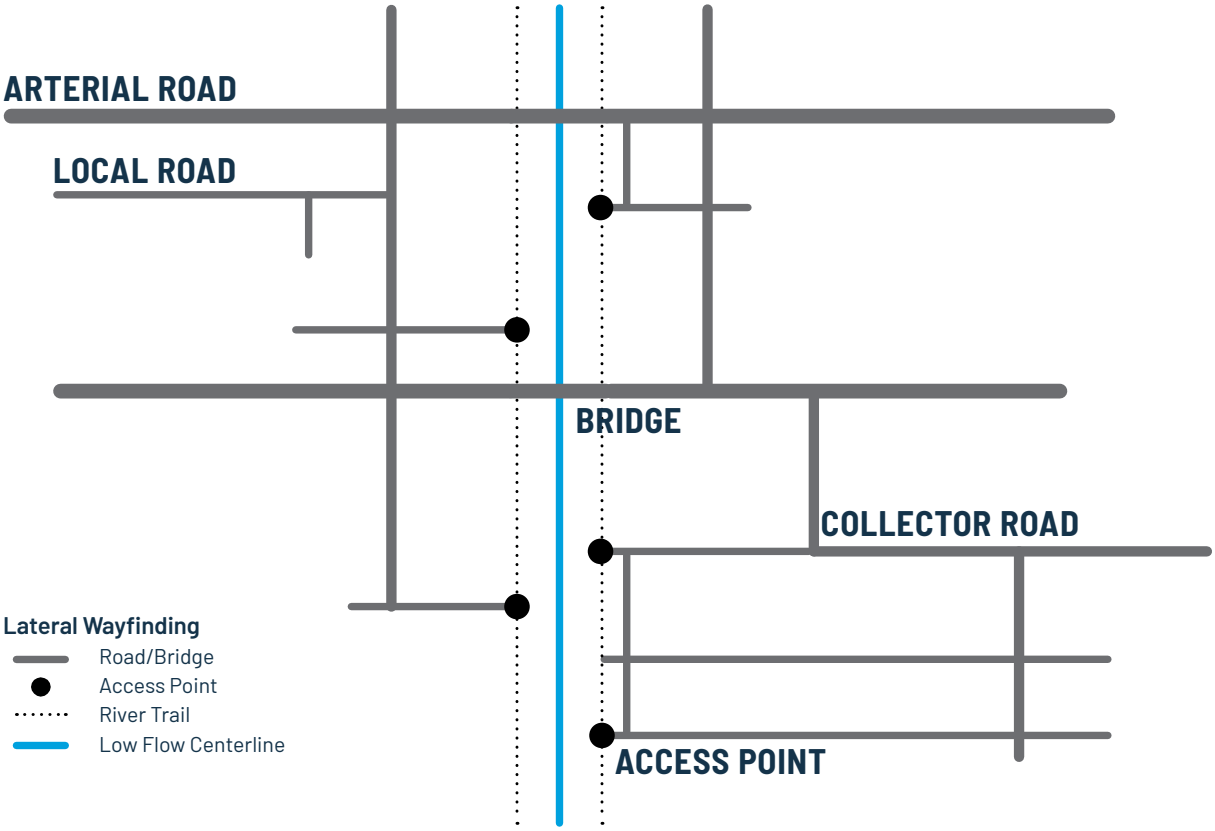


Figure 65. **The approach to the placement and sequence of environmental graphics depends on the context and expected volume and speed of users passing by. The diagram above shows an abstraction of different contexts for environmental graphics leading to and along the LA River. Example scenarios are depicted on the pages that follow.**

SEQUENCE AND PLACEMENT OF ENVIRONMENTAL GRAPHICS

Lateral wayfinding is crucial in showing users how to navigate to the LA River, and clear placement of signs at gateways and along the trail notify users without being overwhelming. The vignettes on the following pages show examples of environmental graphics sequence and placement in typical contexts leading to and along the river. Directional environmental graphics should be placed so they are visible to pedestrians, bicyclists, those in vehicles, and equestrians where appropriate. These environmental graphics should be placed along a safe route that directs pedestrians and cyclists to the nearest access point. Informational, regulatory, and other categories of signage should be placed in a clear manner at access points and along trails to avoid sign clutter.

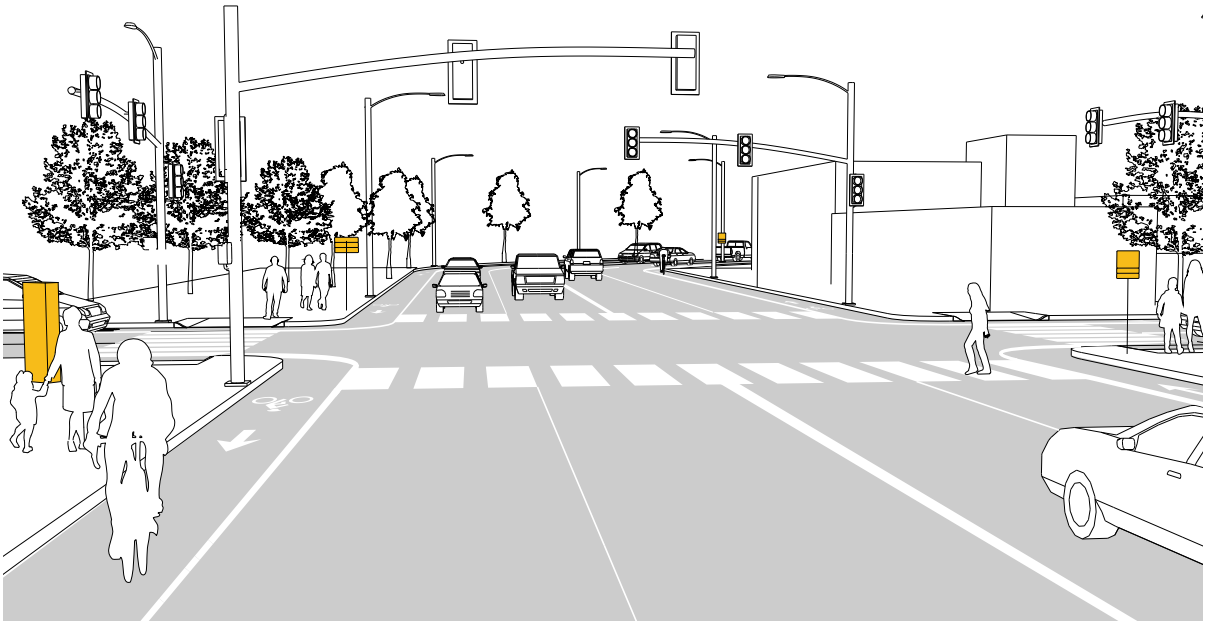
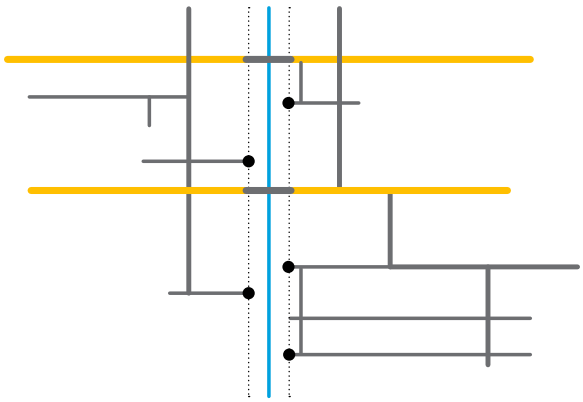


Figure 66. Environmental graphics along arterial roads should guide users across busy intersections.

ARTERIAL ROAD ENVIRONMENTAL GRAPHICS

- Per MUTCD*, do not place wayfinding along Freeways and Expressways.
- Per MUTCD*, do not place wayfinding in a location that competes visually with standard traffic signs.
- Use existing posts and traffic light posts where possible.
- At large pedestrian intersections, combine wayfinding with large totems at corners to avoid sign clutter.
- Apply Directional signs with existing bike lanes and pavement markings where applicable.
- Direct users to the nearest access point along a safe and accessible path.



*Reference the most current MUTCD standards.

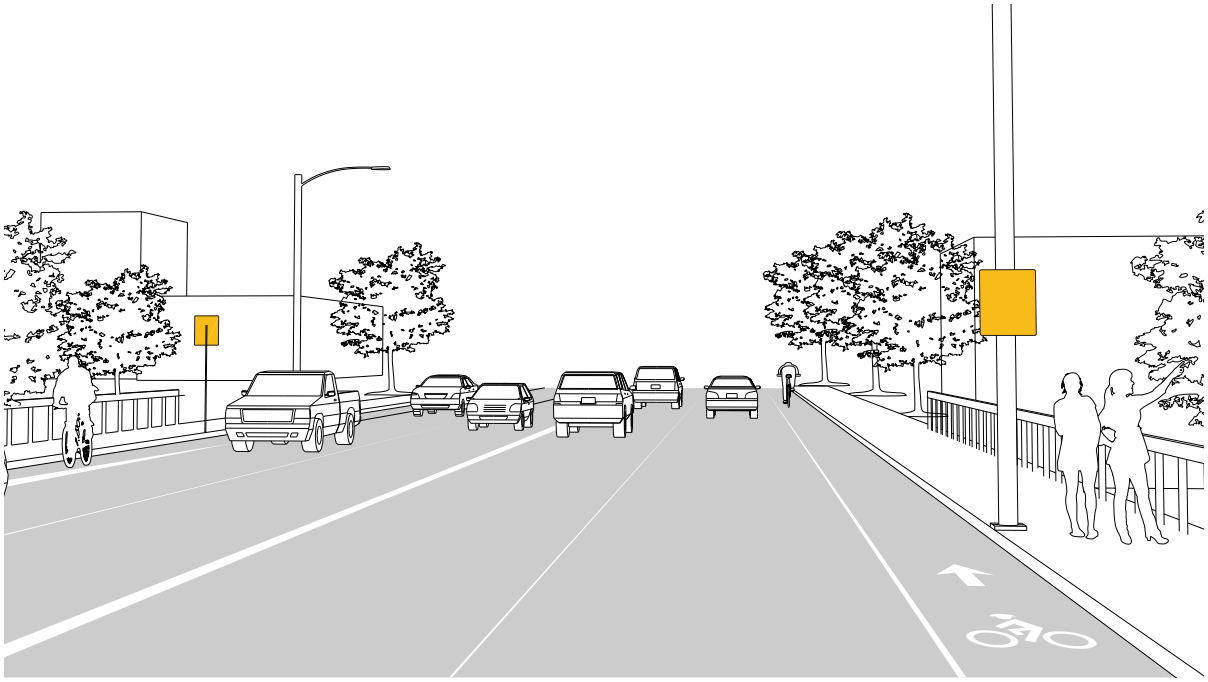


Figure 67. Environmental graphics along vehicular bridges alert drivers to the presence of the LA River.

BRIDGE ENVIRONMENTAL GRAPHICS

- Per MUTCD*, do not place wayfinding along Freeways and Expressways.
- Per MUTCD*, do not place wayfinding in a location that competes visually with standard traffic signs.
- Use existing posts and traffic light posts where possible.
- Apply Confirmation signs that the bridge is crossing the LA River, isolated from other traffic signs.

*Reference the most current MUTCD standards.

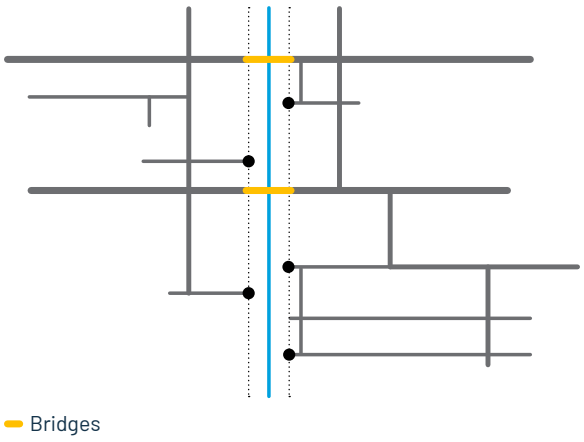
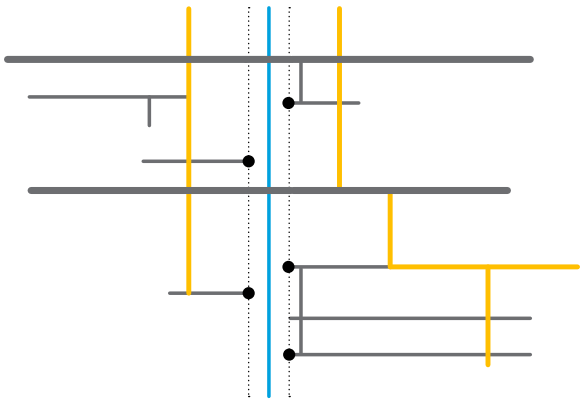


Figure 68. Environmental graphics along collector roads guide users towards the river and also allow for community expression.

COLLECTOR ROAD ENVIRONMENTAL GRAPHICS

- Per MUTCD*, do not place wayfinding along Freeways and Expressways.
- Per MUTCD*, do not place wayfinding in a location that competes visually with standard traffic signs.
- Use existing posts and traffic light posts where possible.
- At large pedestrian intersections, combine wayfinding with large totems at corners to avoid sign clutter.
- Apply Directional signs with existing bike lanes and pavement markings where applicable.
- Direct users to the nearest access point along a safe and accessible path.

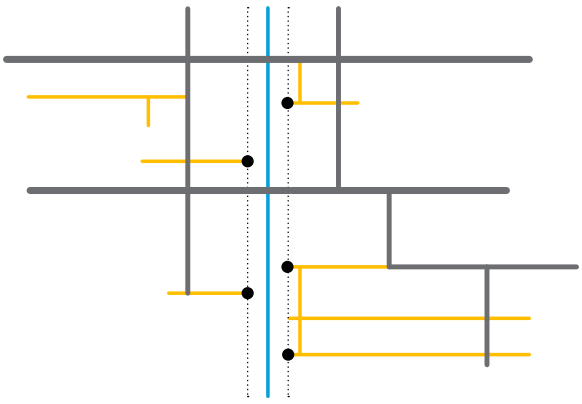


*Reference the most current MUTCD standards.

Figure 69. Environmental graphics along local roads guide users through residential areas.

LOCAL ROAD ENVIRONMENTAL GRAPHICS

- Per MUTCD*, do not place wayfinding along Freeways and Expressways.
- Per MUTCD*, do not place wayfinding in a location that competes visually with standard traffic signs.
- Use existing posts and traffic light posts where possible.
- Apply Directional signs with existing bike lanes and pavement markings where applicable.
- Direct users to the nearest access point along a safe and accessible path.
- Environmental graphics placement should be sensitive to context. In residential areas, place signs in the public right-of-way and minimize environmental graphics as needed.



*Reference the most current MUTCD standards.

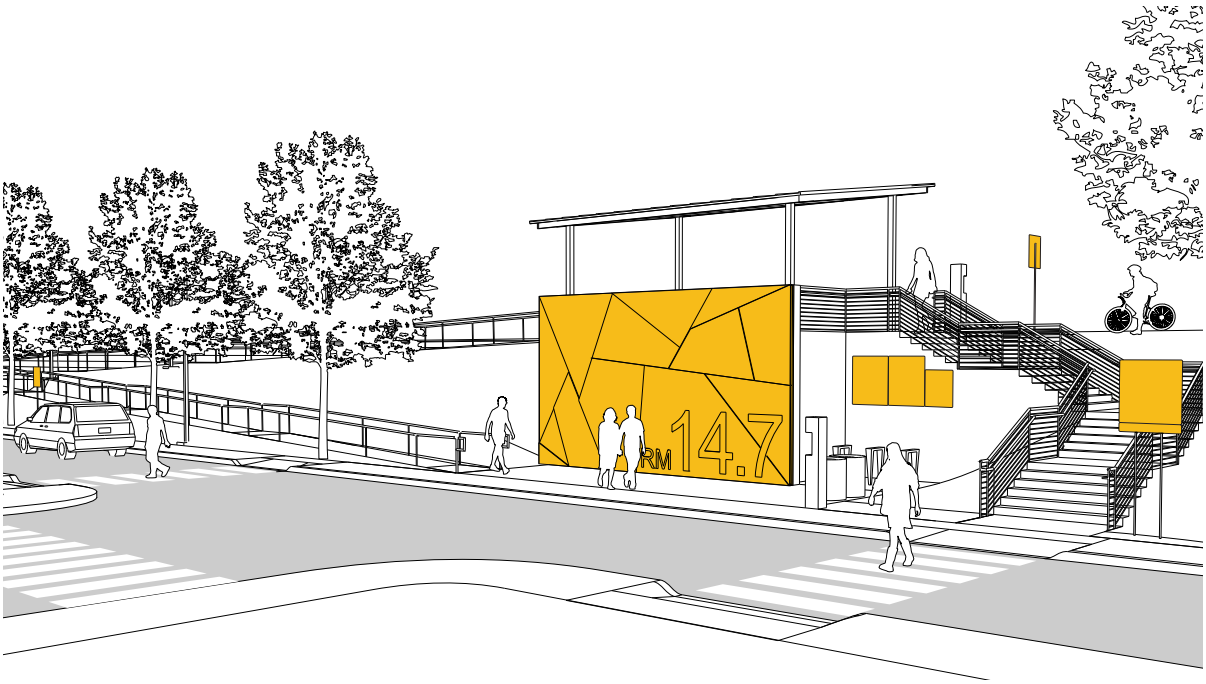
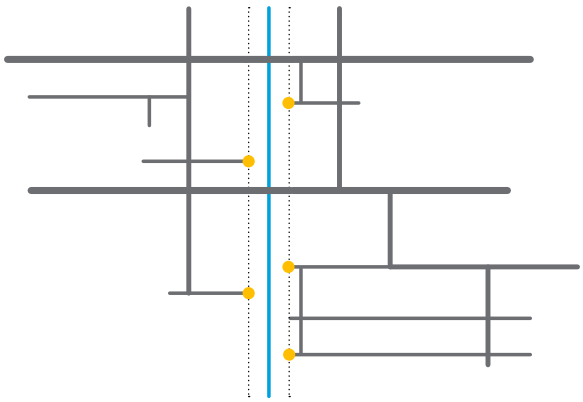


Figure 70. Environmental graphics at gateways should avoid sign clutter.

ACCESS POINT ENVIRONMENTAL GRAPHICS

- Place one informational sign at the main entry of each access point.
- Place Regulatory "Park Rules" sign further back, alongside River Pavilion, trail, or other amenities.
- Apply Regulatory warning and safety environmental graphics along channel at regular intervals.
- Use environmental graphics for neighborhood expression.
- Use existing posts where possible.



● Access Points

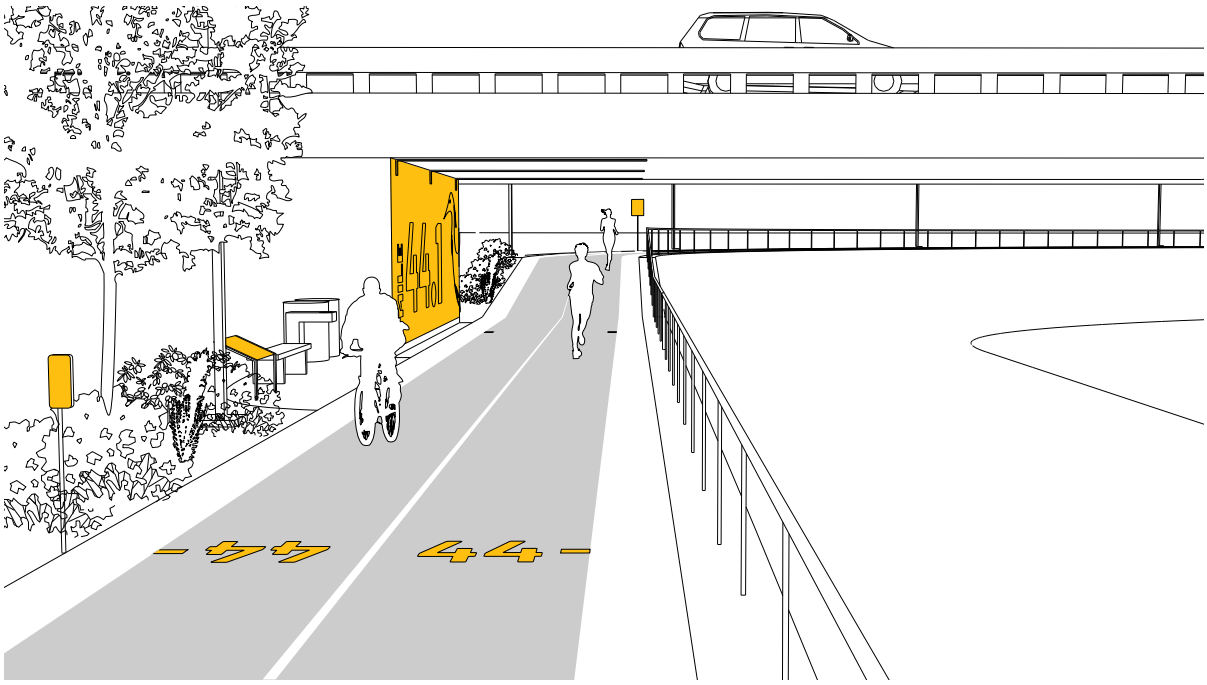
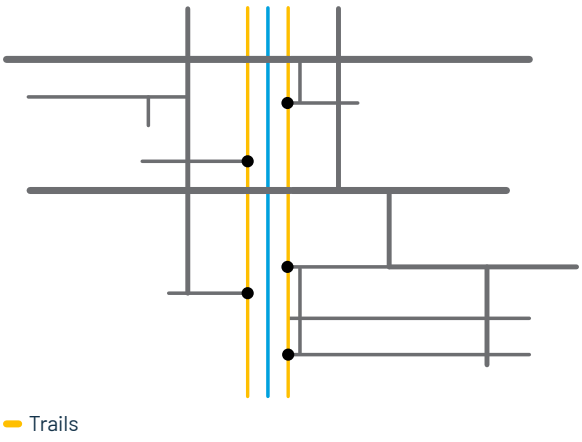


Figure 71. Environmental graphics along the LA River help locate and inform trail users.

TRAIL ENVIRONMENTAL GRAPHICS

- Place mile markers every .5 miles. Place pavement markings every mile with ticks every tenth of a mile.
- Place confirmation signs as needed along the trail (at least every two miles).
- Use environmental graphics for trail underpasses and bare walls along the trail.
- Use existing posts where possible.



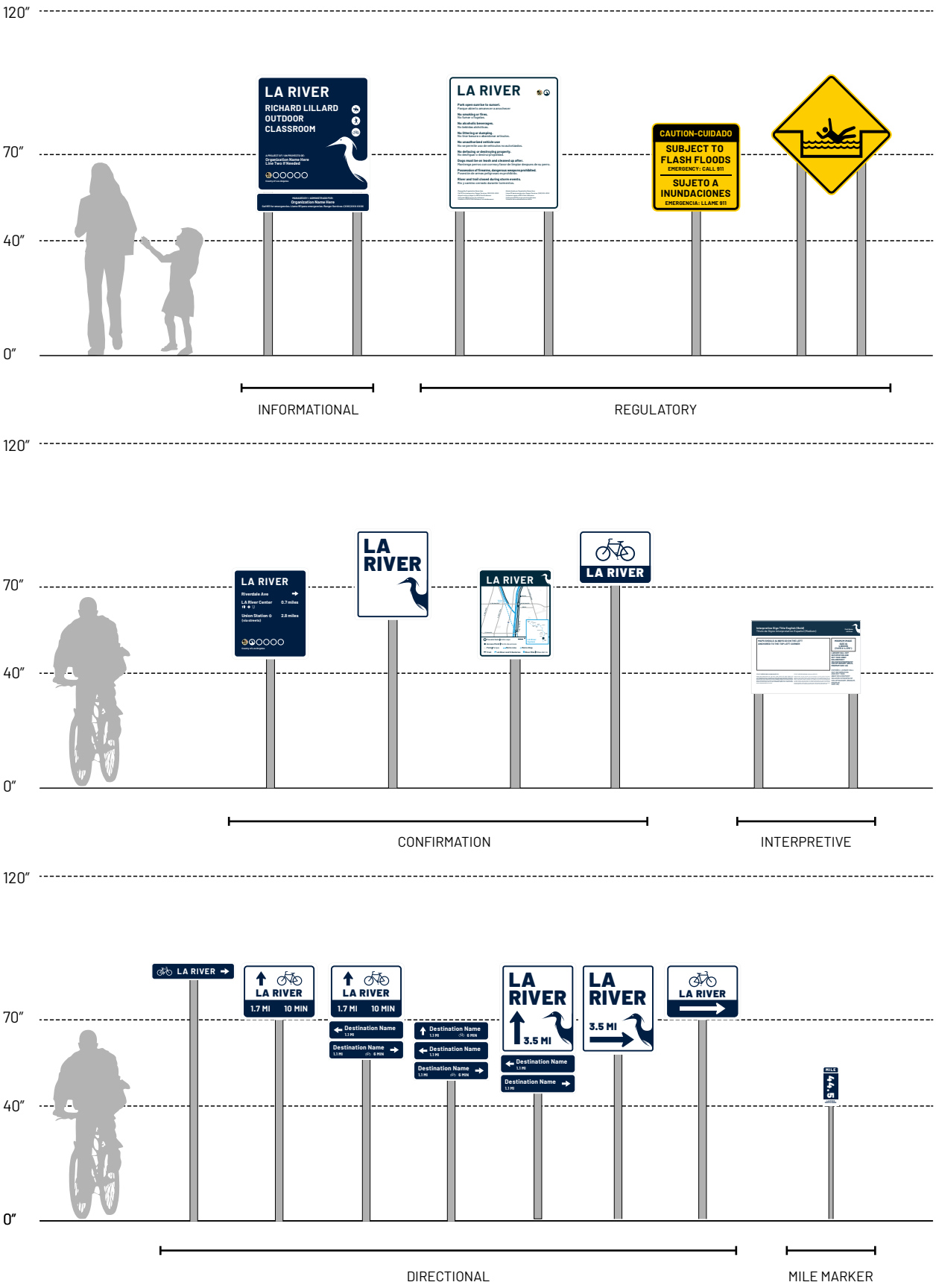


Figure 72. The suite of LA River environmental graphics includes signs leading to the LA River and signs within projects along the LA River.

SUITE OF LA RIVER ENVIRONMENTAL GRAPHICS

The suite of LA River Environmental Graphics varies depending on the scale of the project. Projects range from XL, L, M, S, and XS as defined in the LA River 2020 Master Plan Update and in the Chapter 2 programming section in the Design Guidelines. The quantity of environmental graphics to be used leading up to and within the project grows with the intended size and impact. The diagram on the following page is important for consistency of environmental graphics for the LA River, since it will primarily be installed on a project by project basis. Further, the permitting matrix on page 103 outlines when certain categories of environmental graphics need to have certain criteria, such as font sized to ADA standards or references to Indigenuos Peoples place names.

There are eight categories of environmental graphics included in these guidelines.

- Informational (see page 118)
- Regulatory (see page 121)
- Confirmation (see page 126)
- Interpretive Signs and Displays (see page 131)
- Directional (see page 134)
- Mile Markers (see page 143)
- Pavement Markings (see page 143)
- Large Scale Icon Graphics (see page 147)

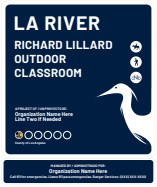
SUITE OF LA RIVER ENVIRONMENTAL GRAPHICS

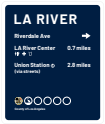
Figure 73. Baseline requirements for environmental graphics leading to the LA River and projects within the LA County Flood Control District right-of-way depend on the scale of the project. Directional signage is required to be two miles away from an XL project, while only required to be 500 ft away from a S project. Directional signage for bicycles are required only for XL-M projects. At gateways, information signage and regulatory environmental graphics are required for S-XL projects. Within an XS project, interpretive, pavement markings, and mile markers are required. Confirmation signs are required with S-XL projects. Incorporation of large scale graphics with L and XL projects should be considered.

GATEWAY

WITHIN PROJECT

PROJECT IDENTITY + INFORMATION





PARAMETERS FOR APPLYING GUIDELINES

	INFORMATIONAL	REGULATORY	CONFIRMATION
ADA FONT SIZE **Size to be determined by height of text off grade and viewing distance as outlined in the most current ADA standards**	**YES**	Check requirements on a project by project basis	**YES** Exception is the trail map sign, which has text that is meant to be read up close
ADA FONT **San serif font, capitalized as necessary per most current ADA standards - use open-source Barlow font**	**YES**	**YES**	**YES**
CONTRAST **Recommended contrast ratio is 7.0:1 - achieved when recommended colors are used**	**YES**	**YES**	**YES**
BILINGUAL **Language dependent on neighborhood Examples: Spanish, Chinese, Korean, Russian**	**NO** Names of locations and managing organizations do not need to be translated	**YES**	**NO**
UNIVERSAL DESIGN **Includes braille or audio components for environmental graphics; also includes considerations for the neurodiverse (contrast, colors, & layout already inherent in many of the sign designs)**	**STRONGLY ENCOURAGED** Ensure that an accessible path of travel leads to sign and that braille is within reach if used	**STRONGLY ENCOURAGED** Ensure that an accessible path of travel leads to sign and that braille is within reach if used	**STRONGLY ENCOURAGED** Ensure that an accessible path of travel leads to sign and that braille is within reach if used
INDIGENOUS PLACE NAMES & REFERENCES **Content dependent on site location along the LA River.**	**STRONGLY ENCOURAGED** Contact appropriate Indigenous Peoples representative per site location and River Mile	**NO**	**STRONGLY ENCOURAGED** Contact appropriate Indigenous Peoples representative per site location and River Mile

Figure 74. This matrix lists the minimum design feature requirements for each category of environmental graphics. Specific requirements will be determined on a project by project basis. These parameters provide the best practices for clear, uncluttered text layout and consistency.

DIRECTIONAL	MILE MARKERS	PAVEMENT MARKINGS	INTERPRETIVE SIGNS & DISPLAYS	LARGE SCALE ICON GRAPHICS
YES	YES	YES Check requirements on a project by project basis for graphics on pavement	Check requirements on a project by project basis	Check requirements on a project by project basis
YES	YES	YES Check requirements on a project by project basis for graphics on pavement	YES	Check requirements on a project by project basis
YES	YES	YES	YES	**NO** Guidelines color is not required, choices are to artist's discretion
NO	**NO**	**NO**	YES	**STRONGLY ENCOURAGED** Ensure that an accessible path of travel leads to sign and that braille is within reach if used
SOMETIMES Encouraged for wayfinding along pedestrian paths of travel	**NO**	**NO**	**STRONGLY ENCOURAGED** Ensure that an accessible path of travel leads to sign and that braille is within reach if used	**STRONGLY ENCOURAGED** Ensure that an accessible path of travel leads to sign and that braille is within reach if used
STRONGLY ENCOURAGED Contact appropriate Indigenous Peoples representative per site location and River Mile	**NO**	**NO**	**STRONGLY ENCOURAGED** Contact appropriate Indigenous Peoples representative per site location and River Mile	**STRONGLY ENCOURAGED** Contact appropriate Indigenous Peoples representative per site location and River Mile

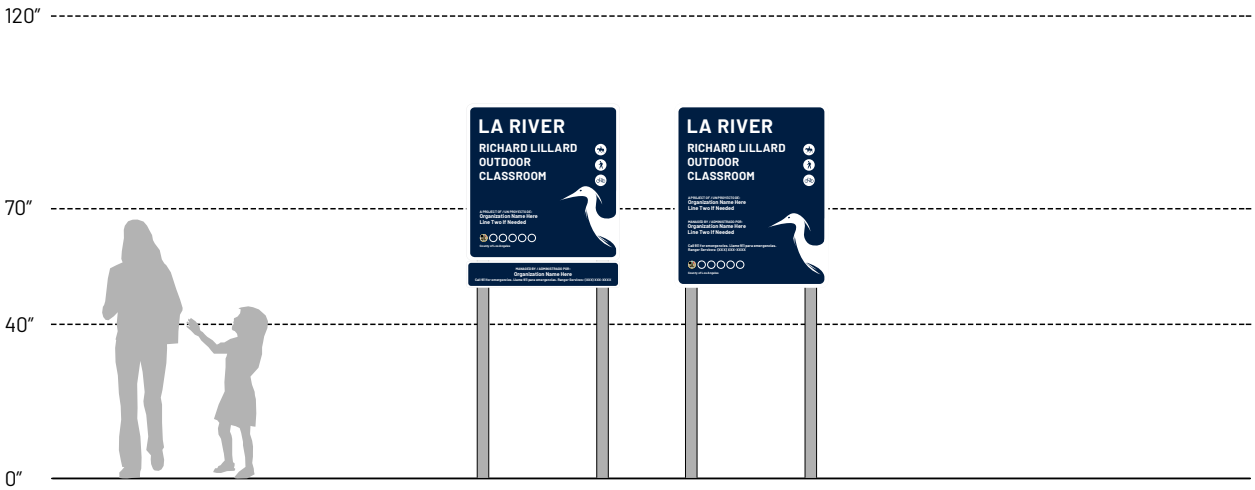


Figure 75. Freestanding informational environmental graphics should be hung on double posts with the bottom of the sign between 40″ and 45″ minimum above grade.

INFORMATIONAL

PURPOSE

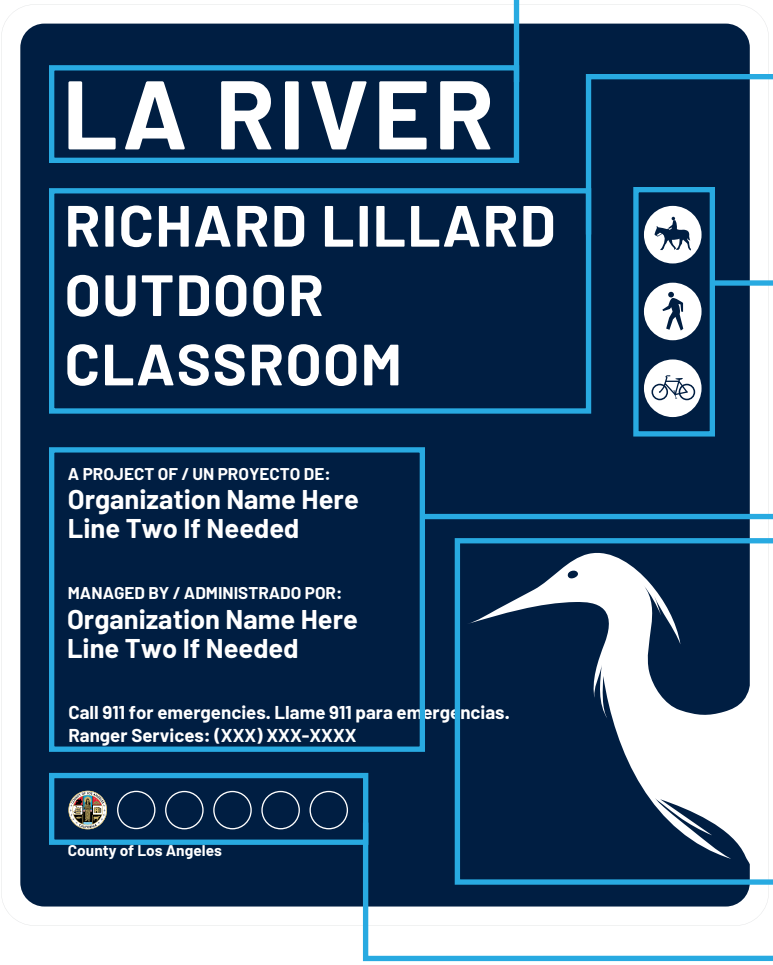
Informational signs are used to inform visitors about a place, and include park entry signs and other non-regulatory signs.

As necessary, these signs are used to inform visitors about the park or trail, the owner or operator, funding source(s), and agencies and organizations involved with the project. Grant funding sources may have specific requirements for credits and graphics.

PLACEMENT

Locations of informational signs should be placed near the primary access point and be visible from the street or trail to aid visitors in finding the park or trail. A single informational sign should be placed at the access point or gateway to reduce visual clutter.

INFORMATIONAL - OPTION 1
ONE SIGN



TITLE 1

Text: LA RIVER
Font: Barlow - Bold, All Caps
Size: 3.5" high
Color: White
Position: Left aligned, 3" from top of blue background, 2.5" from left

TITLE 2

Text: LOCATION NAME
Font: Barlow - Bold, All Caps
Size: 2" high (minimum)
Color: White
Position: Left aligned, 3" from bottom of Title 1 text, 2.5" from left edge of blue background, 1.5" between lines

TRAIL USAGE SYMBOLS

Size: Symbols centered in 3" circle
Color: Circle-White, Symbol - Pantone 282 C
Position: 2.5" from right edge of blue background; spaced 1" apart vertically; top aligned with top of Title 2 text
* Only include symbols for usage on trail at this access point
** See MUTCD for approved symbols

INFORMATIONAL TEXT

Font: Barlow - Bold, Title Case
Size: .625" minimum height of capital letter
Color: White
Position: Left aligned; 2.5" from left edge of blue background, 2.5" vertical space between separate groups of text

HERON GRAPHIC

Size: 16" high
Color: White
Position: Flush right with white border; 2.5" from bottom edge of blue background

LOGOS

Size: 2" circles with 5 pt white stroke
Position: 2.5" from left edge of blue background, 4" from bottom; spaced .5" apart horizontally

Figure 76. Informational signs provide the location name, owner, operator, and funding source of a project, along with trail usage symbols denoting types of trails available.

SIGN SPECIFICATIONS

- **Size:** 40x48" with 1.75" radius rounded corners
- **White border of sign:** 1" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** Pantone 282 C with 1.25" radius rounded corners
- **Margins within background:** 3" from top, 2.5" on left, right, and bottom

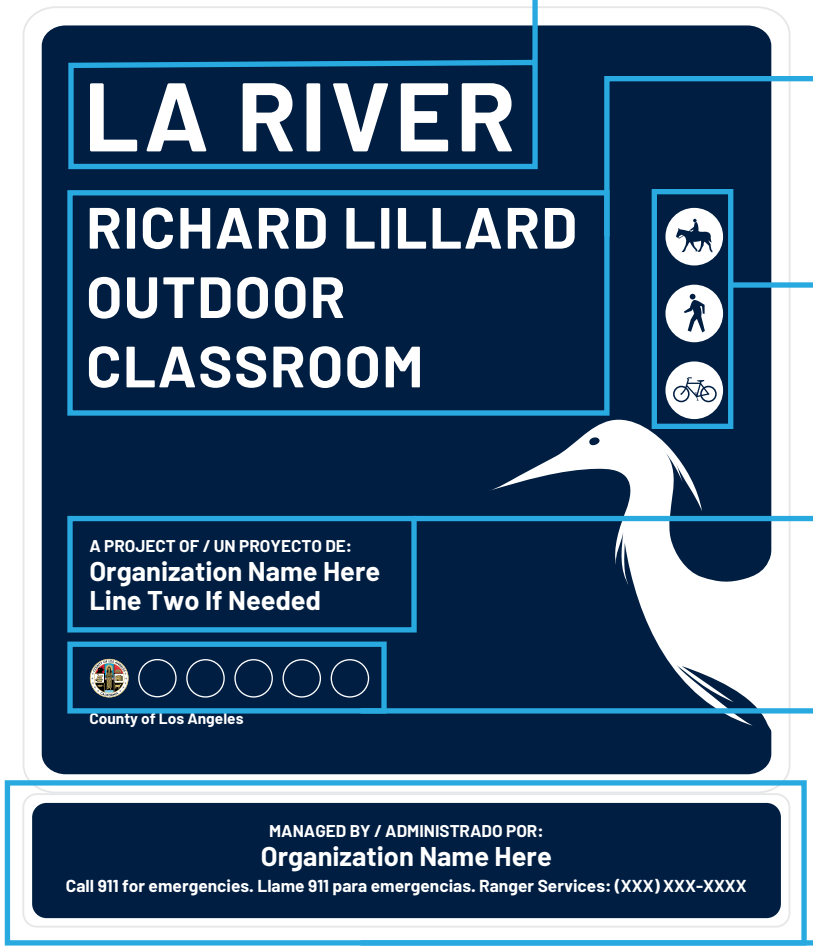
INSTALLATION

- At access point, not directly on a circulation path
- Bottom of sign hung between 40" and 45" off the ground and on double posts if freestanding

NOTES

- Always confirm specifications with latest applicable guidelines

INFORMATIONAL - OPTION 2
SIGN WITH BOTTOM PANEL



TITLE 1

Text: LA RIVER
Font: Barlow - Bold, All Caps
Size: 3.5" high
Color: White
Position: Left aligned, 3" from top of blue background, 2.5" from left

TITLE 2

Text: LOCATION NAME
Font: Barlow - Bold, All Caps
Size: 2" high (minimum)
Color: White
Position: Left aligned, 3" from bottom of Title 1 text, 2.5" from left edge of blue background, 1.5" between lines

TRAIL USAGE SYMBOLS

Size: Symbols centered in 3" circle
Color: Circle-White, Symbol - Pantone 282 C
Position: 2.5" from right edge of blue background; spaced 1" apart vertically; top aligned with top of Title 2 text
* Only include symbols for usage on trail at this access point
** See MUTCD for approved symbols

INFORMATIONAL TEXT

Font: Barlow - Bold, Title Case
Size: .625" minimum height of capital letter
Color: White
Position: Left aligned; 2.5" from left edge of blue background

LOGOS

Size: 2" circles with 5 pt white stroke
Position: 2.5" from left edge of blue background, 4" from bottom; spaced .5" apart horizontally

INFORMATIONAL PANEL

Size: 40x7" with .75" radius rounded corners
White border: .5" on all sides
Material: Aluminum with anti-graffiti film overlay
Background: Pantone 282 C with .75" radius rounded corners
Margins within background: 1.15" on all sides

Font: Barlow - Bold, Title Case,
Size: .625" minimum height of capital letter
Color: White
Text Position: Center aligned, 1.15" from all edges of blue background

Placement: Hung below informational sign, flush edge to edge ; bottom of sign between 40" and 45" off the ground or a minimum of 80" off the ground and on double posts if freestanding

Figure 77. The information panel allows for ease of updating information such as management and funding.

SIGN SPECIFICATIONS

- **Size:** 40x41" with 1.75" radius rounded corners
- **White border of sign:** 1" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** Pantone 282 C with 1.25" radius rounded corners
- **Margins within background:** 3" from top, 2.5" on left, right, and bottom

INSTALLATION

- At access point, not directly on a circulation path
- Bottom of information sign combination (sign and below panel) hung between 40" and 45" off the ground and on double posts if freestanding

NOTES

- Separate "informational panel" allows for flexibility to update only partial and potentially more frequently changing content
- Always confirm specifications with latest applicable guidelines

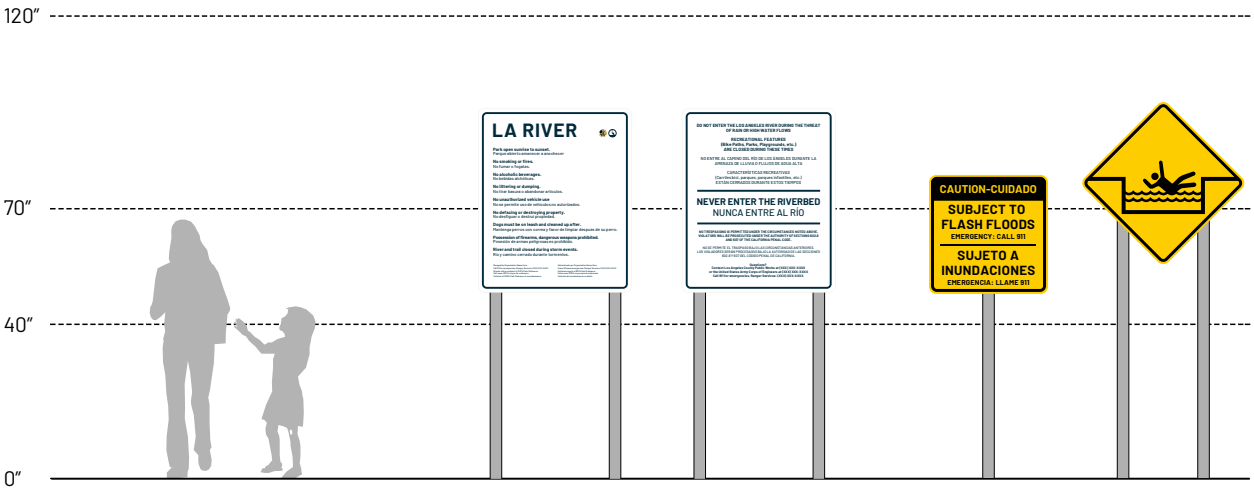


Figure 78. **Regulatory environmental graphics should be hung so that the bottom-most text is between 40″-70″ above grade. Certain freestanding signs require double posts.**

REGULATORY

PURPOSE

Regulatory signs are used to alert users to rules and regulations within LA River parks or multiuse trails. They are also used to warn park and trail users of dangerous conditions or to inform bicyclists and drivers of regulations and upcoming conditions. Under the California Code of Regulations rules and specific code numbers must be posted in order to be enforced by patrolling park rangers and police officers.[18]

For additional regulatory signs needed for flood safety or other municipal requirements, refer to the standard guidelines of the appropriate regulatory agency for color, size, content, and materials.

PLACEMENT

Regulatory signs are typically placed at or near park entrances or access points. Certain regulatory sign placement needs to follow uniform traffic standards and MUTCD guidelines. All users should be able to see the regulatory signs as they enter the park or multiuse trails. Signs warning users of flood danger should be placed along the channel itself. To prevent trespass, signs should be posted informing trail users of adjacent private property and instructing them to respect private lands by staying on the trail. Trail signs that are located on public and private property boundaries should inform trail users when they are entering and leaving private lands.

REGULATORY RULES

TITLE 1

Text: LA RIVER
Font: Barlow - Bold, All Caps
Size: 3.5" high
Color: Pantone 282 C
Position: Left aligned, 2.5" from top and left blue border

LOGOS

Size: 2" circles with 5 pt Pantone 282 C stroke
Position: 2.5" from right blue border; spaced .5" apart horizontally

REGULATION TEXT: ENGLISH

Font: Barlow - Bold, Sentence Case
Size: .625" minimum height of capital letter
Color: Pantone 282 C
Position: Left aligned; 2.5" from left blue border, 1.25" vertical space between separate groups of text

REGULATION TEXT: SPANISH

Font: Barlow - Medium, Sentence Case
Size: .625" minimum height of capital letter
Color: Pantone 282 C
Position: Left aligned; 2.5" from left blue border, 1.25" vertical space between separate groups of text

INFORMATIONAL TEXT: ENGLISH AND SPANISH

Font: Barlow - Medium, Sentence Case
Size: .375" minimum height of capital letter
Color: Pantone 282 C
Position: Left aligned; 2.5" from left and bottom blue border

BLUE BORDER

Size: 0.5" width with 1.25" radius rounded corners
Color: Pantone 282 C

Figure 79. **Regulatory rule signs alert park and trail users to the rules and regulations in effect within river parks and on trails, and must be bilingual.**

SIGN SPECIFICATIONS

- **Size:** 40x48" with 1.75" radius rounded corners
- **White border of sign:** 1" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** White with 0.5" blue border with 1.25" radius rounded corners
- **Margins within background:** 2.5" on all sides

INSTALLATION

- At access point, not directly on a circulation path
- Bottom of sign hung between 40" and 45" off the ground and on double posts if freestanding

NOTES

- Rules and regulations should always be bilingual
- Always confirm specifications with latest applicable guidelines

REGULATORY WARNING

REGULATION TEXT: ENGLISH

Font: Barlow - Bold, All Caps
Size: .625" minimum height of capital letter
Color: Pantone 282 C
Position: Center aligned; 2.5" minimum from blue border on all sides, 1.625" vertical space between separate groups of text

REGULATION TEXT: SPANISH

Font: Barlow - Medium, All Caps
Size: .625" minimum height of capital letter
Color: Pantone 282 C
Position: Center aligned; 2.5" minimum from blue border on all sides, 1.625" vertical space between separate groups of text

HORIZONTAL DIVIDER LINE

Size: .5" high, 32" long
Color: Pantone 282 C
Position: Center aligned; 2.5" from blue border on left and right; 1.625" vertical space between line and text

TITLE 1: ENGLISH

Font: Barlow - Bold, All Caps
Size: 1.75" high (.625" minimum)
Color: Pantone 282 C
Position: Center aligned; 2.5" minimum from blue border on all sides, 1.625" vertical space between separate groups of text

TITLE 1: SPANISH

Font: Barlow - Medium, All Caps
Size: 1.75" high (.625" minimum)
Color: Pantone 282 C
Position: Center aligned; 2.5" minimum from blue border on all sides, 1.625" vertical space between separate groups of text

CONTACT INFORMATION TEXT

Font: Barlow - Bold, Sentence Case
Size: .375" minimum height of capital letter
Color: Pantone 282 C
Position: Center aligned; 2.5" minimum from blue border on all sides

BLUE BORDER

Size: 0.5" width with 1.25" radius rounded corners
Color: Pantone 282 C

Figure 80. Regulatory warnings signs alert users of flood danders and trail violations should be placed on gates or fences at entrances to the trail.

SIGN SPECIFICATIONS

- **Size:** 40x48" with 1.75" radius rounded corners
- **White border of sign:** 1" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** White with 0.5" blue border with 1.25" radius rounded corners
- **Margins within background:** 2.5" on all sides

INSTALLATION

- At access point, not directly on a circulation path
- Bottom of sign hung between 40" and 45" and on double posts if freestanding

NOTES

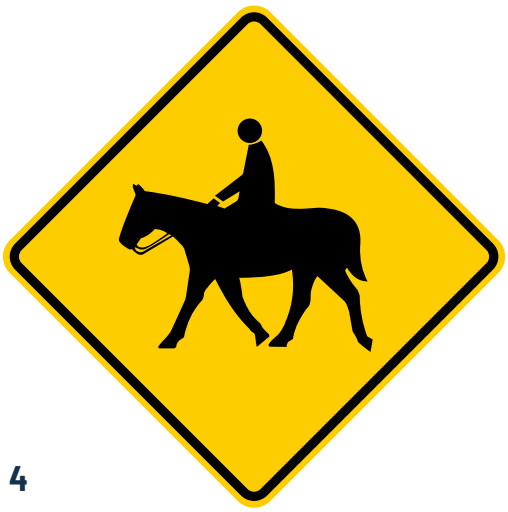
- Rules and regulations should always be bilingual
- Always confirm specifications with latest applicable guidelines

REGULATORY HAZARD

1

2

3



4

5

Figure 81. **The signs shown above (1-4) are examples of warning and safety regulations signs that are standard designs and must not be altered. These guidelines do not provide artwork for these standard signs. Designers should consult latest MUTCD guidelines.**
Source: 2009 MUTCD Edition with Revisions 1 and 2, 2012.

Figure 82. **The signs shown to the left (5) is a standard regulatory sign, created as part of these guidelines, that must not be altered. Artwork for this standard sign can be downloaded here: (Final link to be included in final guidelines)**

STANDARDIZED REGULATORY SIGNS

Certain regulatory signs are standard and shall not be altered or customized in order to maintain recognition and consistency. Examples of these standardized signs include MUTCD signs for flood danger, equestrian requirements, parking requirements, and USACE signs for no dumping or littering. These guidelines will not provide the artwork for other agencies standard signage. Refer to appropriate jurisdiction codes for most up-to-date requirements and sign specifications.

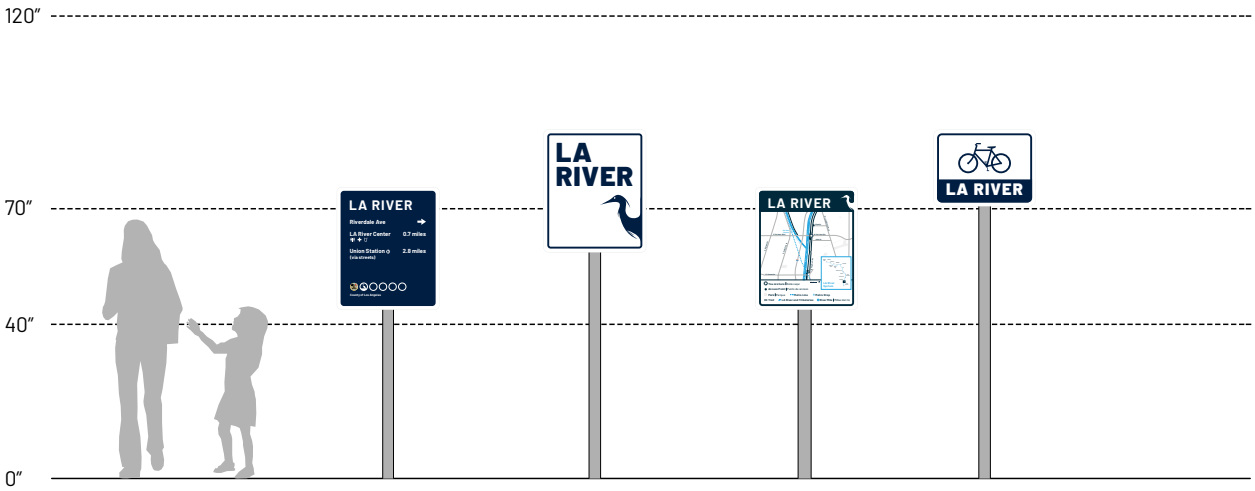


Figure 83. Confirmation environmental graphics should be hung so that the "LA River" text is between 70"-120" above grade.

CONFIRMATION

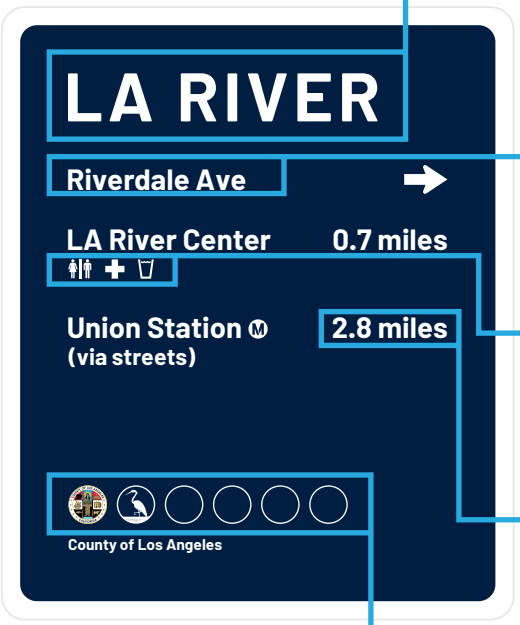
PURPOSE

Confirmation signs inform users that they are on the correct route or alerts users to an upcoming turn. This information can include distances or time to destination or the LA River. Signs showing destinations should show locations that are ahead on the trail and on the same side of the river bank. They should be double-sided, and can include symbols that indicate locations that have amenities such as restrooms, hydration, and first aid.

PLACEMENT

Confirmation signs should be placed at access points and along the LA River trail. Confirmation signs showing destinations along the trail should occur at a frequency of no less than two miles. Trail map signs should be placed at access points so that users can identify access points and exits before they embark on their route.

CONFIRMATION



TITLE 1

Text: LA RIVER
Font: Barlow - Bold, All Caps
Size: 2.5" high
Color: White
Position: Left aligned, 2.5" from top and left edge of blue background

DESTINATION NAME

Font: Barlow - Bold, Title Case
Size: .625" minimum height of capital letter
Color: White
Position: Left aligned; 2.5" from left edge of blue background, 2" vertical space between separate groups of text

AMENITY SYMBOLS

Size: 1" high
Color: White
Position: 2.5" from left edge of blue background; spaced 0.75" apart horizontally; 0.5" below Destination Name
* See MUTCD for approved symbols

DESTINATION DISTANCE

Font: Barlow - Bold, Sentence Case
Size: 0.625" minimum height of capital letter
Color: White
Position: Right aligned; 2.5" from right edge of blue background, aligned with Destination Name vertically

LOGOS

Size: 2" circles with 5 pt white stroke
Position: 2.5" from left edge of blue background, 4" from bottom; spaced .5" apart horizontally

Figure 84. Confirmation signs confirm to the viewer that they are traveling the correct direction and identify the next closest major destinations. They can also indicate arrival at a destination with the addition of an arrow.

SIGN SPECIFICATIONS

- **Size:** 26.75x32" with 1.25" radius rounded corners
- **White border of sign:** 1" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** Pantone 282 C with 0.875" radius rounded corners
- **Margins within background:** 2.5" on all sides

INSTALLATION

- Along LA River trail
- Bottom of sign hung between 40" and 45" off the ground

NOTES

- Amenity symbols should be MUTCD standard symbols whenever available, custom symbols can only be used when symbol does not exist in from MUTCD
- An arrow replaces the destination distance when the sign is at the destination or at the trail exit for that destination
- Only three destinations per sign
- Always confirm specifications with latest applicable guidelines

CONFIRMATION AT RIVER

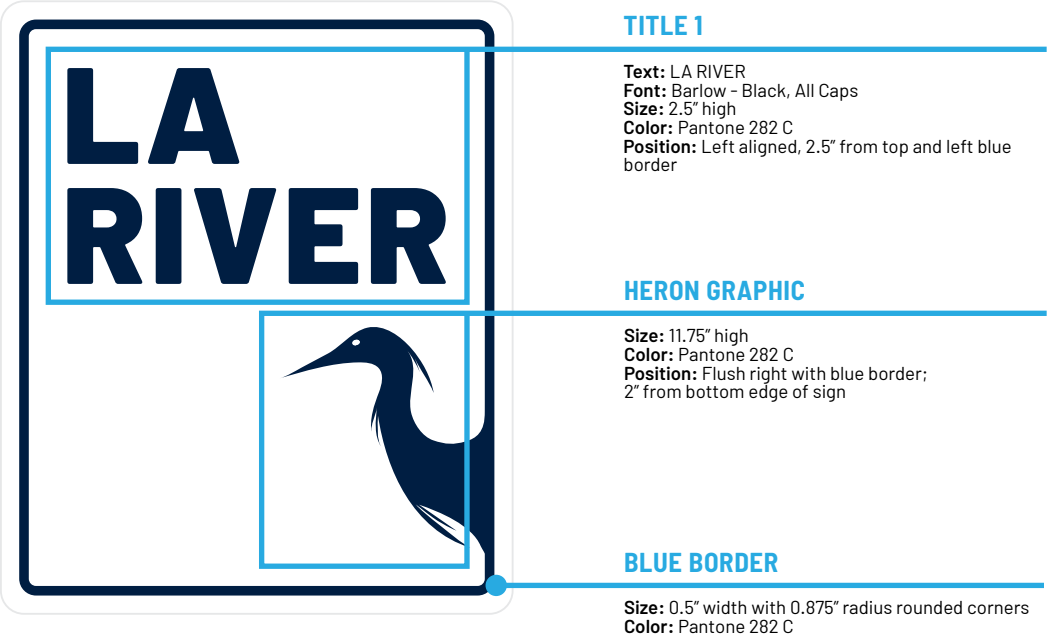


Figure 85. This Confirmation sign should be used at locations such as bridge crossings to confirm the location of the LA River.

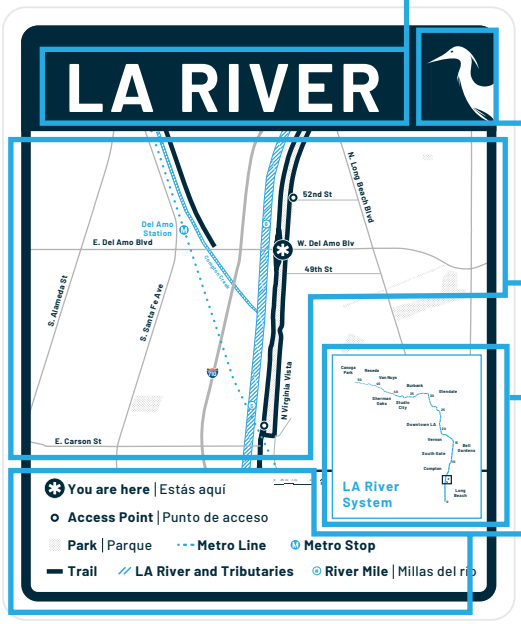
SIGN SPECIFICATIONS

- **Size:** 26.75x32" with 1.25" radius rounded corners
- **White border of sign:** 1" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** White with 0.5" blue border with 1.25" radius rounded corners
- **Margins within background:** 2" on all sides

INSTALLATION

- Key locations close to the LA River, such as on bridge overpasses
- Always confirm specifications with latest applicable guidelines

CONFIRMATION MAP



TITLE 1

Text: LA RIVER
Font: Barlow - Bold, All Caps
Size: 2.5" high
Color: White
Position: Left aligned, 2" from top edge of blue background, 2" from top edge of blue background

HERON GRAPHIC

Size: 4.25" high
Color: White
Position: Flush right with blue border; 1" from top edge of blue background

MAP FRAME

Size: 23.75" wide, 17.5" high
Background Color: White

RIVER SYSTEM KEY

Size: 7.75" wide, 8.5" high
Background Color: White

MAP KEY

Size: 23.75" wide, 6.5" high
Background Color: White
Text Size: 0.625" minimum height of capital letter
Text Color: Pantone 282 C

Figure 86. Confirmation maps help users locate where they are on the trail in relation to the river system and the trail itself, and help to locate other access points.

SIGN SPECIFICATIONS

- **Size:** 26.75x32" with 1.25" radius rounded corners
- **White border of sign:** 1" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** White

INSTALLATION

- At access point
- Bottom of sign hung between 40" and 45" off the ground
- Always confirm specifications with latest applicable guidelines

CONFIRMATION BIKE ROUTE

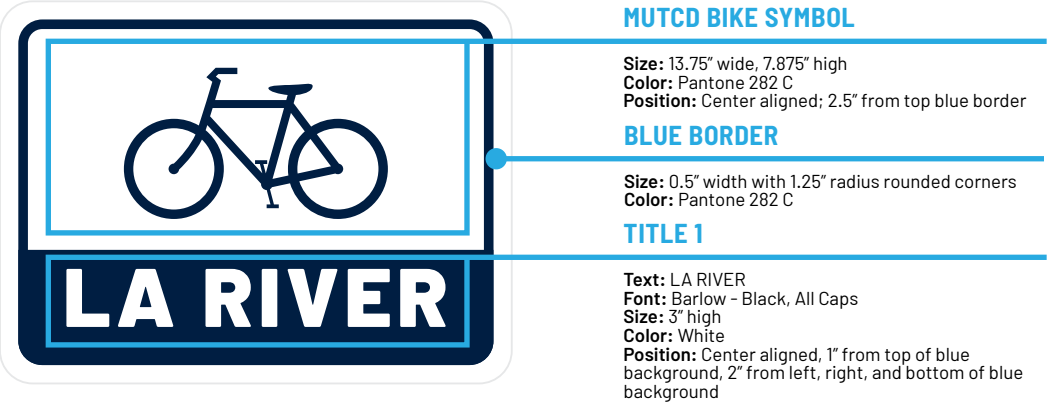


Figure 87. This Confirmation sign should be used for bike routes leading to LA River.

SIGN SPECIFICATIONS

- **Size:** 26.75x20" with 1.75" radius rounded corners
- **White border of sign:** 1" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** White with 0.5" blue border with 1.25" radius rounded corners
- **Margins within background:** 2.5" from top, 2" on left, right, and bottom

INSTALLATION

- Along bike route, maximum two miles from LA River
- Bottom of sign hung between 70" and 120" off the ground

NOTES

- All bicycle route environmental graphics should be retroreflective per MUTCD requirements.
- Always confirm specifications with latest applicable guidelines

CONFIRMATION OVERPASS

Figure 88. A street identifying signs should be hung above the LA River trail denoting name of street above, crossing over the trail.

SIGN SPECIFICATIONS

- **Size:** Width varies x 8" with 1" radius rounded corners
- **White border of sign:** 0.25" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** White with 0.375" blue border with 1" radius rounded corners
- **Margins within background:** 1.375" top and bottom, 2.375" minimum left and right sides

INSTALLATION

- On bridge or overpass above trail

NOTES

- Width of sign will vary base on the length of the name, but margins will remain standard, based on MUTCD guidelines
- Always confirm specifications with latest applicable guidelines

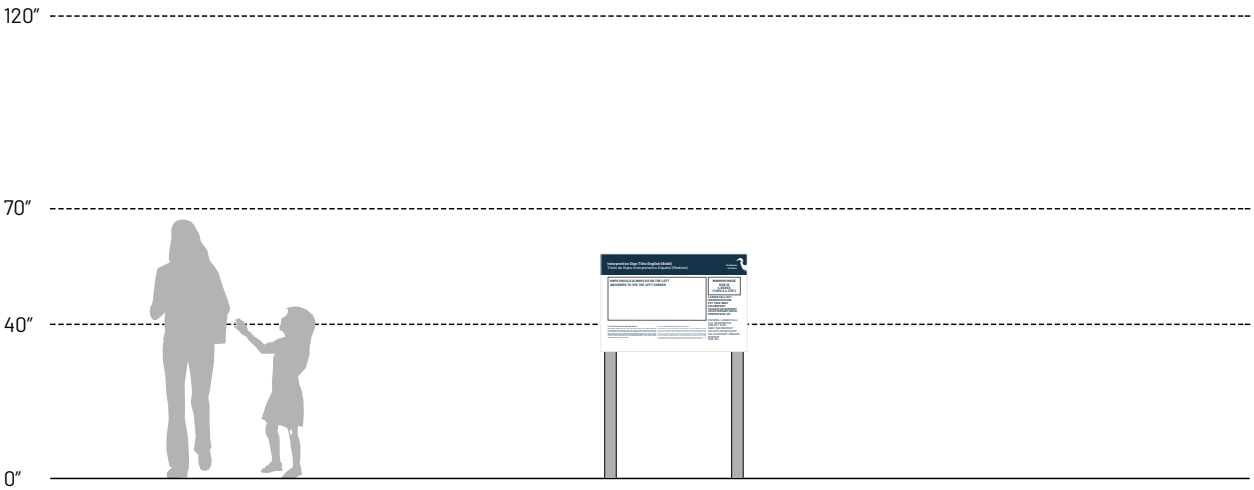


Figure 89. Interpretive environmental graphics should be hung at a height that is easily legible. When freestanding, the sign should be on double posts.

INTERPRETIVE

PURPOSE

Interpretive signs and displays are used to educate users. Typically, they will be found in LA River parks or at access points to the river and trails. Each park-owning agency will determine the content and use of interpretive signs.

Suggested topics include geomorphology and engineering of the river, ecological restoration, water supply, water quality, wildlife of the region, natural history of Los Angeles, Indigenuos Peoples place markers and traditions, settlement history of Los Angeles, and cultural history of local neighborhoods. Topic selection should consider the content of other interpretive signs and displays within the river system and the unique features of the project site.

The specifications shown on the following page for interpretive signs were designed to provide flexibility for the individual sign designers. Consistent to all interpretive signs are the title location, size, color, and font, and the size and location of the heron logo. For ease of sign layout, a grid system will unify sign layout.

PLACEMENT

Interpretive signs and displays should be placed along trail lookouts, gateways, access points, pocket parks, and within major projects themselves. The location of these environmental graphics is dependent on the educational content and where that is best viewed in context. Their placement should be coordinated with appropriate seating, shade, and other amenities where possible.

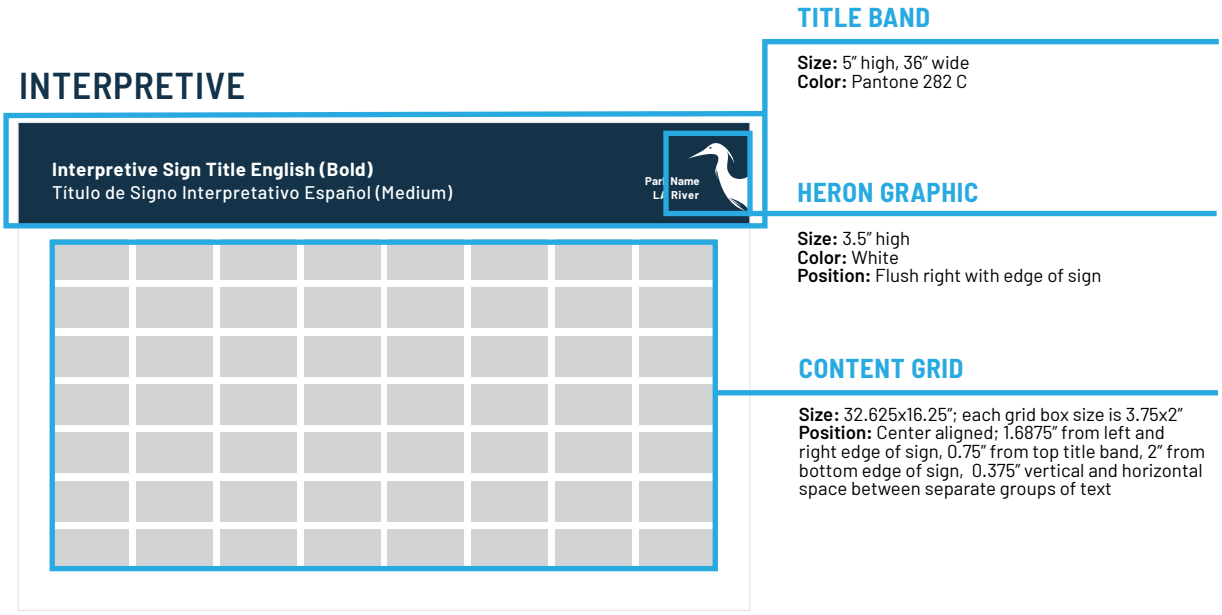


Figure 90. **The content grid of the interpretive sign provides a template for the layout of content .**

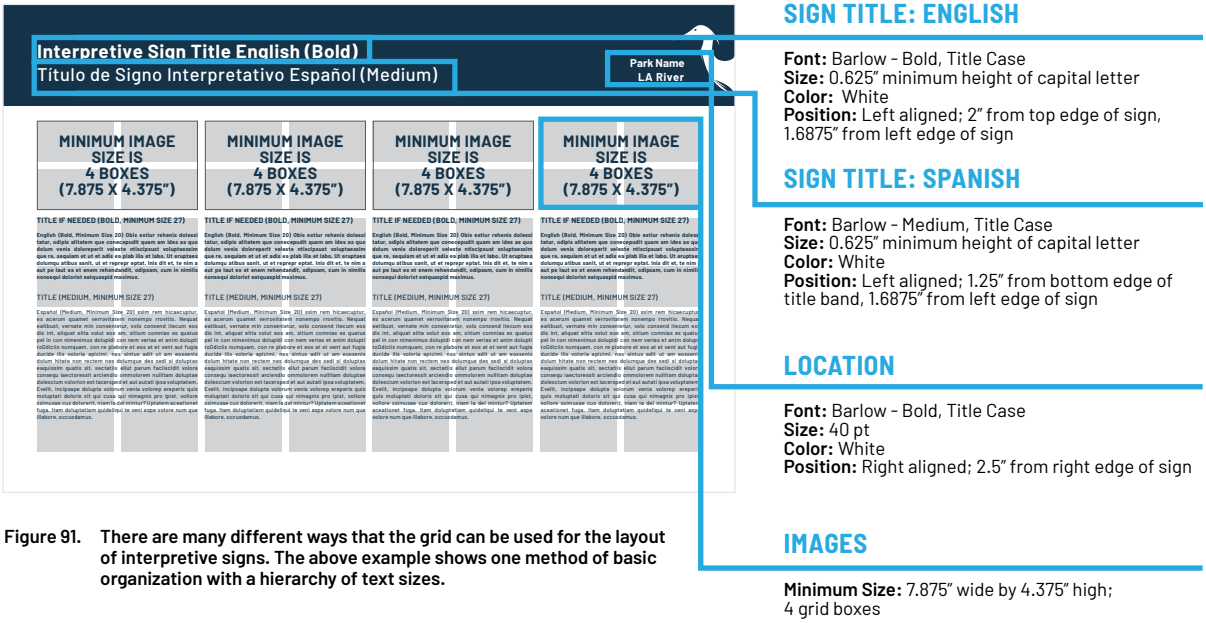


Figure 91. **There are many different ways that the grid can be used for the layout of interpretive signs. The above example shows one method of basic organization with a hierarchy of text sizes.**

USING THE GRID

Text, photographs, maps and illustrations should be aligned on the grid at the discretion of the designer. Each grid box is 3.75 inches wide by 2 inches tall, and are evenly spaced ⅜ inch apart allowing for adequate space between different types of content. Images should not be any smaller than 4 grid boxes, 7 ⅞ inches wide by 4 ⅜ tall. When using a large map or graphic they should be anchored in the top left corner of the grid and additional content should align below or to the right of the large map or graphic, when reading this sign from left to right it will be where the viewer starts on take in the content of the sign. Creating hierarchy between different types of content will help the viewer to digest the content more easily. Larger sized text callouts can be used to draw attention to important points and can help to break up large amounts of text. Bold titles within text can also be used to better segment text on an interpretive sign. Interpretive signs should be bilingual to better speak to more users. It is recommended to differentiate languages with different type weights for a quicker and easier navigation of content on the sign.

INTERPRETIVE

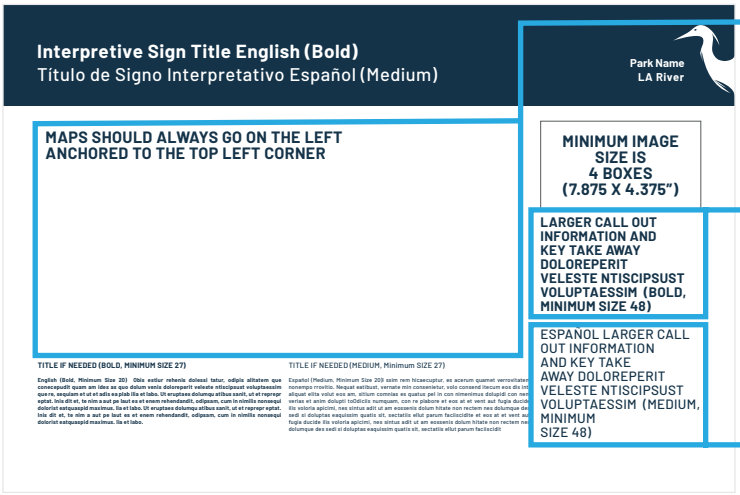


Figure 92. **Images or maps should also be incorporated into interpretive signs as focal points.**

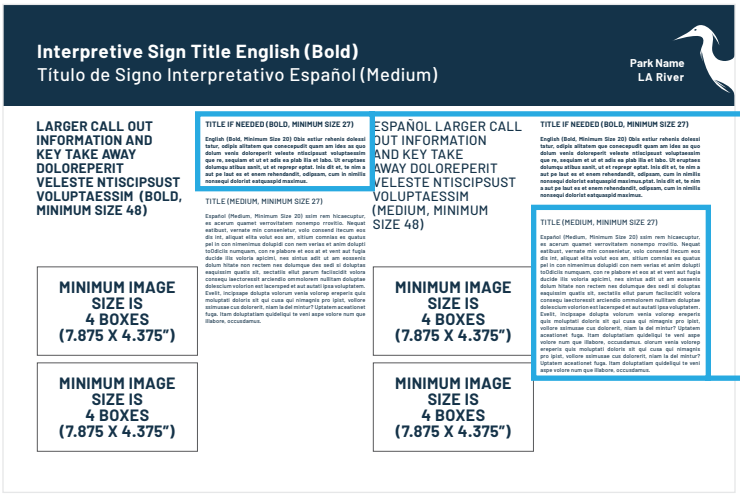


Figure 93. **Large callouts or quotes can be incorporated into interpretive signs to highlight key information.**

MAPS AND LARGE IMAGES/DIAGRAMS

Position: Top left corner, 1.6875" from left edge of sign, 0.75" from top blue Title Band

CALL OUT TEXT: ENGLISH

Font: Barlow - Bold, All Caps
Size: 48 pt minimum
Color: Pantone 282 C
Position: Left aligned; 1.6875" minimum from right edge of sign

CALL OUT TEXT: SPANISH

Font: Barlow - Medium, All Caps
Size: 48 pt minimum
Color: Pantone 282 C
Position: Left aligned; 1.6875" minimum from right edge of sign

INFORMATIONAL TEXT: ENGLISH

Font: Barlow - Bold, Sentence case
Size: 20 pt minimum
Color: Pantone 282 C
Position: Left justified, text box aligned with grid

INFORMATIONAL TEXT: SPANISH

Font: Barlow - Medium, Sentence case
Size: 20 pt minimum
Color: Pantone 282 C
Position: Left justified, text box aligned with grid

SIGN SPECIFICATIONS

- **Size:** 36x24"
- **Material:** Varies per project with anti-graffiti treatment
- **Background:** White
- **Header:** 5" tall Pantone 282 C band spanning width of sign
- **Margins from edge of sign:** 2" on top and bottom, and 1.6875" on left and right

INSTALLATION

- Along trail, not directly on circulation path
- Bottom of sign hung at a height where text is legible, on double posts if freestanding

NOTES

- Should always be bilingual
- Always confirm specifications with latest applicable guidelines

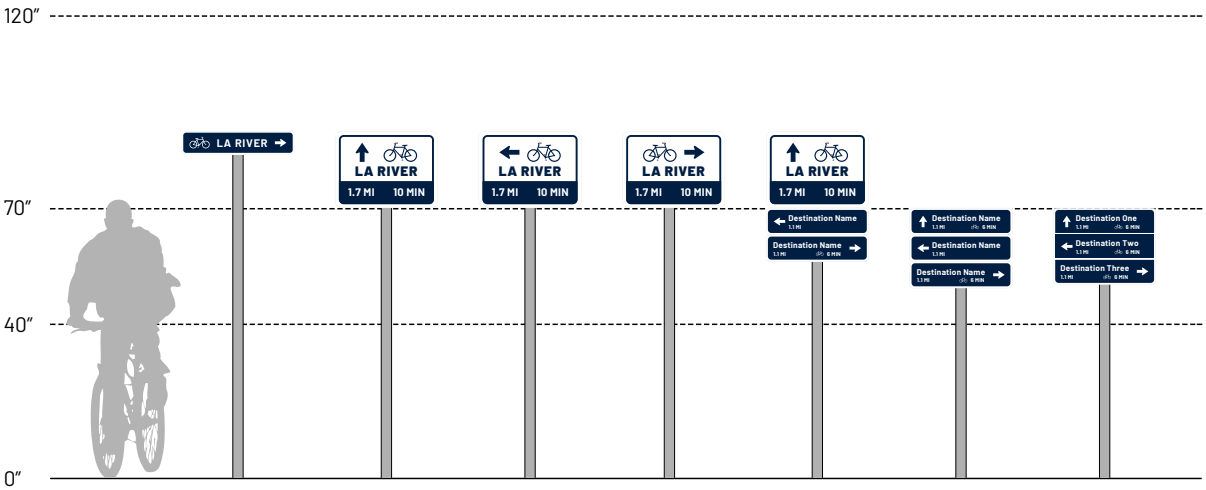


Figure 94. Directional environmental graphics should be placed along bike routes leading to the LA River and its access points and projects. Estimated times are based on an average six minute mile.

DIRECTIONAL

PURPOSE

Directional signs are used to alert travelers to the location of the river, multiuse trails, and river parks. They serve an important wayfinding function and will set traffic patterns to and from the river. Jurisdictionally, these signs will typically be located in Caltrans right-of-way, local municipalities' departments of transportation rights-of-way, or unincorporated LA County. All signs must conform to the appropriate jurisdictional regulations.

PLACEMENT

Directional environmental graphics should be placed along streets and at intersections that cater to pedestrians and cyclists. Locations chosen should direct users to the river's nearest access point.

To direct users to the LA River from local streets where a Class II or III bike path exists, use the directional environmental graphics for cyclists. To direct users to the LA River where there is no existing bike path, use signs that address both cyclists and pedestrians. For direction within 500ft of an access point, use signs with the directional arrow only.

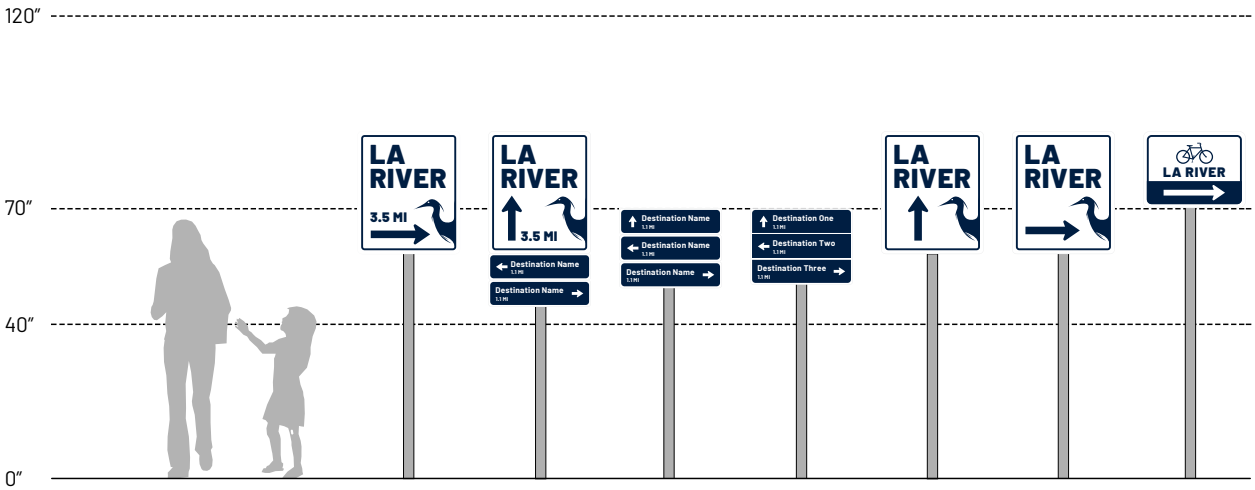


Figure 96. **Directional environmental graphics, communicating to both pedestrians and bicyclists, lead to the LA River and its access points and projects from a maximum of two miles away.**

MUTCD GUIDELINES OVERVIEW*

- All signs should be hung a minimum of 48″ above grade.
- An arrow pointing to the right, if used, shall be at the extreme right-hand side of the sign.
- An arrow pointing left or up, if used, shall be at the extreme left-hand side of the sign.

***Always use most recent MUTCD Guidelines. Guidelines at time of this publications were 2009 Edition, including Revisions 1 and 2 dated May 2012**

- On bicycle destination signs, a bicycle symbol shall be placed next to each destination or group of destinations. If an arrow is at the extreme left, the bicycle symbol shall be placed to the right of the respective arrow.
- The bicycle symbol should be to the left of the destination legend
- Although the standard design of symbol signs cannot be modified, the orientation of the symbol may be changed to better reflect the direction of travel, if appropriate.

Figure 95. **The above information is from the Manual on Uniform Traffic Contol Devices for Streets and Highways, 2009 Edition, including Revisions 1 and 2 dated May 2012, section 9B.20 Bicycle Guide Signs.** Source: 2009 MUTCD Edition with Revisions 1 and 2, 2012.

DIRECTIONAL BIKE ROUTE

MUTCD BIKE SYMBOL

Size: 8.75" wide, 5" high
Color: Pantone 282 C
Position: 1.5" from top blue border, 3.875" from right blue border

TITLE 1

Text: LA RIVER
Font: Barlow - Black, All Caps
Size: 2.5" high
Color: Pantone 282 C
Position: Center aligned,1.25" margin above and below, 3.875" left and right blue border

DISTANCE

Font: Barlow - Bold, All Caps
Size: 2" high
Color: White
Position: Left aligned, 2" from top and bottom of blue background, 2.5" from left of blue background

DIRECTIONAL ARROW

Size: 3.375" width of arrow head, length varies depending on direction pointing
Color: Pantone 282 C
Position: 2.25" from top blue border, 3.875" from right blue border

BLUE BORDER

Size: 0.5" width with 1.25" radius rounded corners
Color: Pantone 282 C

ESTIMATED TIME

Font: Barlow - Bold, All Caps
Size: 2" high
Color: White
Position: Right aligned, 2" from top and bottom of blue background, 2.5" from right of blue background

Figure 97. **Place directional bike route signs along bike routes leading to LA River. These signs include a directional arrow, the distance to LA River, and the estimated time to bike there.**

SIGN SPECIFICATIONS

- **Size:** 26.75x20" with 1.75" radius rounded corners
- **White border of sign:** 1" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** White with 0.5" blue border with 1.25" radius rounded corners
- **Margins within background:** 1.5" from top, 2" minimum on left and right, and 2" from bottom

INSTALLATION

- Along bike route, maximum two miles from LA River
- Bottom of sign hung between 70" and 120" off the ground

NOTES

- Arrow pointing right should appear on far right of sign, arrows point straight (up) and left should appear on the far left of sign
- Direction of MUTCD bike symbol travel should change to mimic direction of arrow
- Estimated time is based of a biking a six minute mile
- All bicycle route directional environmental graphics should be retroreflective per MUTCD requirements.
- Always confirm specifications with latest applicable guidelines

DIRECTIONAL BIKE ROUTE

Figure 98. **This LA River Bike Route Sign can be mounted above another MUTCD Bike Route sign within 2 miles of LA River access points. .**

MUTCD BIKE SYMBOL

Size: 5.25" wide, 3" high
Color: White
Position: 1.125" from top and bottom of blue background, 2" margin on left and right

TITLE 1

Text: LA RIVER
Font: Barlow - Bold, All Caps
Size: 2" high
Color: White
Position: 1.625" minimum to edge of blue background on all sides

DIRECTIONAL ARROW

Size: 2" width of arrow head, 3" long
Color: White
Position: 1.625" minimum to edge of blue background on all sides

SIGN SPECIFICATIONS

- **Size:** 29.25x6" with 0.75" radius rounded corners
- **White border of sign:** 0.375" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** Pantone 282 C with 0.75" radius rounded corners
- **Margins within background:** 1.625" on top and bottom, and 1.625" minimum on left and right

INSTALLATION

- Mounted above MUTCD Bike Route signs or stand alone within two miles of river access point

NOTES

- Arrow pointing right should appear on far right of sign, arrows point straight (up) and left should appear on the far left of sign
- Direction of MUTCD bike symbol travel should change to mimic direction of arrow
- The bicycle symbol should be to the left of the destination name
- All bicycle route directional environmental graphics should be retroreflective per MUTCD requirements.
- Always confirm specifications with latest applicable guidelines

Figure 99. **This LA River bike route sign can be mounted above another MUTCD bike route sign within 2 miles of LA River access points.**

TITLE 1

Text: LA RIVER
Font: Barlow - Bold, All Caps
Size: 2" high
Color: White
Position: 1.625" minimum to edge of blue background on all sides

DIRECTIONAL ARROW

Size: 2" width of arrow head, 3" long
Color: White
Position: 1.625" minimum to edge of blue background on all sides

SIGN SPECIFICATIONS

- **Size:** 24x6" with 0.75" radius rounded corners
- **White border of sign:** 0.375" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** Pantone 282 C with 0.75" radius rounded corners
- **Margins within background:** 1.625" on top and bottom, and 1.625" minimum on left and right

INSTALLATION

- Mounted above MUTCD bike route signs within two miles of river access point

NOTES

- Arrow pointing right should appear on far right of sign, arrows point straight (up) and left should appear on the far left of sign
- Width of sign should match the width of the MUTCD bike route sign it is mounted above. Always confirm specifications with latest applicable guidelines

DIRECTIONAL BIKE DESTINATION PANELS

GROUPING DIRECTIONAL SIGNS

When adding directional destination bike panels below directional bike route signs, maximum destinations cannot exceed three

DESTINATION NAME

Font: Barlow - Bold, Title Case
Size: .625" minimum height of capital letter
Color: White
Position: Left aligned; 1.5" minimum margin on all sides from edge of blue background

ESTIMATED TIME

Font: Barlow - Bold, All Caps
Size: 1" high
Color: White
Position: 1" minimum margin on all sides from edge of blue background and bike symbol

DIRECTIONAL ARROW

Size: 2" width of arrow head, 3" long
Color: White
Position: 1.5" minimum to edge of blue background on all sides, 1" minimum from text

MUTCD BIKE SYMBOL

Size: 2" wide, 1.25" high
Color: White
Position: 1" from bottom of blue background, 15.5" from left edge of blue background

DISTANCE

Font: Barlow - Bold, All Caps
Size: 1" high
Color: White
Position: Left aligned with Destination Name, 1" from bottom of blue background, 1.5" minimum from left of blue background

Figure 100. LA River directional bike destination sign panels direct users to major destinations and provide the distance and estimated time to bike there. Separate panels allow for multiple destinations to be added over time.

SIGN SPECIFICATIONS

- **Size:** 26.75x7" with 0.875" radius rounded corners
- **White border of sign:** 0.5" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** Pantone 282 C with 0.875" radius rounded corners
- **Margins within background:** 1.5" minimum on all sides

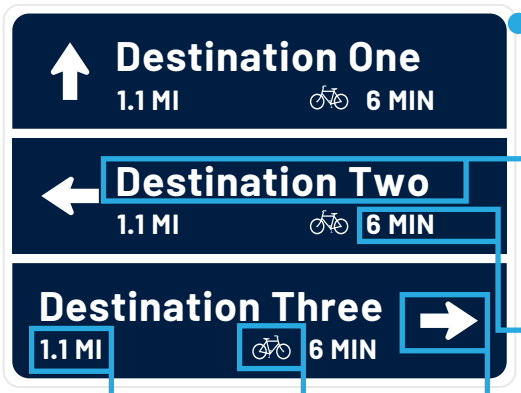
INSTALLATION

- Along bike route, maximum two miles from LA River
- Bottom of sign hung between 48" and 70" off the ground

NOTES

- When grouping destination signs, maximum three destinations can be grouped per MUTCD standards
- The order of signs hung below must be hung with straight (up) arrow on top, followed by destinations to the left, and then destinations to the right
- Arrow pointing right should appear on far right of sign, arrows point straight (up) and left should appear on the far left of sign
- Direction of MUTCD bike symbol travel should change to mimic direction of arrow
- Estimated time is based of a biking a six minute mile
- All bicycle route directional environmental graphics should be retroreflective per MUTCD requirements
- Always confirm specifications with latest applicable guidelines

DIRECTIONAL BIKE DESTINATION COMBINATION SIGN



GROUPING DIRECTIONAL SIGNS

When adding directional destination bike panels below direction bike route signs, maximum destinations cannot exceed three

DESTINATION NAME

Font: Barlow - Bold, Title Case
Size: .625" minimum height of capital letter
Color: White
Position: Left aligned; 1.5" minimum margin on all sides from edge of blue background

ESTIMATED TIME

Font: Barlow - Bold, All Caps
Size: 1" high
Color: White
Position: 1" minimum margin on all sides from edge of blue background and bike symbol

DIRECTIONAL ARROW

Size: 2" width of arrow head, 3" long
Color: White
Position: 1.5" minimum to egde of blue background on all sides, 1" minimum from text

MUTCD BIKE SYMBOL

Size: 2" wide, 1.25" high
Color: White
Position: 1" from bottom of blue background, 15.5" from left edge of blue background

DISTANCE

Font: Barlow - Bold, All Caps
Size: 1" high
Color: White
Position: Left aligned with Destination Name, 1" from bottom of blue background, 1.5" minimum from left of blue background

Figure 101. This LA River directional bike destination sign combination allows for all three destinations to live on a singular sign.

SIGN SPECIFICATIONS

- **Size:** 26.75x20" with 0.875" radius rounded corners
- **White border of sign:** 0.5" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** Pantone 282 C with 0.875" radius rounded corners
- **Margins within background:** 1.5" minimum on all sides

INSTALLATION

- Along bike route, maximum two miles from LA River
- Bottom of sign hung between 48" and 70" off the ground

NOTES

- This single sign is a combination of the maximum three destination allowed per MUTCD standards, as opposed to three separate signs panels
- The order of signs must be hung with straight (up) arrow on top, followed by destinations to the left, and then destinations to the right
- Arrow pointing right should appear on far right of sign, arrows point straight (up) and left should appear on the far left of sign
- Direction of MUTCD bike symbol travel should change to mimic direction of arrow
- Can include logo to left of Destination Name (e.g. Metro logo), height of logo or icon should not exceed height of capital letter in Destination Name
- Estimated time is based of a biking a six minute mile
- All bicycle route directional environmental graphics should be retroreflective per MUTCD requirements.
- Always confirm specifications with latest applicable guidelines

DIRECTIONAL WITH DISTANCE

TITLE 1

Text: LA RIVER
Font: Barlow - Black, All Caps
Size: 2.5" high
Color: Pantone 282 C
Position: Left aligned, 2" from top and left blue border

HERON GRAPHIC

Size: 11.75" high
Color: Pantone 282 C
Position: Flush right with blue border; 2" from bottom blue border

DISTANCE

Font: Barlow - Black, All Caps
Size: 2.5" high
Color: Pantone 282 C
Position: Left aligned; 1.5" from arrow tail on left, 2" from bottom blue border

DIRECTIONAL ARROW

Size: 5.25" width of arrow head, length varies depending on direction pointing
Color: Pantone 282 C
Position: 2" from bottom of Title 1 above, 2" from left and bottom blue border

BLUE BORDER

Size: 0.5" width with 0.875" radius rounded corners
Color: Pantone 282 C

Figure 102. Large directional signs provide direction and distance to the LA River and serve as a visual marker.

SIGN SPECIFICATIONS

- **Size:** 26.75x32" with 1.25" radius rounded corners
- **White border of sign:** 1" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** White with 0.5" blue border with 1.25" radius rounded corners
- **Margins within background:** 2" on all sides

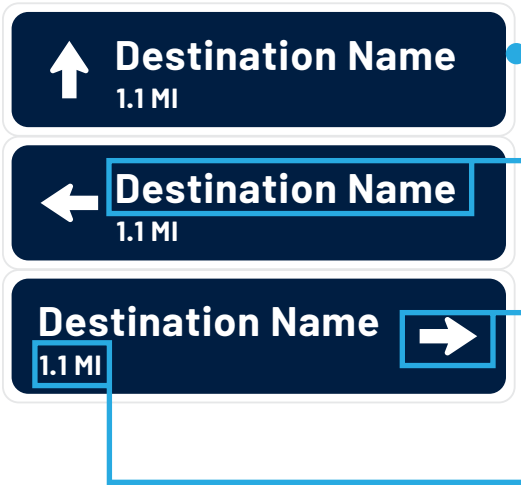
INSTALLATION

- Key locations leading up to LA River Access Point from maximum two miles out to minimum 0.5 miles, includes distance
- Bottom of sign hung between 48" and 70" off the ground

NOTES

- When grouping destination signs, maximum three destinations can be grouped per MUTCD standards (i.e. two destination panels can be hung below this large LA River directional sign)
- The order of signs hung below must be hung with straight (up) arrow on top, followed by destinations to the left, and then destinations to the right
- Always confirm specifications with latest applicable guidelines

DIRECTIONAL PEDESTRIAN DESTINATION PANELS



GROUPING DIRECTIONAL SIGNS

Maximum destinations cannot exceed three

DESTINATION NAME

Font: Barlow - Bold, Title Case
Size: .625" minimum height of capital letter
Color: White
Position: Left aligned; 1.5" minimum margin on all sides from edge of blue background

DIRECTIONAL ARROW

Size: 2" width of arrow head, 3" long
Color: White
Position: 1.5" minimum to edge of blue background on all sides, 1" minimum from text

DISTANCE

Font: Barlow - Bold, All Caps
Size: 1" high
Color: White
Position: Left aligned with Destination Name, 1" from bottom of blue background, 1.5" minimum from left of blue background

Figure 103. LA River directional destination sign panels direct users to major destinations and the distances to them. At a maximum, three should be stacked together per MUTCD guidelines.

SIGN SPECIFICATIONS

- **Size:** 26.75x7" with 0.875" radius rounded corners
- **White border of sign:** 0.5" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** Pantone 282 C with 0.875" radius rounded corners
- **Margins within background:** 1.5" minimum on all sides

INSTALLATION

- Key locations leading up to LA River Access Point from maximum two miles out to minimum 0.5 miles
- Bottom of sign hung between 48" and 70" off the ground

NOTES

- When grouping destination signs, maximum three destinations can be grouped per MUTCD standards
- The order of signs must be hung with straight (up) arrow on top, followed by destinations to the left, and then destinations to the right
- Arrow pointing right should appear on far right of sign, arrows point straight (up) and left should appear on the far left of sign
- Can include logo to left of Destination Name (e.g. Metro logo), height of logo or icon should not exceed height of capital letter in Destination Name
- Always confirm specifications with latest applicable guidelines

DIRECTIONAL WITHOUT DISTANCE

Figure 104. LA River large directional signs should be used within 0.5 miles from the LA River. Mile numbers do not appear on signs within 0.5 miles of the destination.

Figure 105. LA River bike route directional sign does not show the distance and estimated time when within 0.5 miles of the LA River.

SIGN SPECIFICATIONS

- **Size:** 26.75x32" with 1.25" radius rounded corners
- **White border of sign:** 1" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** White with 0.5" blue border with 1.25" radius rounded corners
- **Margins within background:** 2" on all sides

INSTALLATION

- Key locations leading up to LA River Access Points, maximum 0.5 miles out, does not include distance

NOTES

- Always confirm specifications with latest applicable guidelines

SIGN SPECIFICATIONS

- **Size:** 26.75x20" with 1.75" radius rounded corners
- **White border of sign:** 1" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** White with 0.5" blue border with 1.25" radius rounded corners
- **Margins within background:** 1.5" from top, 3.875" left and right, and 1" from bottom

INSTALLATION

- Along bike route leading up to LA River Access Point, maximum 0.5 miles out, does not include distance
- Bottom of sign hung between 70" and 120" off the ground

NOTES

- Direction of MUTCD bike symbol travel should change to mimic direction of arrow
- All bicycle route directional environmental graphics should be retroreflective per MUTCD requirements. Should change to mimic direction of arrow
- Always confirm specifications with latest applicable guidelines

MILE MARKERS

TITLE 1

Text: MILE
Font: Barlow - Black, All Caps
Size: 1" high
Color: White
Position: Center aligned, 0.4375" from top edge of blue background

RIVER MILE NUMBER

Font: Barlow - Black
Size: 2.5" high (wide)
Color: White
Position: Center aligned top to bottom, centered left-right; turned 90° clockwise; 0.75" minimum from top edge of blue background, 1.375" from left and right edge of blue background

TITLE 2

Text: LA RIVER
Font: Barlow - Bold, All Caps
Size: 0.5" high
Color: Pantone 282 C
Position: Center aligned, 0.25" from edge of blue background above

BANK LOCATION

Font: Barlow - Bold, All Caps
Size: 0.5" high
Color: Pantone 282 C
Position: Center aligned, 0.8125" from bottom of sign, 0.8125" minimum margin on left and right

Figure 106. Mile markers must appear every 0.5 miles along the LA River. The mile number and bank side are clear and helpful indicators for travelers and emergency responders.

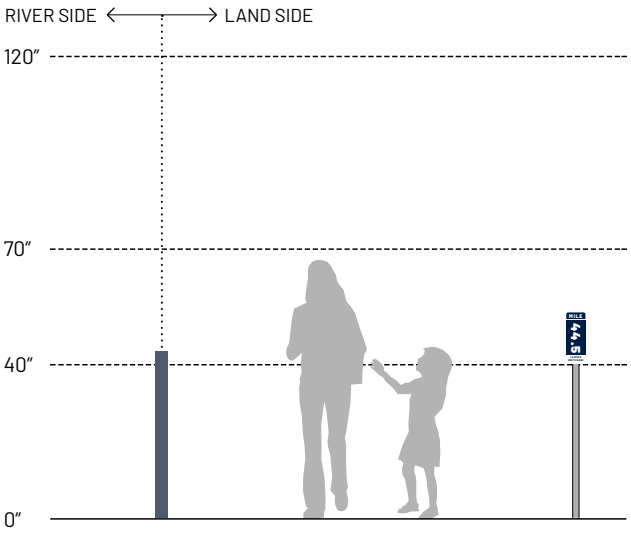


Figure 107. Mile markers should be hung so that the bottom of the sign is at is 40" above grade.

SIGN SPECIFICATIONS

- **Size:** 6x14.5" with 0.5" radius rounded corners
- **White border of sign:** 0.375" on all sides
- **Material:** Aluminum with anti-graffiti film overlay
- **Background:** Pantone 282 C with 0.5" radius rounded corners
- **Margins within background:** 0.4375" minimum on all sides

INSTALLATION

- On land side of trail, every 0.5 miles
- Bottom of sign hung at 40" off the ground

NOTES

- Two signs should be installed sandwiching the pole so that the sign faces both directions of travel
- Always confirm specifications with latest applicable guidelines

MILE MARKERS

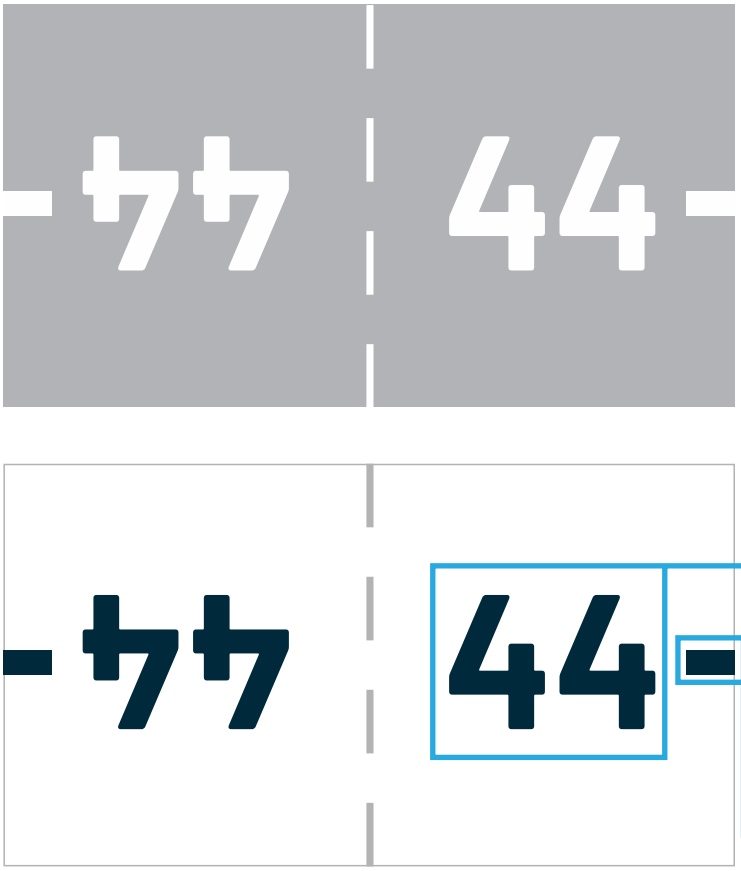
PURPOSE

Mile markers are a new and important signage type to the LA River. A cohesive system of mile numbering along the LA River unifies all 51 miles and helps users identify their location along river trails. Further, having consistent numbering strengthens public safety by allowing people to easily locate themselves along the river for emergency responders. Mile markers demarcate the distance from the outfall into the ocean (river mile 0) to the headwaters (river mile 51). Mile markers also indicate what side of the river someone is on. Bank sides are determined when looking north, up the river. Miles 0 to 32 are denoted as west and east banks, and at river mile 32, at the bend in the river, it switches to north and south banks.

PLACEMENT

Mile markers should be placed every half mile, facing both directions of travel, along the trail on the landside of the trail.

PAVEMENT MARKINGS



RIVER MILE NUMBER

Font: Barlow - Bold
Size: 22" high
Color: Pantone 282 C when on light concrete, white when on asphalt (match treatment of existing lines)
Position: Center aligned in lane; 13" minimum on left and right to edge of trail and center of trail

1/10 MILE TICK

Size: 8" wide, 4" high
Color: Pantone 282 C when on light concrete, white when on asphalt (match treatment of existing lines)
Position: Right aligned, flush to edge of trail; center aligned vertically with river mile number

Figure 108. LA River pavement markings alert users to their river mile location along the trail.

INSTALLATION

- On ground of trail, facing both directions of travel
- Number occurs every mile, and tick on edges of trail occurs every 1/0 mile

NOTES

- Color varies depending on color of trail paving, match treatment of existing lines

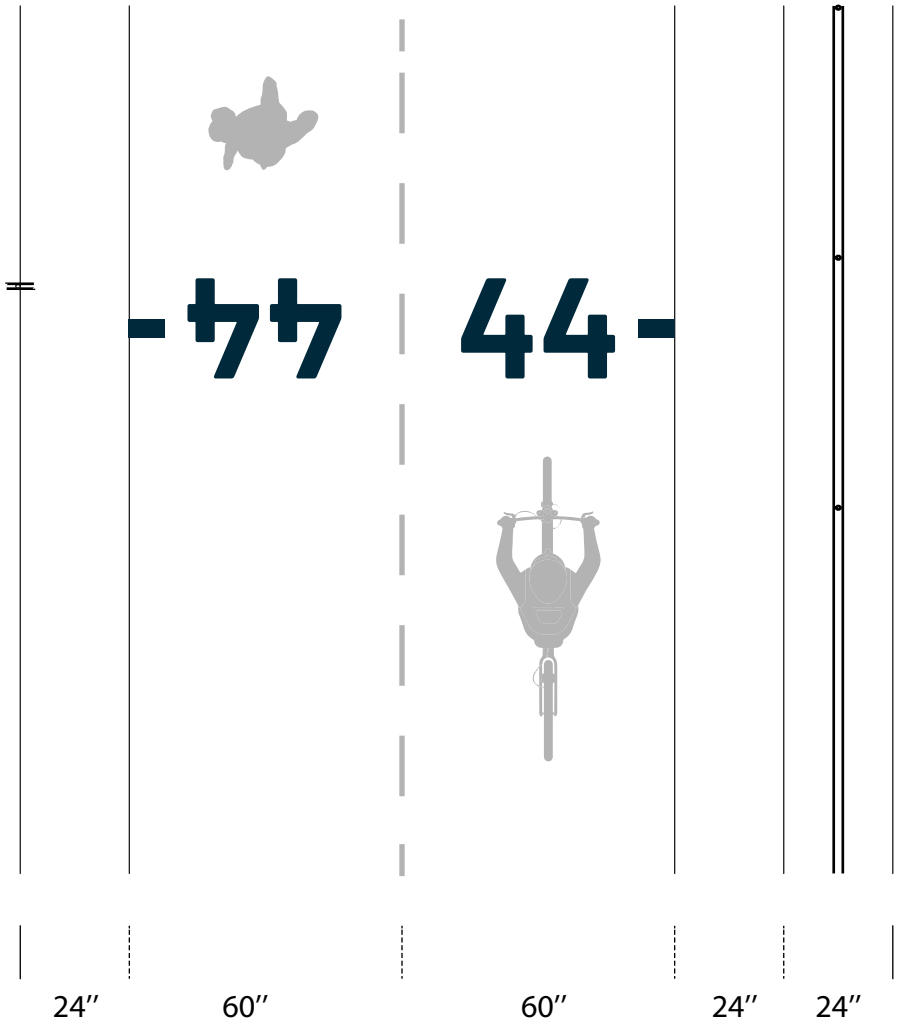


Figure 109. Pavement markings should be placed so that they face the direction of travel.

PAVEMENT MARKINGS

PURPOSE

Pavement marking occur on the pavement of multiuse trails along the LA River and demarcates the distance from the outfall into the ocean (river mile 0) to the headwaters (river mile 51). Pavement markings should consist of either water-based or thermoplastic paint (contractor-grade acrylic striping paint, alkyd, or chlorinated rubber striping paint). Consider skid resistance, reflectivity, and durability when selecting materials, as well as ADA requirements for visibility. Refer to page 153 for more information on thermoplastic paint as necessary.

PLACEMENT

Pavement markings including the large mile number must be incorporated at every mile on all paved paths along the LA River trail, including bikeways and multiuse trails, and facing both directions of travel. Every tenth of a mile shall be marked with only the horizontal ticks on both sides on far outsides of the path as well as in the middle of the path, not including the large mile number.

LARGE SCALE ICON GRAPHICS

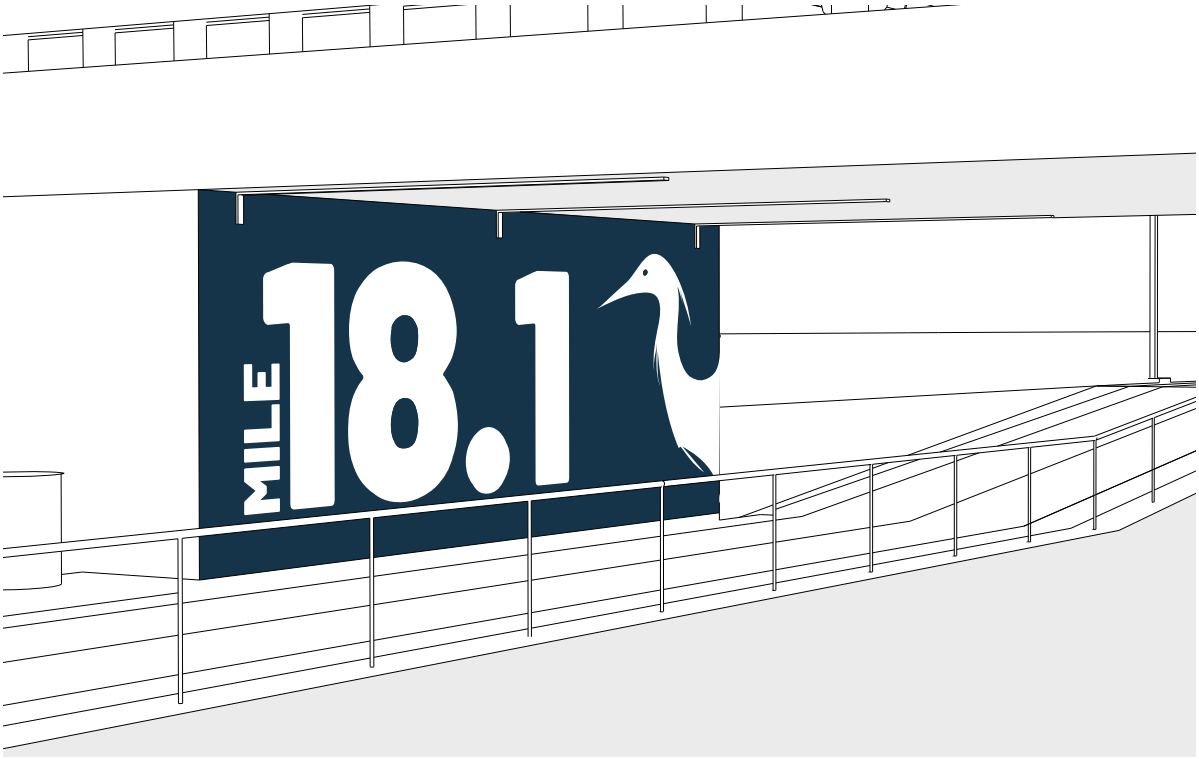


Figure 110. Underpasses are an opportunity for large scale icon graphics and can alert users to their river mile location.

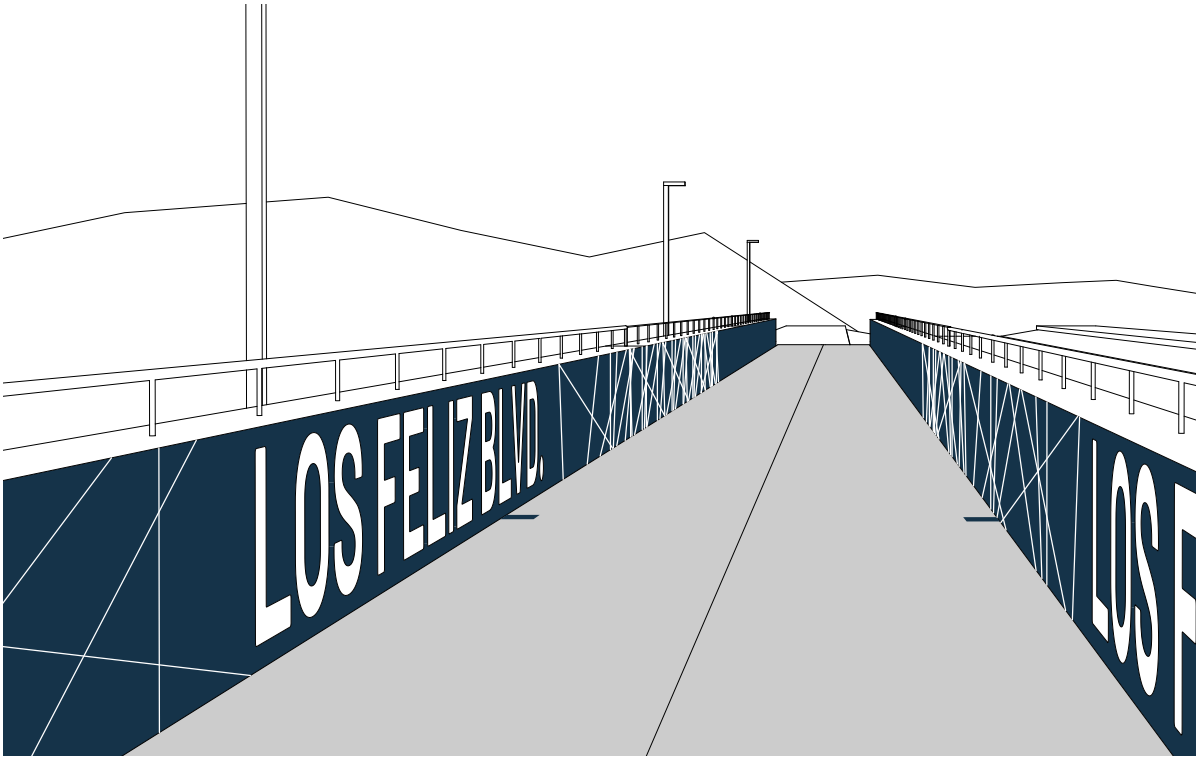


Figure 111. Bridges and overpasses are opportunities for large scale icon graphics and can alert users to street crossings underneath.

LARGE SCALE ENVIRONMENTAL GRAPHICS ALLOW FOR OPPORTUNITIES OF UNIQUE COMMUNITY EXPRESSION

LARGE SCALE ICON GRAPHICS

PURPOSE

Integration with architecture, art, and design can best occur with creative use of large scale icon graphics. These environmental graphics are a critical component in the reduction of sign clutter, and can help inform users about their location along the trail or direct them to the LA River. Large scale icon graphics have the most flexibility in their expression and are a compelling way to incorporate art into wayfinding. Alternative wall treatments, such as textured finishes and vine planting can also be considered.

PLACEMENT

Placement of large scale icon graphics is up to the discretion of the artist(s). They could be placed along blank walls, underpasses, or other key moments to highlight the river mile number or adjacent communities.

PAVEMENT MARKINGS

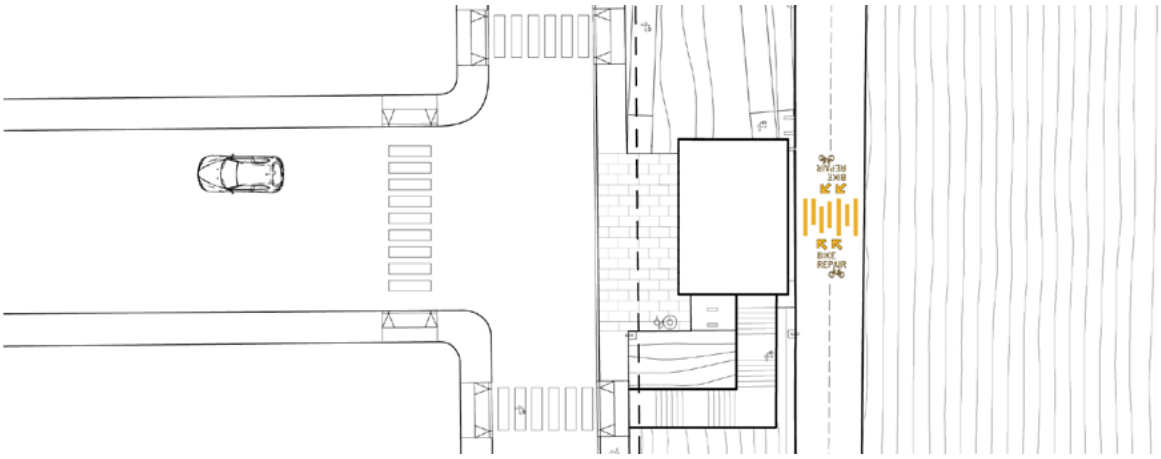


Figure 112. Pavement Markings can be customized along the LA River trail at gateways to allow for the integration of community expression.

COMMUNITY EXPRESSION

Within the suite of LA River environmental graphics, there are opportunities for unique community expression. Certain elements can be customized, while other elements should stay consistent for legibility and clarity in wayfinding.

The following types of environmental graphics must be consistent throughout the LA River:

- Regulatory
- Confirmation
- Directional
- Mile markers
- Pavement markings (only at river pavilion or gateway moments where other regulatory markings are suspended)

The following types of environmental graphics can be modified for an individual project as long as certain elements remain consistent:

- Pavement markings
- Informational
- Interpretive signs and displays
- Large scale icon graphics

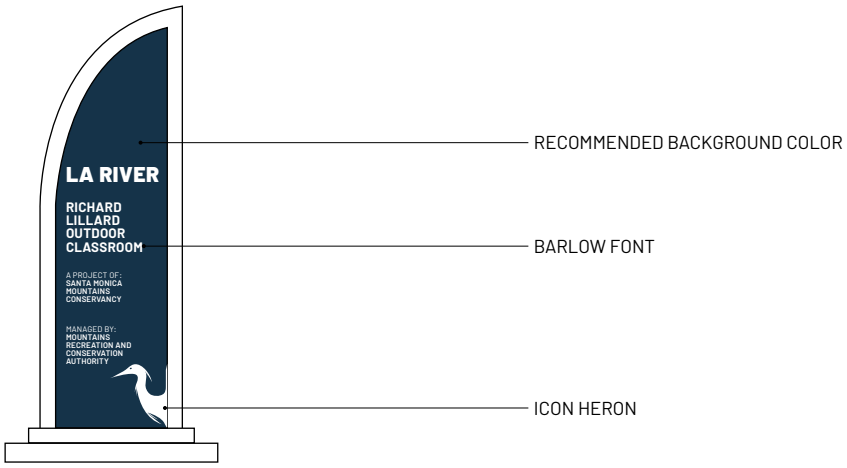
Within the signs that can be modified, the following elements should remain consistent:

- Barlow font
- Heron symbol or icon
- The required background color (the color variation in natural uncoated materials and other neutral colors are allowed).

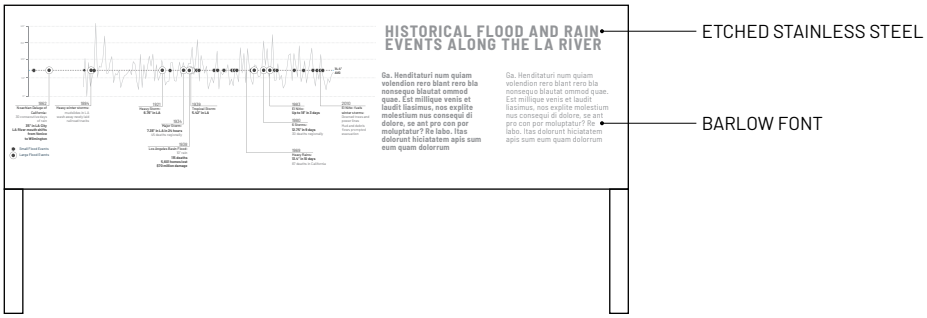
An exception is with large scale icon graphics, where the artist(s) have discretion on the final product. Materials in these four types of environmental graphics can be modified as long as they are water quality compliant (non-toxic and will not leach off into the river). Further, the form and content of the environmental graphics can be modified.

ENVIRONMENTAL GRAPHICS, AS WELL AS OTHER FORMS OF COMMUNITY EXPRESSION THAT ADHERE TO THESE GUIDELINES, CAN BE CUSTOMIZED FOR EACH PROJECT

INFORMATIONAL EXAMPLE



INTERPRETIVE EXAMPLE



LARGE SCALE ICON GRAPHICS EXAMPLE

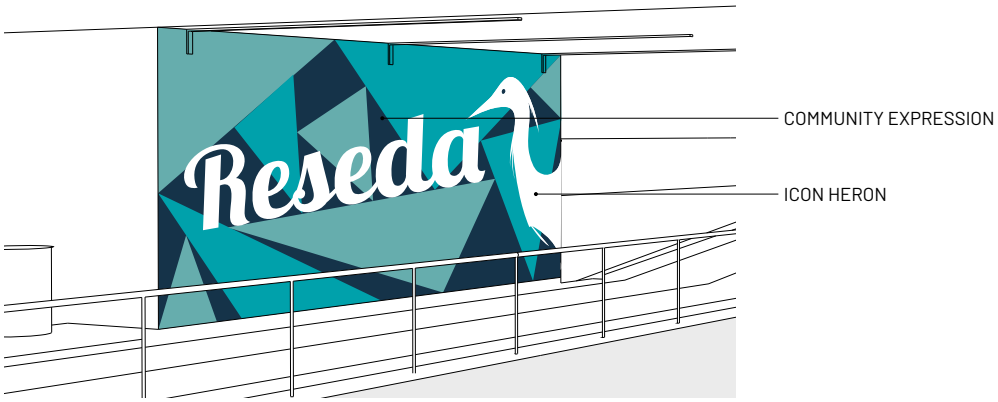


Figure 113. Elements of informational environmental graphics, interpretive signs and displays, and large scale icon graphics can all be customized for specific projects. Designers can create their own approaches within the outlined parameters on a project by project basis.

INSTALLATION & MAINTENANCE

Responsibility for maintaining signs should be determined prior to installation. Agencies may have requirements for inventory of signs within their jurisdiction. The Operational Services Division of LAC Public Works should be notified appropriately of all signs that they will be responsible for maintaining.

Required maintenance consists of regular inspections for vandalism, cleaning and repair as necessary and periodic replacement. A UV coating on aluminum inhibits fading of sign colors, but aluminum signs likely will need replacement after five to ten years. Frequent vandalism may shorten the lifespan.

SIGN MOUNTING

Where possible, signs should be mounted onto existing posts. For brand new sign installation for either new sign types or in completely new projects, these guidelines should be followed:

- Posts should be steel tube posts with finish matching RAL 9007.
- The post cap should be made from welded aluminum with all edges and corners neatly finished.
- The sign should be mounted to bracket with tamper-proof bolts, lock washers, and nuts.
- Natural rock bases or podiums should be avoided due to maintenance concerns.

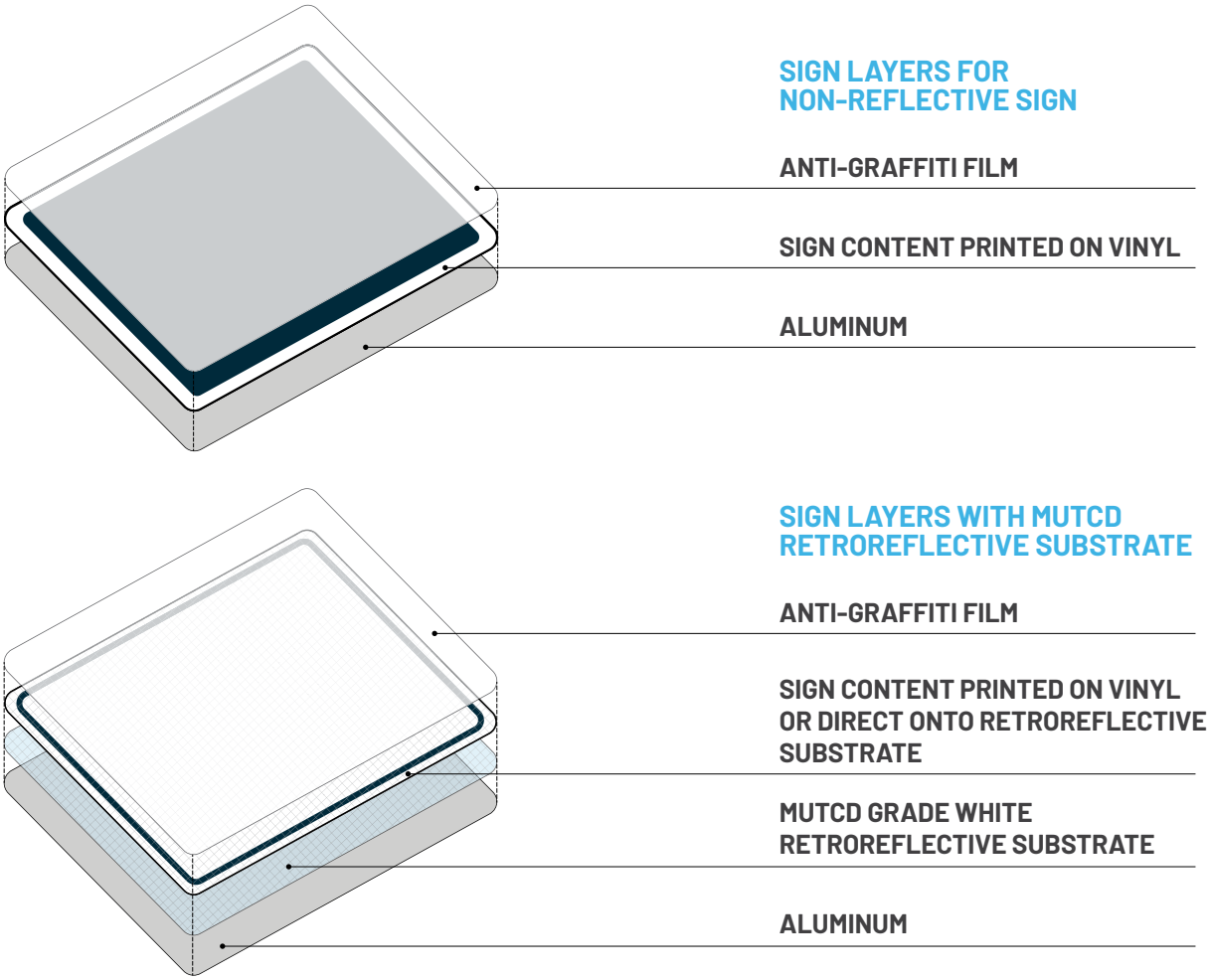


Figure 114. **Common layers of an aluminum sign include anti-graffiti film, printed vinyl, and retroreflective substrate on aluminum. The best application of applied graphics using vinyl or print is to be determined by fabricator. Always confirm with the fabricator that graphics are protected for exterior environments.**

VANDALISM

Many signs installed along the LA River will likely be vandalized at some point. Typical vandalism may be spray paint, etching or other destruction. Regular and diligent inspection of all signs is recommended on a weekly basis. At the time of inspection, if vandalism is found it should be immediately repaired or cleaned.

Aluminum signs are manufactured with an anti-graffiti coating. Anti-graffiti coatings and protective film must be specified to have a satin, non-glare finish for ADA compliance. The coating allows spray paint to be cleaned off using commercial products that are applied directly to the sign to wipe off spray paint. For other posts or surfaces, an anti graffiti barrier can be used to add a clear protective coating to painted wood, aluminum, metal, masonry, bricks, concrete, and stone.

Figure 115. Aluminum with rounded corners is used as the base of many types of signs. Source: OLIN, 2019.

Figure 116. Retroreflective substrates, colored film, and clear anti-graffiti film layer on top of aluminum to create the graphic of a sign. Source: OLIN, 2019.

RAL 9007

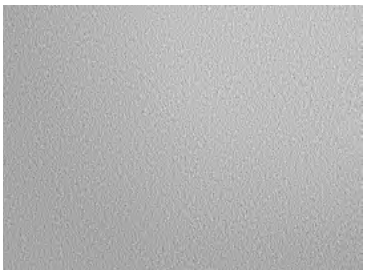


Figure 117. New sign posts should be RAL 9007.

MATERIALS

The materials used for environmental graphics are very important for its consistency and performance once installed. Required materials for the signs in these guidelines are 0.080 thick aluminum with rounded corners and an anti-graffiti film layer. Anti-graffiti film provides a cleanable and clear layer on top of the graphics of a sign, and if damage is severe enough can be a layer that is removed entirely for ease of maintenance. Always confirm with the fabricator that graphics are protected for exterior environments, including UV protection to avoid fading. Best application of applied graphics using vinyl or direct print to be determined by fabricator.

A retroreflective substrate should only be used on all bicycle route directional environmental graphics per MUTCD requirements. Refer to latest MUTCD guidelines for the most current level of retroreflectivity requirements.

PAVEMENT MARKING PAINT

WATER-BASED

- ENVIRONMENTAL IMPACT: Low
- COST: Medium
- DURABILITY: Medium

SOLVENT-BASED

- ENVIRONMENTAL IMPACT: High
- COST: Low
- DURABILITY: High

THERMOPLASTIC

- ENVIRONMENTAL IMPACT: Low
- COST: High
- DURABILITY: Very High

COLD PLASTIC

- ENVIRONMENTAL IMPACT: Low
- COST: Medium
- DURABILITY: Medium

Recommended

Figure 118. There are many options of paint for pavement markings. Thermoplastic and water-based paints are recommended for use along the LA River based on their durability and environmental impact.

Figure 119. Thermoplastic paint is a durable option for pavement markings on asphalt. Source: LeManna, Shutterstock.com, 2020.

BIKE TRAIL PAINT

Where possible, paints should be chosen for low environmental impact while balancing out initial and long-term O&M costs. The main types of paint include: water based (e.g., acrylic), solvent based, thermoplastic, and cold plastic. They are all applicable to asphalt and concrete and require primer before application. Reflective beads can be added to most types of paint to increase reflectivity.

Water based paints have the lowest environmental impact in production, application, and removal. When freezing temperatures are not a concern, water based paints are similar to durability as solvent based paints.

When specifying for bike trail paint, note the following considerations though many more exist and should be researched before final specifications are written: Water based paint should be specified as lead-free; Solvent based and thermoplastic paints should be specified with various Volatile Organic Compound (VOC) compliance standards depending on the additive (epoxy,polyurea, acetone, etc.); Caltrans and Federal Type I approved paint lists can be referenced and are widely available (The main difference between Federal and Caltrans approved guidelines are freezing temperature durability and differences in VOC compliance); Additional additives for texture and durability should be consulted for each type of paint, especially thermoplastics.

ENVIRONMENTAL GRAPHICS CHECKLIST

Reference the LACFCD and Public Works Permitting checklist on page 36 for an overview of project permitting and applicable codes.

Detailed Technical Requirements Checklist for Environmental Graphics

Standard Design Features

- □ Provide technical drawings showing signs matching specified requirements for current ADA font, size, contrast, bilingual content, braille, and Indigenuos Peoples references per permitting matrix on pg 118.
- □ Follow sign design template files available for download here: (Final link to be included in final guidelines)
- □ Ensure that any custom modifications occur only in these` environmental graphics categories: Informational, Interpretive Signs and Displays, and Large Scale Icon Graphics. Further, ensure that consistent elements are followed.

Placement and Sequence of Environmental Graphics

- □ Avoid sign clutter where possible.
- □ Follow placement of signs as recommended in Chapter 4. Show proposed sign placements in plan.
- □ Define scale of project (XS, S, M, L, XL - further defined in programming section in Chapter 2). Ensure lateral wayfinding and environmental graphics within project is installed leading to the project per the table page 116.
- □ Show that proposed heights of signs follow the recommendations for the appropriate category in this chapter.

Detailed Maintenance Program Checklist for Environmental Graphics

- □ Define jurisdiction responsible for ongoing maintenance and repair of environmental graphics.
- □ Specify appropriate anti-graffiti and UV film.
- □ Establish schedule for routine checks for vandalism, graffiti, or weathering (recommended on a weekly basis). Address minor fixes or replace signs as needed.

Figure 120. Vegetation Classification. Much of the vegetation around the LA River is degraded or mostly comprised of non-native plant species.
Source: LA River Master Plan, 2020.

5.
ECOLOGY, HABITAT, AND PLANTING

THE RIVER'S CAPACITY TO SUPPORT NATIVE HABITATS IS DETERMINED BY CONDITIONS UNIQUE TO EACH FRAME, FROM ITS CHANNEL SHAPE TO URBAN CONTEXT TO HYDROLOGIC CONDITIONS

Despite being highly urbanized, the LA River watershed sits within one of the world's most diverse Mediterranean biodiversity hotspots. The river's capacity to support biological life is determined by hydrological conditions, channel geometry, and connectivity across and along the river to adjacent patches and habitat areas.. The guidelines for ecology and planting are thus guided by the unique biodiversity of the region and characteristics of the river's distinct reaches.

With further connectivity and habitat enhancement, the river has the potential to increase urban biodiversity given the high natural biodiversity occurring nearby in the region's large inland protected areas. Additionally, elements of the river's former ecology can be reintroduced where appropriate to reestablish many of the rare riparian and upland ecosystems that have been lost to urbanization. However, the resilience of these native ecosystems to changes in hydrology and climate should also be considered and, where needed, planting palettes should be augmented and adaptively managed.

WHAT'S IN THE CHAPTER

The following pages contain the guidelines for the design and installation of planting along the LA River. This chapter will provide information regarding planting setbacks and buffers, planting along levee and floodwalls, and channel modifications among other aspects related to the creation of habitats and functioning ecosystems. Further, extensive LA River plant community lists are in this chapter, described in detail starting on page 208.

The designer or engineer shall be responsible for ensuring the implementation of these guidelines is compliant with prevailing building codes and regulations. Consult the checklist at the end of the chapter to ensure the correct guideline items are followed.

Figure 121. Chapter 5 of this document covers items related to ecology, habitat, and planting in and along the LA River.

DESIGNERS SHOULD PLANT SPECIES APPROPRIATE TO THE PROJECT'S PLANNING FRAME, AND PROVIDE SUCCESSIONAL DEVELOPMENT OF PLANTINGS INTO COMMUNITIES OF PLANTS

CONSIDERATIONS FOR ECOLOGICAL PROJECT SUCCESS

To ensure success in habitat and planting projects along the LA River, design considerations must include everything from site preparation to sourcing plant material to maintenance post installation. These guidelines put forward the following values for projects along the river:

- Plant species appropriate to the planning frame of the project.
- Provide successional development of plantings into communities of plants that are ultimately best suited to the conditions of their environment.
- Provide a continuous native tree and plant corridor along the river with linkages to riparian habitat and upland areas in close proximity to the river.
- Support nurseries and organizations that specifically collect and propagate indigenous native plant species for planting along the river corridor.
- Achieve healthy soil biology, not just chemistry, by providing the critical foundation for each stage of succession that will ultimately host a sound ecological system.
- Eradicate invasive species, and deter the use of non-native species that provide little or no habitat value.
- Encourage the use of permeable paving solutions, filtration and percolation of rainwater, and on site water retention/ detention to mitigate/eliminate water pollution and to reduce runoff.
- Consider the resilience of the LA River system and the future effects of climate change in project planning and design.
- Ensure there is a maintenance plan for the installed landscape that is appropriate to the needs of the planted species.
- Provide opportunities for artwork through habitat creation and planting.

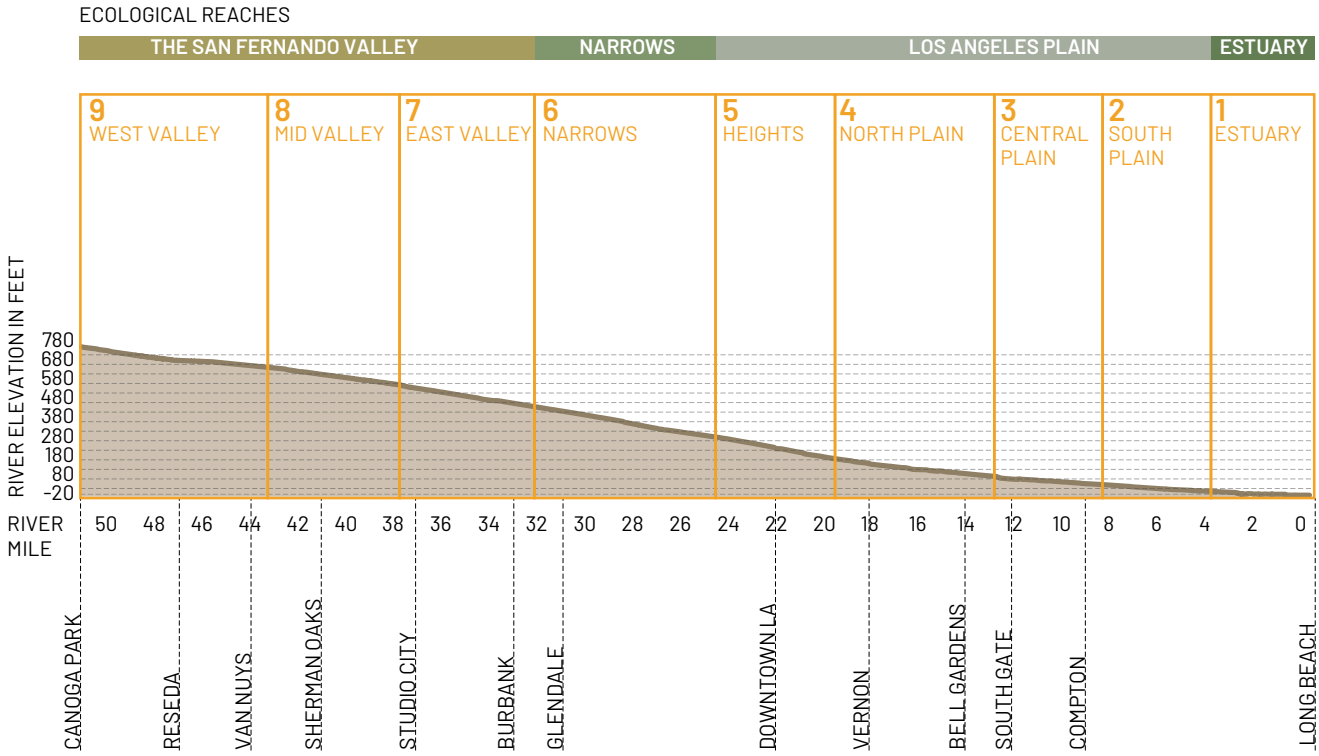


Figure 122. Depicted here with a 4x vertical exaggeration, the LA River changes approximately 780 feet in elevation over its course of 51 miles and passes through several distinct ecological reaches, from the San Fernando Valley to the Estuary.

THE LIMITED LANDSCAPE MANAGEMENT ZONE, SET 17' BACK FROM ANY ENTRENCHED CHANNEL WALL, LIMITS PLANTING IN THIS ZONE TO SHRUBS AND GROUNDCOVER NOT TO EXCEED 3-5' IN HEIGHT

SETBACKS AND BUFFERS

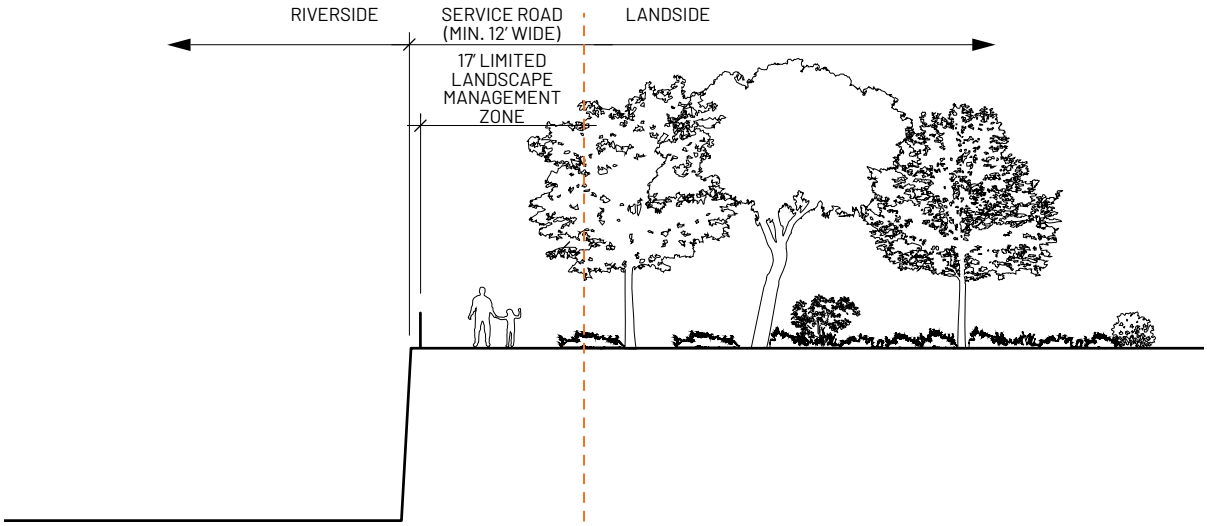
Planting along the LA River corridor is affected by various setback requirements necessary for the maintenance of its function as a flood channel. Additionally, there are opportunities for planting to serve as a buffer from the urban context of the LA River, including best management practices (BMPs) for the capture and treatment of stormwater runoff.

There are two types of buffers along the LA River channels, and further details on the USACE's Vegetation Free Zone requirements for buffers are located on the following pages. Although some existing conditions providing for maintenance along the top of the channels may not comply with those stated in this document, all proposed new projects shall comply with these guidelines. Any variance shall be reviewed and approved by the appropriate jurisdiction.

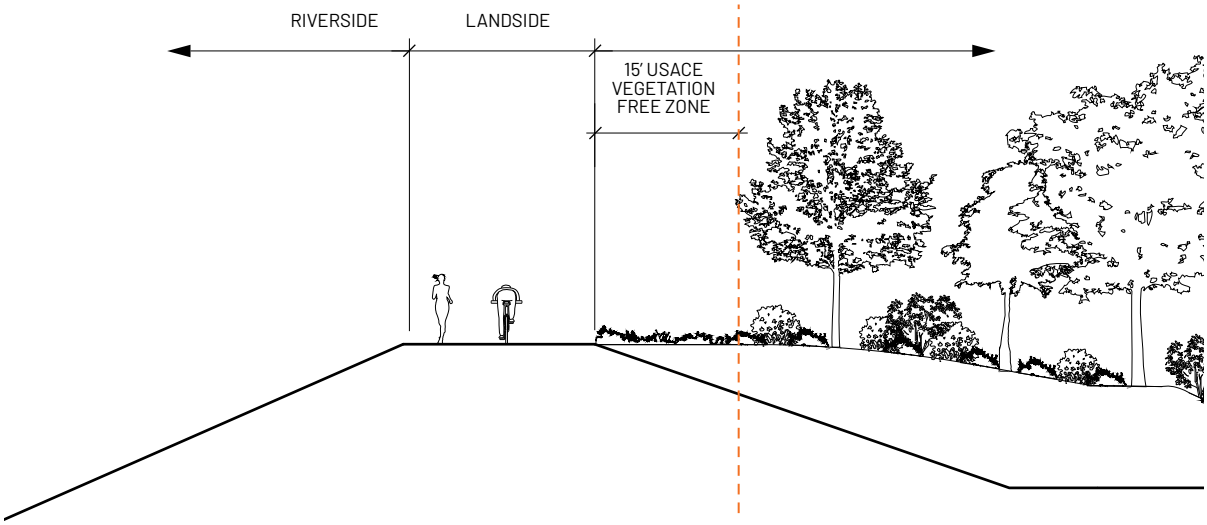
The Limited Landscape Management Zone is an important setback needed for any service road along the entrenched portions of the LA River channel to provide clearance for maintenance and emergency vehicle access (Figure 123). This zone is designated to extend 17' from the channel wall and prohibits any structures or obstructions. Plantings or structures in this zone may be heavily disturbed or removed if repair or emergency access is required. Plantings in this zone are restricted to low growing species, not to exceed 3-5' in height. Trees and shrubs outside this zone are not subject to these size restrictions. This zone also includes the required 12' minimum service road width.

Planting areas against the channel walls, such as the ones shown in Figure 123, may be considered if they are planted with low shrubs (18" or less), ground cover, and grasses (no trees or large woody shrubs). Further, these planting areas may be located between expansion joints but not directly behind one, at a minimum of five feet from an expansion joint.

VEGETATION SETBACKS ALONG EXISTING ENTRENCHED PORTIONS OF THE RIVER



VEGETATION SETBACKS ALONG EXISTING LEVEED PORTIONS OF THE RIVER



VEGETATION SETBACKS ALONG EXISTING OR PROPOSED FLOODWALLS ADJACENT TO THE RIVER

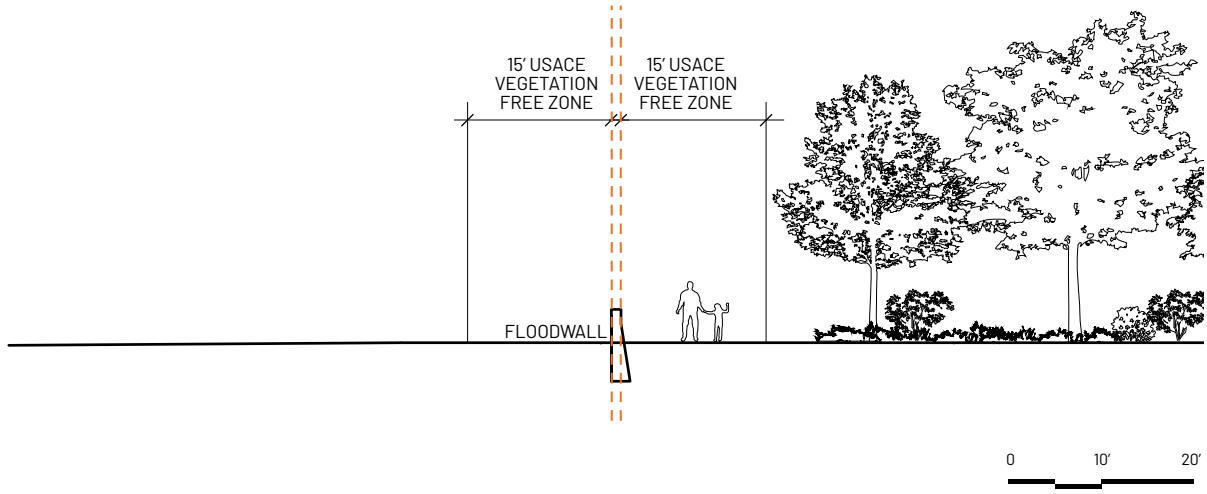


Figure 123. Along entrenched portions of the channel, the LACFCD requires a 17' Limited Landscape Management Zone that prohibits any structures and limits planting to shrubs and groundcovers up to 3-5' in height. The USACE guidelines require a 15' Vegetation Free Zone that limits planting to grasses and shallow-rooting perennials near levees or floodwalls. This distance is measured from either the landside edge of the levee, the top of a levee with a planting berm, or from the edge of a flood wall.

USACE GUIDELINES FOR PLANTING ALONG FLOOD STRUCTURES SHOULD BE FOLLOWED TO ENSURE THE STRUCTURE'S INTEGRITY. THIS INCLUDES LIMITS TO WHERE TREE AND LARGE SHRUB PLANTING MAY OCCUR

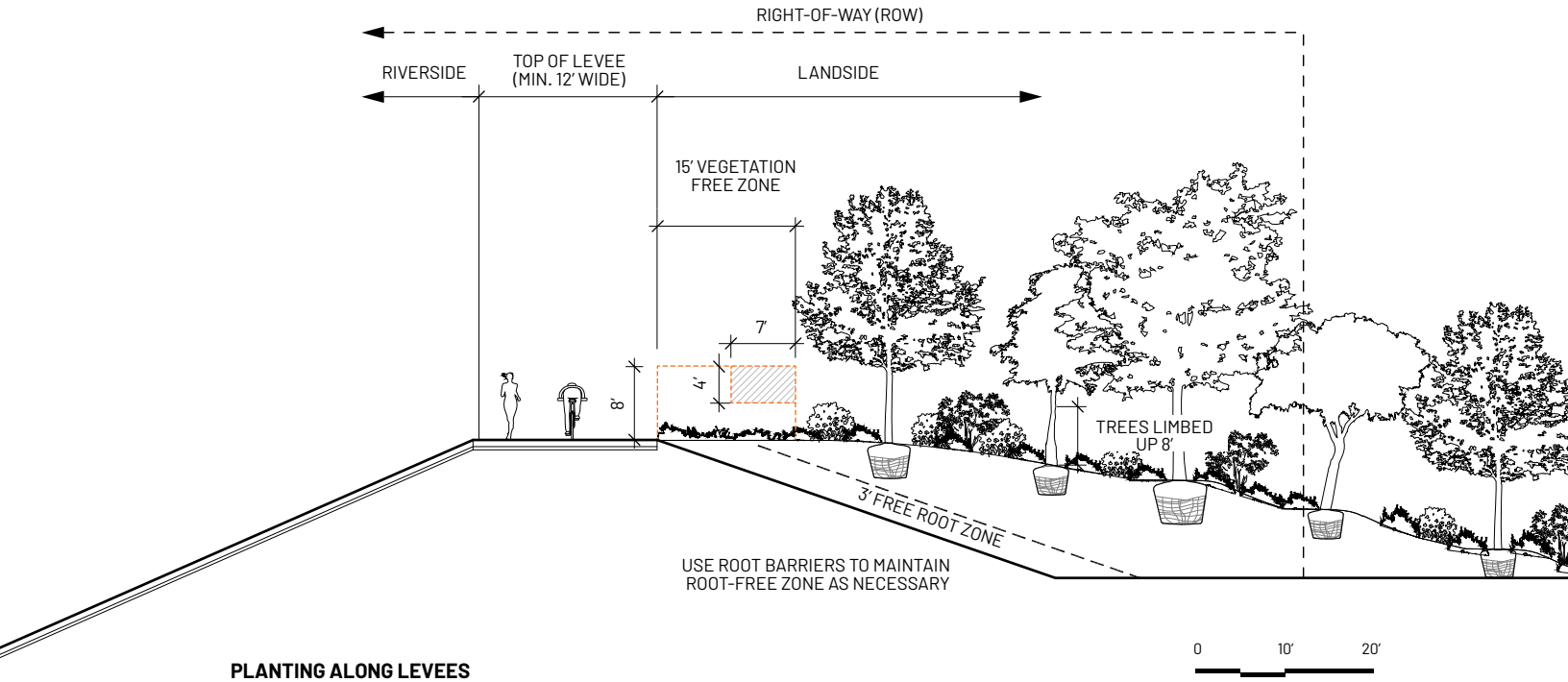
PLANTING ALONG LEVEES AND FLOODWALLS

Planting along flood channels must consider strategies that do not compromise the level of flood risk reduction provided by the structures. Planting should follow the standards set forth by the USACE's Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures (ETL 1110-2-583) or the most current publication.[19]

Along both levees and floodwalls, a corridor 15' wide and 8' tall should be maintained as a Vegetation Free Zone, limited to forbs and grasses. Any shrubs in this area require a variance from the USACE. Tree limbs are allowed in a 4' by 7' transition zone for a period of up to 10 years, at which point branches should be limbed to 8'. Mature tree limbs may also need to be limbed to 8' in the Vegetation Management Zone which can extend beyond 15' from the flood control structure, wherever clear access is needed by the USACE.

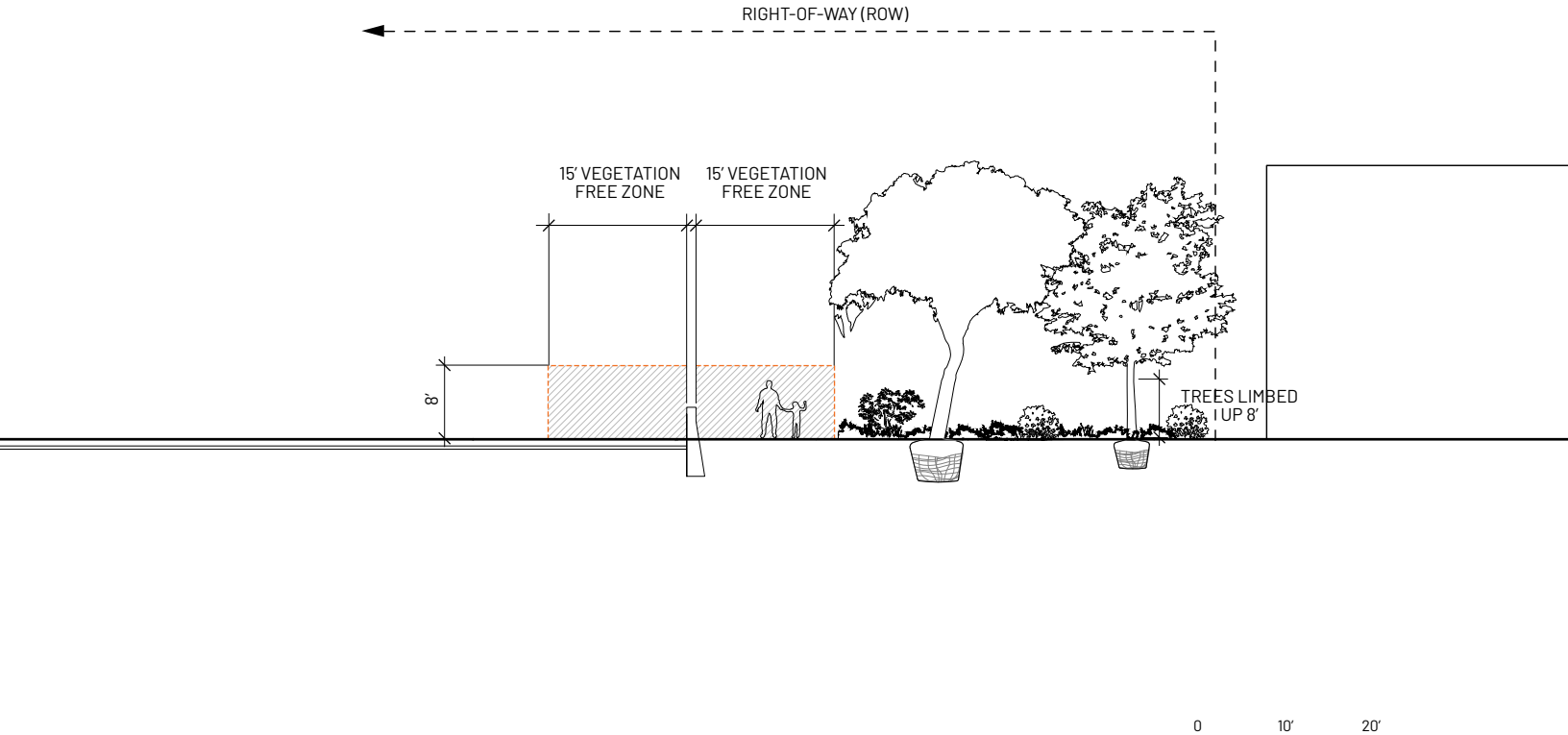
In leveed sections the USACE requires a Vegetation Free Zone that extends along the slopes of the levee, unless a planting berm is constructed on top of the levee itself. In a planting berm condition, as depicted in Figure 124, a 3' root-free zone offset from the landside slope of the levee is required. Often this is also achieved with the installation of root barriers to deter tree roots from compromising the levee structures. Planting berms are only feasible where the right-of-way is wide enough to accommodate the widened levee.

Overall it is important to discuss any planting strategy along flood structures with the USACE, and to refer to their latest applicable guidelines.



PLANTING ALONG LEVEES

Figure 124. Planting along the landside of levees is achievable through the creation of a planting berm that includes a 3' root-free zone off the landside slope of the levee. This planting must follow the latest USACE requirements as stated in the Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures. Source: Drawing based on US Army Corps of Engineers Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures, 2014.



PLANTING ALONG FLOODWALLS

Figure 125. Planting along floodwalls is achievable as long as the vegetation-free is kept clear of shrubs and trees. Planting along floodwalls must follow the USACE requirements as stated in the Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures. Source: Drawing based on US Army Corps of Engineers Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures, 2014.

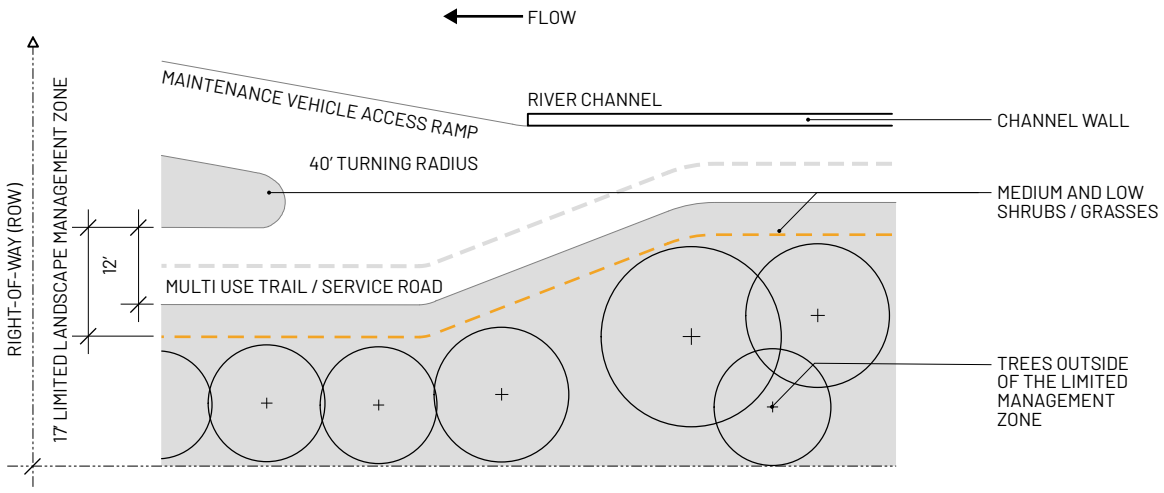


Figure 126. Proper ingress and egress clearance must be allowed for maintenance vehicles. The above example considers requirements for a maintenance ramp into an entrenched portion of the river channel, which includes, but is not limited to, the turning radius, direction of flow, and the limited landscape management zone.

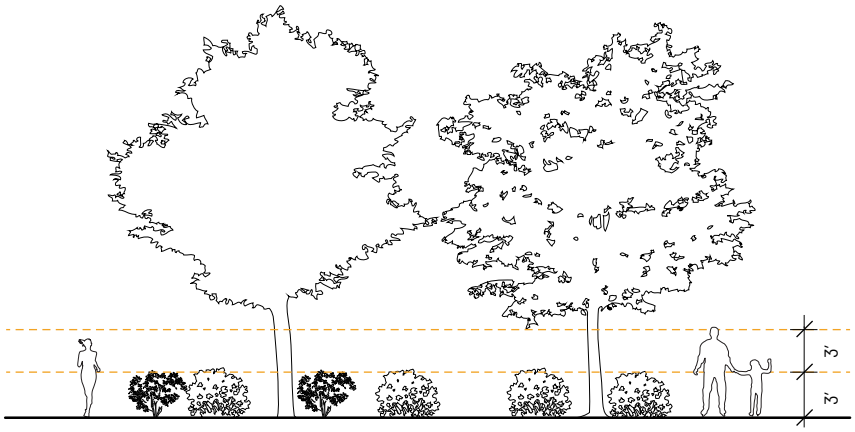
MAINTENANCE BUFFERS AND CLEARANCES

Maintenance vehicles require adequate access and space to maneuver in order to service the flood channel. The following additional clearances should be followed in the absence of criteria from the local agency of jurisdiction:

- All maintenance vehicles must have ingress/egress clearance at all times.
- Any alteration/design of service roads must meet with county approval.
- 40 foot centerline turning radius for truck ingress and egress from arterial streets.
- A minimum 4' trees and tall shrub setback from the sidewalk adjacent to vehicular ingress/egress from arterial streets.
- Vehicular access gates are to be setback 20' from the arterial street curb when available and feasible.

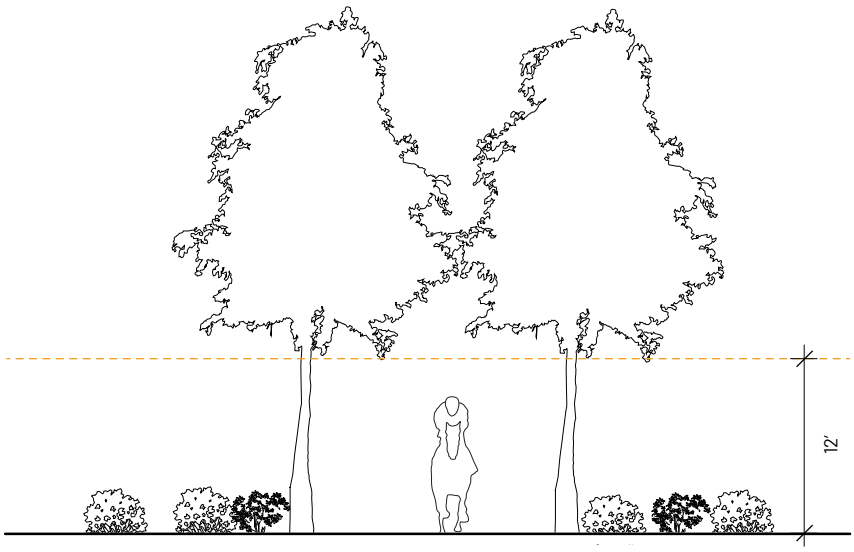
Limbing-up mature trees also helps to provide maintenance access and recreational use. Where multiple limb heights apply, tree limbing should be coordinated so that the highest requirement is met where applicable. In general, trees should not be pruned during their establishment period. When the tree trunk reaches a 4" diameter at breast height, those trees that overhang the service road or trail may then be pruned up to provide clear access or sight lines. At access points and trails intersections, mature trees should be limbed up to a minimum of 6 ft. Trees that fall within the Vegetation Management Zone, or whose branches fall into the Vegetation-Free Zone as defined by the USACE standards (ETL 1110-2-583), should be limbed up to 8' at maturity.[20] Currently the USACE allows a maximum of 10 years for trees to mature without limbing. Any tree branches that directly overhang equestrian trails should be limbed up to a minimum of 12 ft.

TREE LIMBING SHOULD BE COORDINATED SO THAT THE GREATEST APPLICABLE HEIGHT IS MET WHERE NEEDED OR WHERE OVERLAPPING REQUIREMENTS OCCUR. TREE LIMBING SHOULD NOT OCCUR BEFORE THE TREE HAS REACHED MATURITY



SAFETY / VISIBILITY BEST PRACTICE

USACE MAINTENANCE REQUIREMENTS



ABOVE EQUESTRIAN TRAILS ONLY

0 5' 10'

Figure 127. Tree limbing height requirements vary based on the location of the tree, the programmed use of the area, and visibility requirements. Young trees are exempt from these requirements and should not be limbed until they have reached maturity.

RIGHTS-OF-WAY

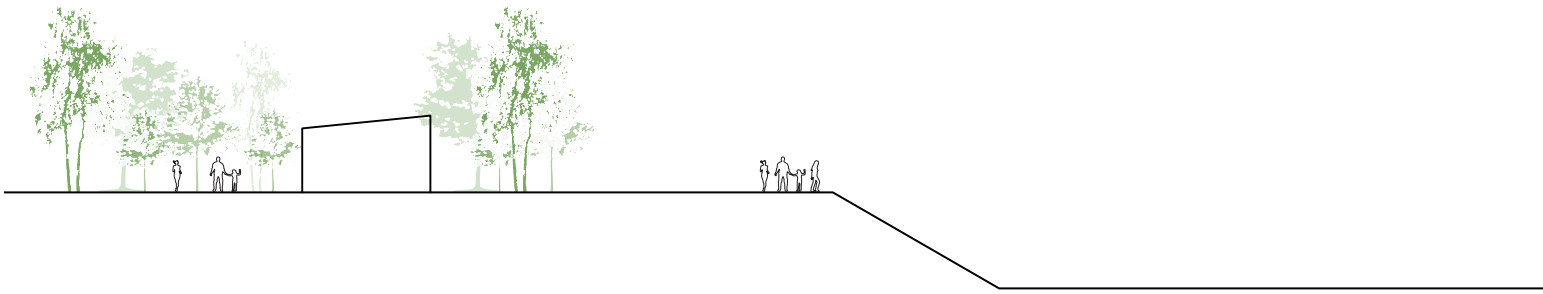
UTILITY RIGHTS-OF-WAY

Utility rights-of-way next to the LA River channel provide opportunities for recreation space, trails, plant nurseries, access roads, gateways, artwork, and other community amenities. Utilizing infrastructure rights-of-way is critical to creating a connected system of trails and open space across LA County.

Three utilities, the City of Los Angeles Department of Water and Power (LADWP), Southern California Edison, and the City of Vernon Gas and Electric Department maintain power lines and transmission towers located on the service road or adjacent to the channel. Project teams working in areas near a transmission line should contact the utility companies directly to confirm current requirements. These agencies will separately check and approve projects and planting plans within their easements.

RAIL RIGHTS-OF-WAY

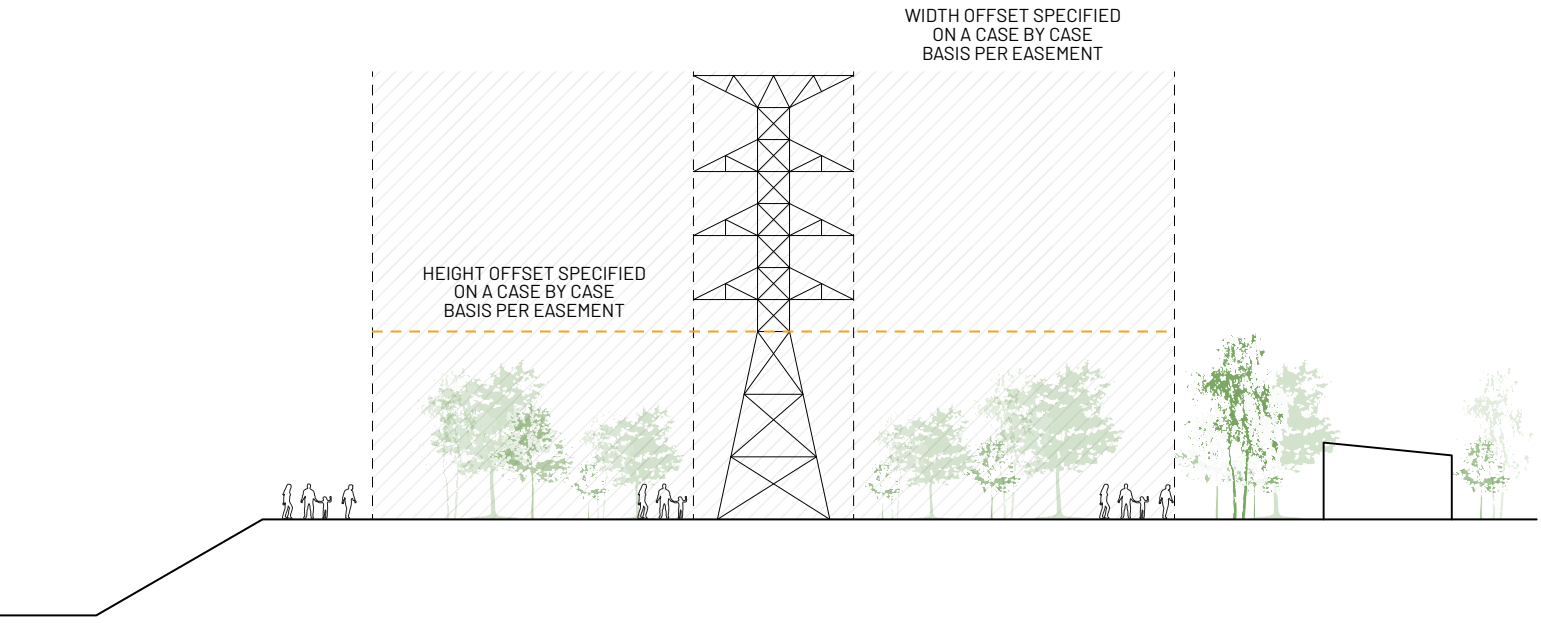
Some LA River projects will be located adjacent to not-in-service railroad rights-of-way. These rights-of-way are opportunities for increased connectivity to the trails and paths around LA County. Project teams working near rail rights-of-way should contact the right-of-way owner to discuss opportunities and requirements.



UTILITY ROW PLANTING

Figure 128. Requirements for planting in a utility ROW vary depending on the specific utility agency, but often include limitations on the installation of vegetation of a certain height or within a specified distance to the utility's infrastructure.

PROJECT TEAMS WORKING IN AREAS NEAR A TRANSMISSION LINE SHOULD CONTACT THE UTILITY COMPANIES DIRECTLY TO CONFIRM CURRENT REQUIREMENTS



SAFETY BEST PRACTICES ALONG THE RIVER

Safety along the LA River is of utmost importance to all users of the river corridor, during both regular recreational use and periodic flood events. Designers can incorporate clear lines of sight and allow clearance for emergency vehicles in order to promote safety in river projects.

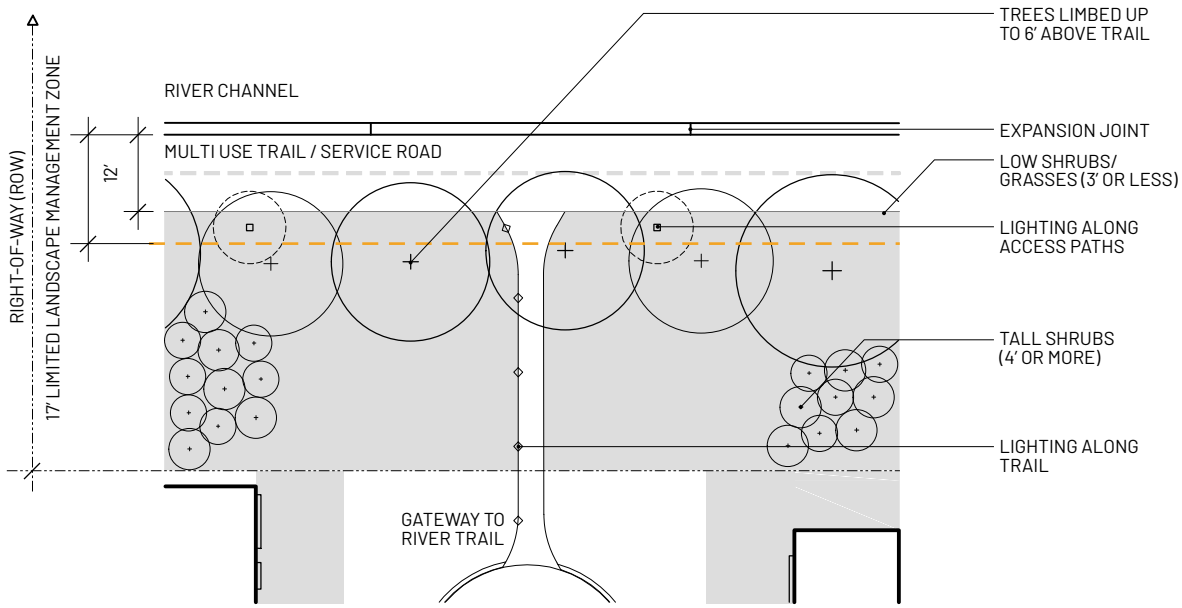
From a planting design perspective, planting densities need to consider the safety of pedestrians, joggers, and cyclists along all trails by providing sufficient line-of-sight clearance. Clear lines of sight are especially important at access points and trail intersections, where planting should be kept below three feet in height, and trees should be limbed up at least six feet (Figure 127).

Further, lighting should be spaced at regular intervals along the river trail to maintain a consistent level of visibility in the evenings. Trees should be placed so as not to shield the light sources along the trails. For further information on lighting, see Chapter 6.

Maintaining the 17′ Limited Landscape Management Zone allows for emergency vehicles to access the channel when necessary. In-channel rescues during flood conditions are performed by city and county fire departments. Rescue anchors located adjacent to major arterials throughout LA County are embedded into the concrete panels along both sides of the river for use in emergency situations.

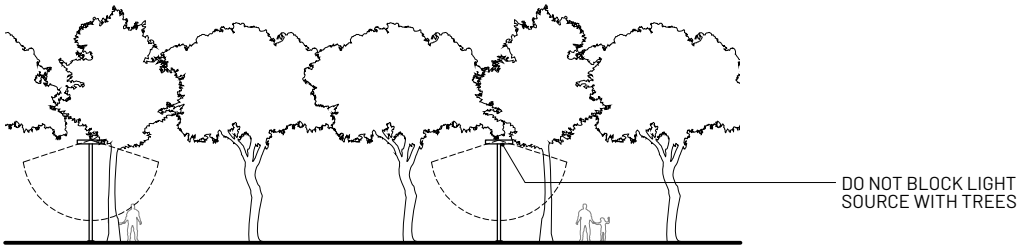
County Flood Control District Maintenance Standards for both maintenance and emergency vehicle ingress and egress apply in current and future locations. Designers should take the swift water anchor rescue locations into account when planning projects.

MAINTAINING A CLEAR LINE OF SIGHT BETWEEN 3'-6' IN HEIGHT IS ESPECIALLY IMPORTANT AT RIVER ACCESS POINTS AND TRAIL INTERSECTIONS



VISIBILITY AT ACCESS POINTS

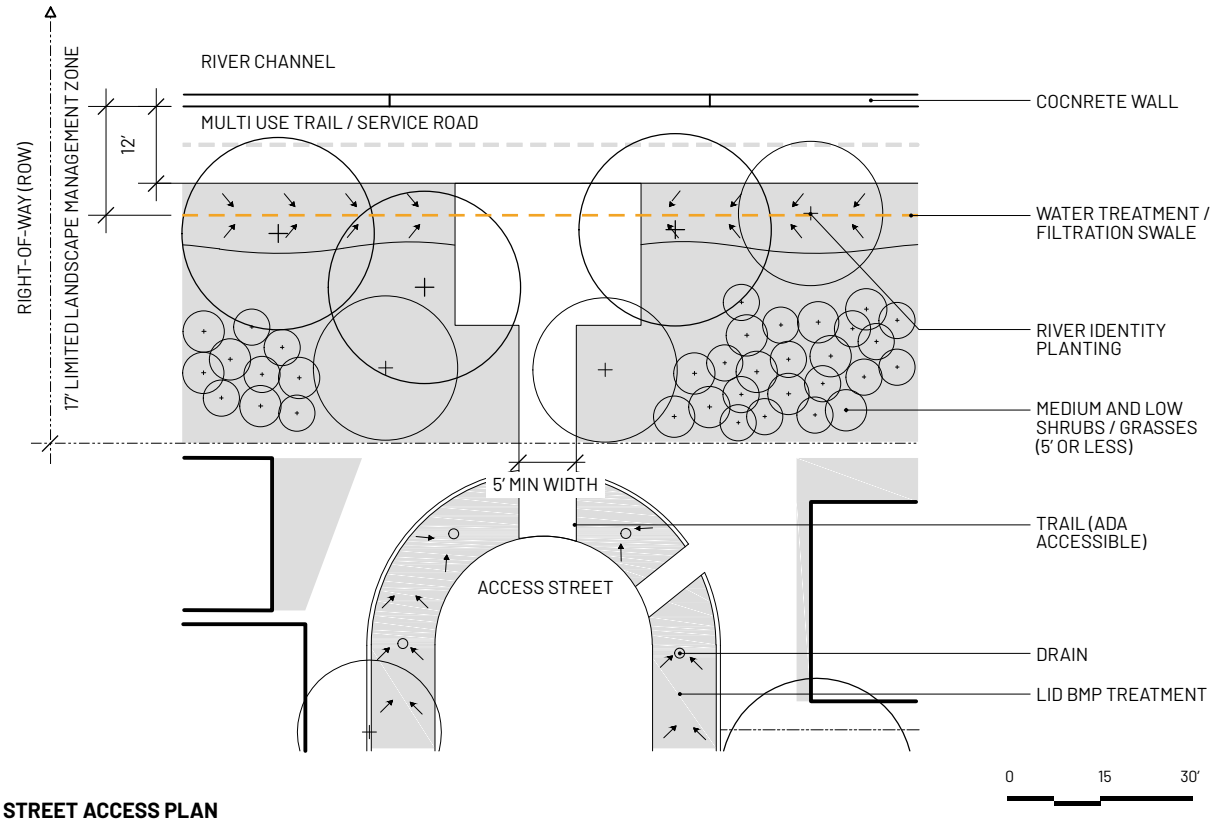
Figure 129. Clear lines of sight and consistently lit paths of travel should be included at gateways and access points.



LIGHTING ALONG THE TRAIL

Figure 130. Lighting along the LA River trail should be consistent and should not be blocked by tree limbs or any other obstructions.

0 15' 30'



STREET ACCESS PLAN

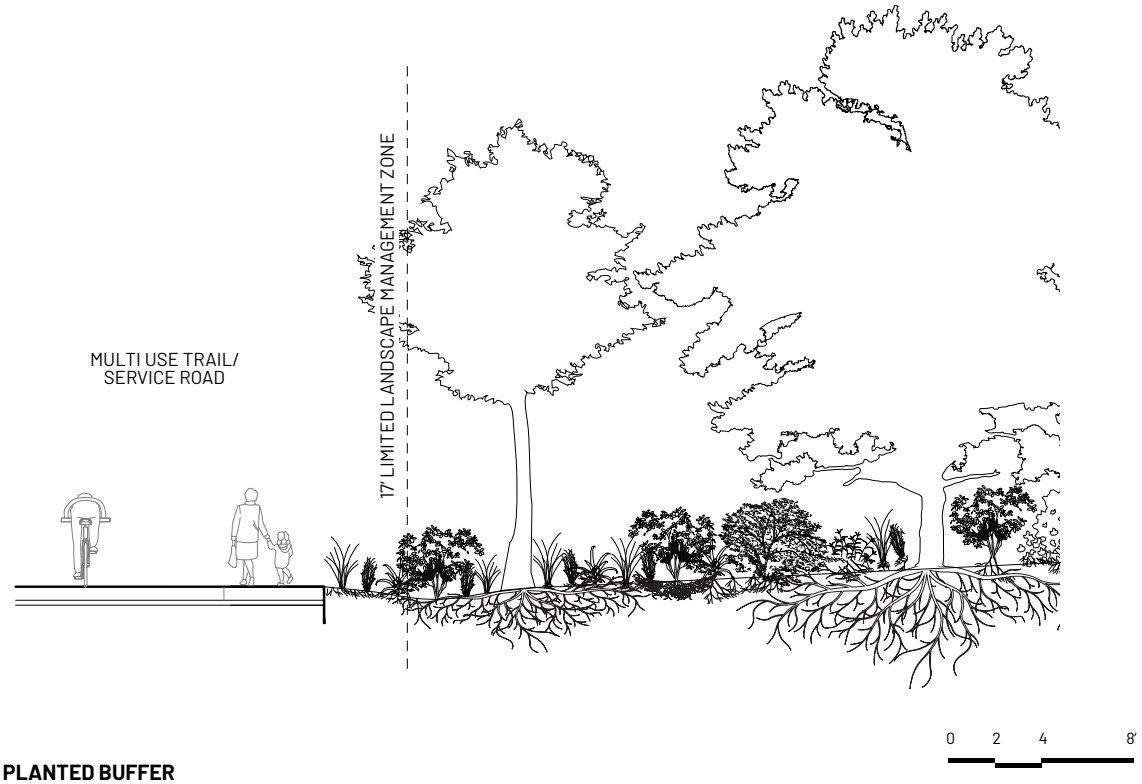
Figure 131. Access points where a street drains into the river provide opportunities to capture and treat stormwater. Swales along trails that slope away from the river also provide opportunities for water treatment.

PLANTED BUFFERS

Planted buffers along the LA River corridor provide comfort for pedestrians along the river trail, promote the unique sense of place of the river, and provide an opportunity for the treatment of stormwater before it enters the river.

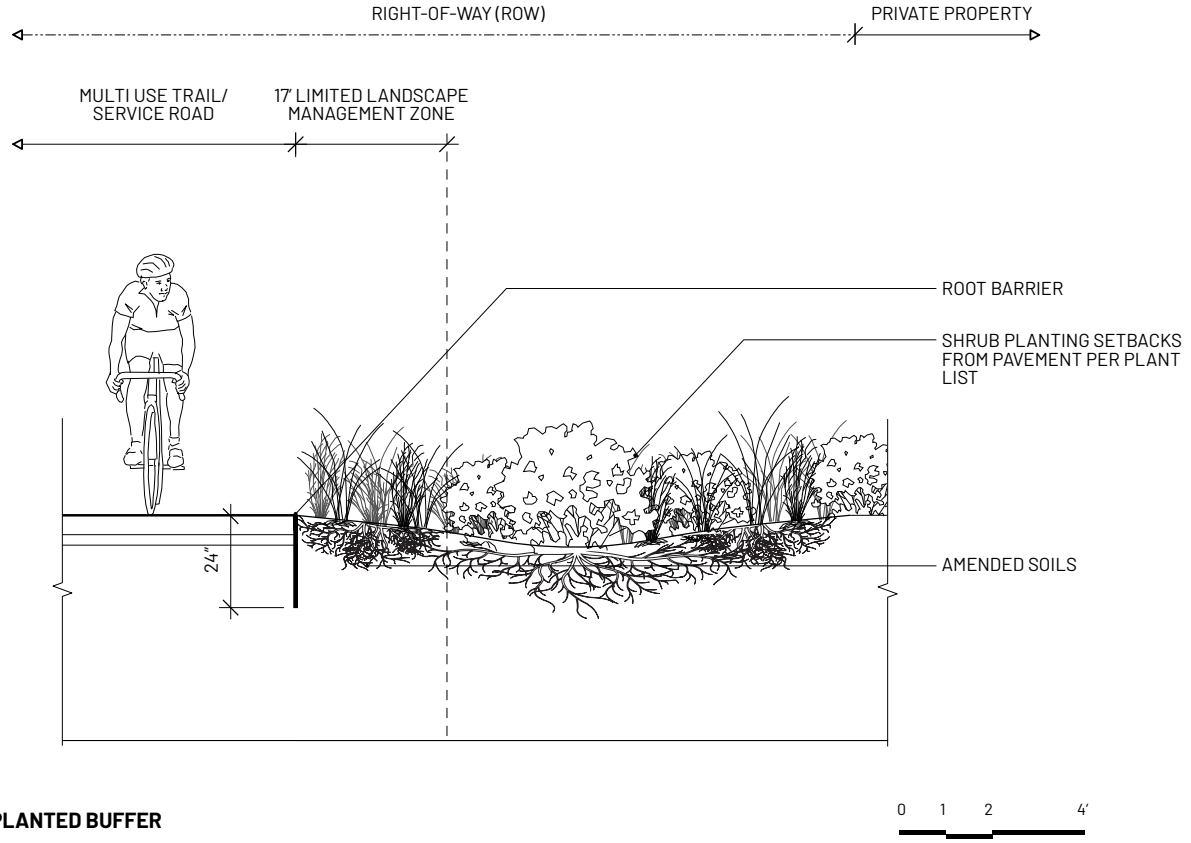
Where a neighborhood street drains directly into the river, new projects should aim to create bioswales or treatment basins to collect stormwater water runoff. Further, new trails, especially those that are paved with impervious materials, should slope to drain away from the river channel towards a bioswale or other BMP area.

Planted buffers should also adhere to suggested setbacks from pavement found in the plants lists at the end of this chapter. Trees and shrubs above 5' tall should be set back a minimum of 5' from the edge of the pavement. This setback distance can be halved if a 24" root barrier is installed immediately next to the pavement, and if the limited landscape management zone clearance is met.



WIDE PLANTED BUFFER

Figure 132. A densely planted buffer consisting of trees, shrubs, and groundcovers creates a unique sense of place along the LA River and provides opportunities to create connected habitats.



NARROW PLANTED BUFFER

Figure 133. If a trail is designed to slope towards a planted swale, it can collect, convey, and treat stormwater before it reaches the LA River.

FOR MORE IN-DEPTH INFORMATION ON STORMWATER BEST MANAGEMENT PRACTICES, PLEASE REFERENCE THE LAC PUBLIC WORKS LOW IMPACT DEVELOPMENT STANDARDS MANUAL

STORMWATER BEST MANAGEMENT PRACTICES

Stormwater best management practices (BMPs) help capture, convey, and treat stormwater through infiltration or other mechanisms during a rain event. Some of the most commonly implemented BMPs include rain gardens, swales, infiltration strips, and infiltration trenches. It is important to work with engineers to ensure that the soils in the project sites are suitable for infiltration. Overall these methods are most effective during common rain events, since during higher, less frequent flood events these methods usually become saturated to capacity.

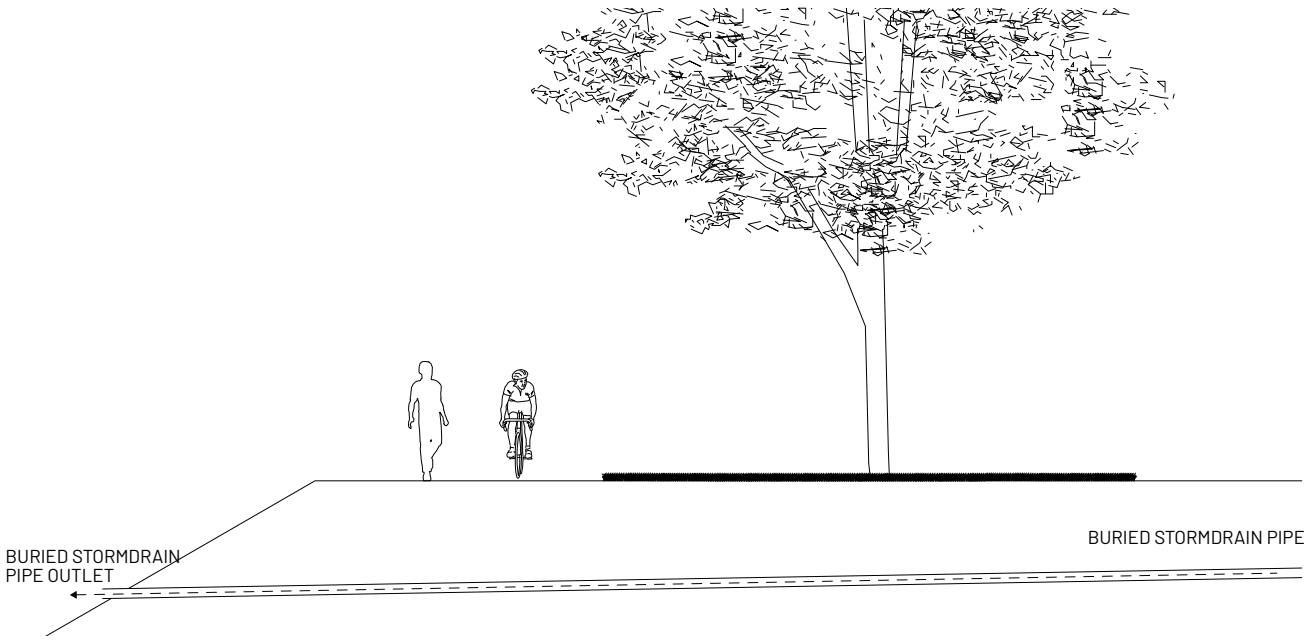
Rain gardens and swales require more space to implement, while infiltration strips and trenches are ideal for tight spaces or areas adjacent to structures. Along the LA River, rain gardens can be implemented where there is a wider project site. These project sites are to be studied to identify optimal locations and possible grading actions that will increase the capture and retention of rainfall to help sustain the growth of the native plantings. Swales can often be installed along paved trails or other linear projects. Swales convey water at a slower rate than traditional pipes do, and it is important to work with an engineer to make sure that the designed swale works with the overall stormwater approach for the project. Infiltration strips and trenches work best where there is a narrow right-of-way, or alongside structures or river pavilions (see Chapter 6). Infiltration can be further enhanced by the installation of vertical perforated pipes within the dripline of larger shrubs and tree species, installed at the time of planting. However, adequate drainage and possible bypass of the planting area, is necessary for heavier storms or obstructed systems. Typical drawdown time requirements for infiltration systems is between 72-96 hours, as dictated by vector control regulations to reduce mosquito populations.

The daylighting of existing storm drains is another method for installing BMPs, as shown in Figure 135. Daylit storm drains can be gravity fed and would help increase the treatment and re-use of stormwater in the right-of-way before it enters the river channel. All BMPs require continued maintenance for long-term success, otherwise they risk becoming obstructed with debris and rendered ineffective.

The following items are important in order to facilitate long-term success of BMPs:

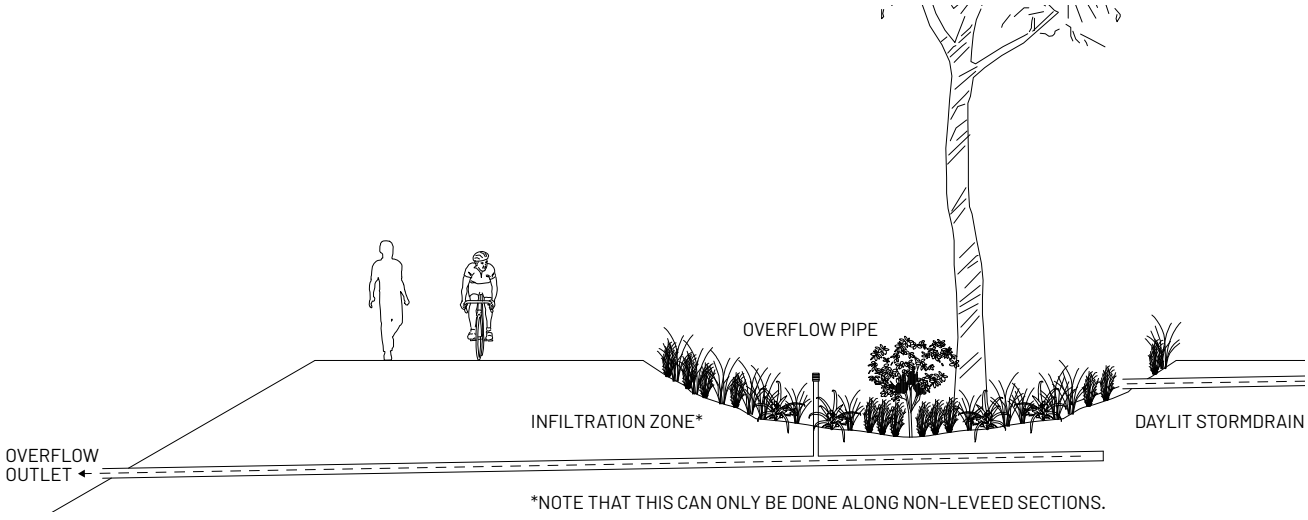
- Long-term commitment to regular maintenance of BMPs; vegetated BMPs in particular are prone to accelerated failures without regular maintenance
- Proper sizing of BMPs with respect to tributary drainage areas
- Adding/requiring pre-treatment BMPs to remove gross solids, sediments, trash, and debris are critical and recommended best practices for BMPs

For more in-depth information on BMPs, please reference the LAC Public Works Low Impact Development Standards Manual.[21]



PIPED DRAINAGE CONDITION

Figure 134. New projects along the LA River offer the opportunity to change the typical condition of stormdrain pipes that flow underneath street ends and exit directly into the river channel.



DAYLIT DRAINAGE CONDITION

Figure 135. A daylit storm drain allows for infiltration and treatment of runoff before it enters the LA River. These types of projects can help improve the water quality in the river.

BEST MANAGEMENT PRACTICE TECHNIQUES	PROS AND CONS	
STORMWATER PLANTER 	**PROS:** • Requires little space • Reduces peak flows during small storm events • Enhances site aesthetics • May conserve water • Requires little maintenance	**CONS:** • May require additional irrigation • Not suitable for areas with steep slopes
TREE WELL FILTER 	**PROS:** • Enhances site aesthetics • Reduces stormwater runoff volume and pollutant discharge • Ideal for highly-developed sites • Integrates well with linear landscapes	**CONS:** • May require additional irrigation
VEGETATED SWALES 	**PROS:** • Low cost of installation • Reduces peak flows during small storm events • Requires little maintenance	**CONS:** • Has limited water quality benefits beyond gross solids filtration • Not suitable for areas with steep slopes • Can cause erosion when not installed and maintained properly
VEGETATED FILTER STRIP 	**PROS:** • Easy to install • Reduces peak flows during small storm events • Enhances site aesthetics • Requires little maintenance	**CONS:** • Not suitable for areas with steep slopes • Can cause erosion when not installed and maintained properly

Figure 136. Various BMP techniques can be implemented depending on the space available and intended use. Source: (Top) OLIN, 2018, (Middle) OLIN, 2018, (Bottom) Roger Soh, 2010. https://bit.ly/2ZJNv2I

SECTION

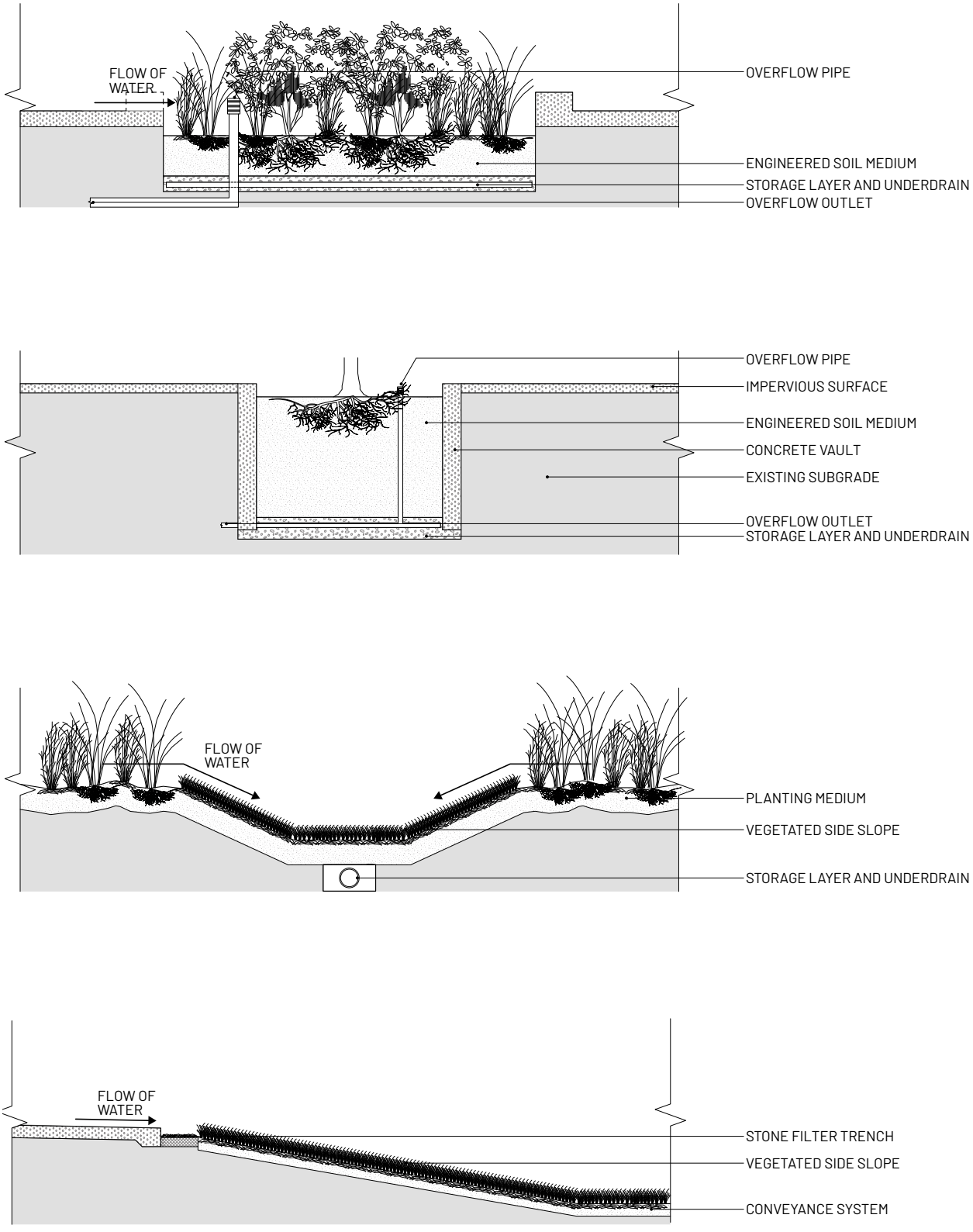
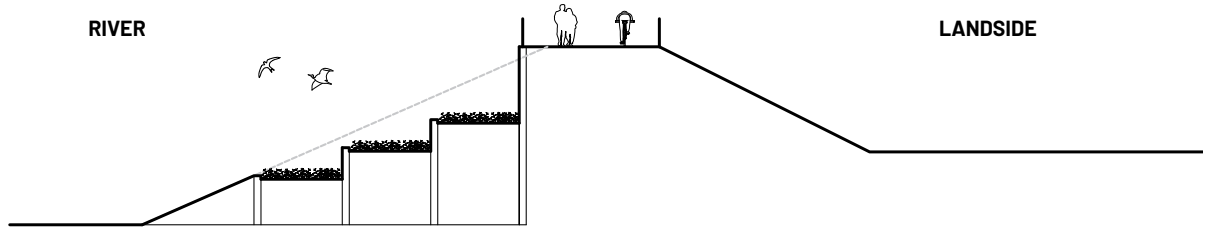
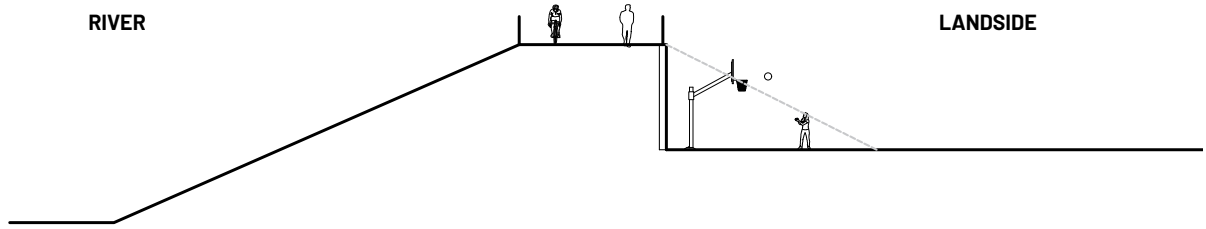


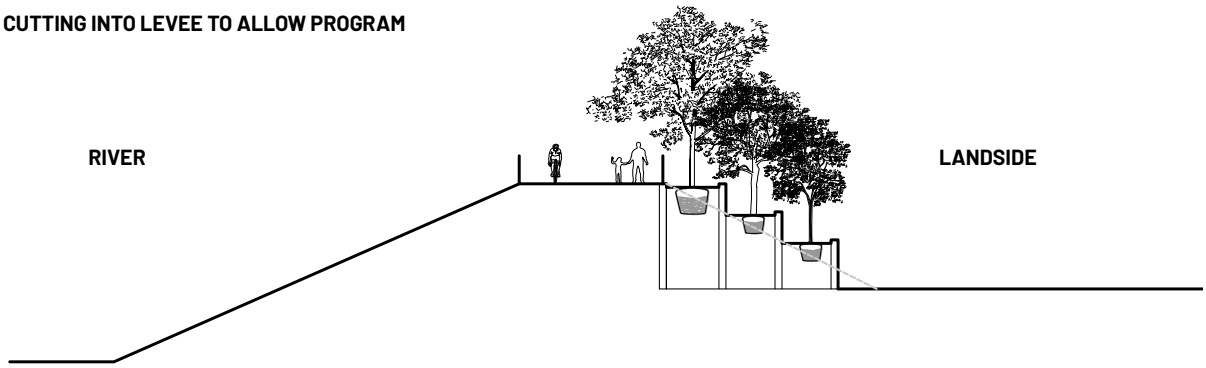
Figure 137. The infrastructure of each BMP varies based on project needs and should be designed with engineers.



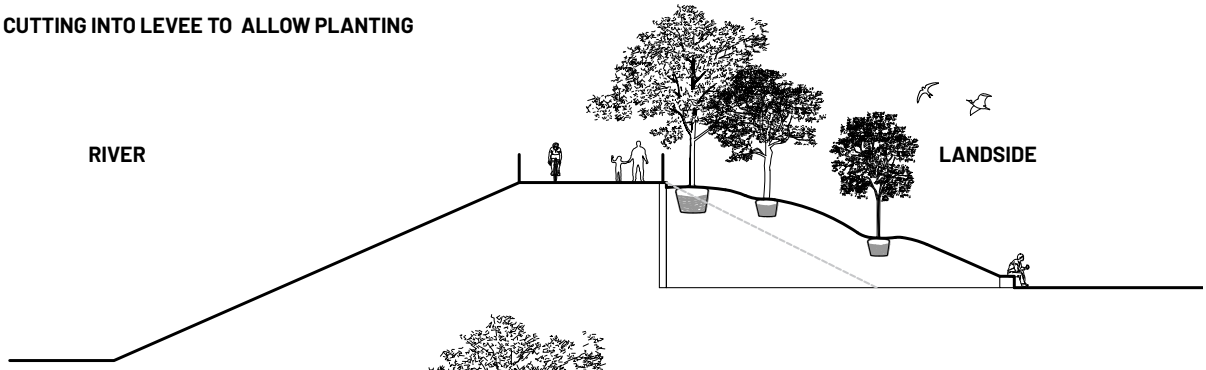
LARGE TERRACES TO ALLOW HABITAT



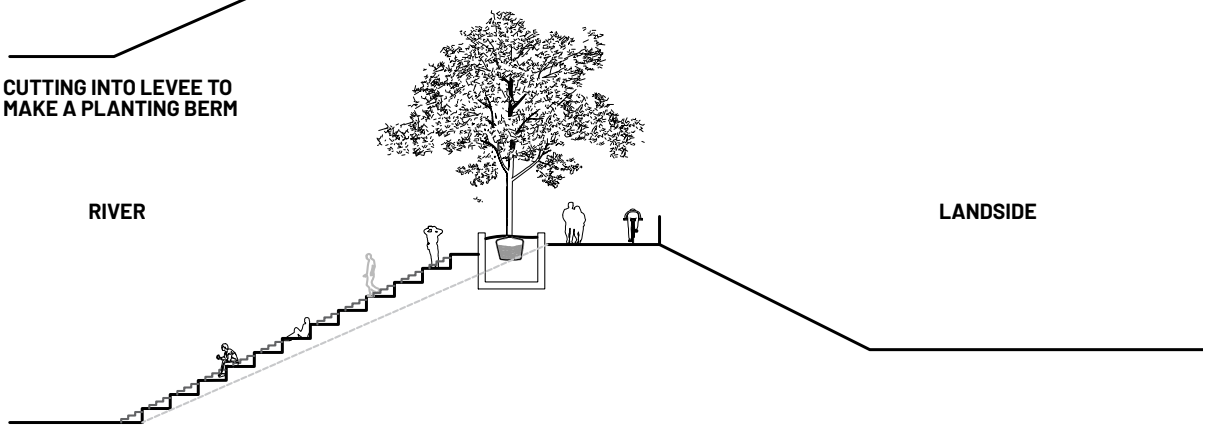
CUTTING INTO LEVEE TO ALLOW PROGRAM



CUTTING INTO LEVEE TO ALLOW PLANTING



CUTTING INTO LEVEE TO MAKE A PLANTING BERM



TERRACING CHANNEL WALL FOR AMPHITHEATER

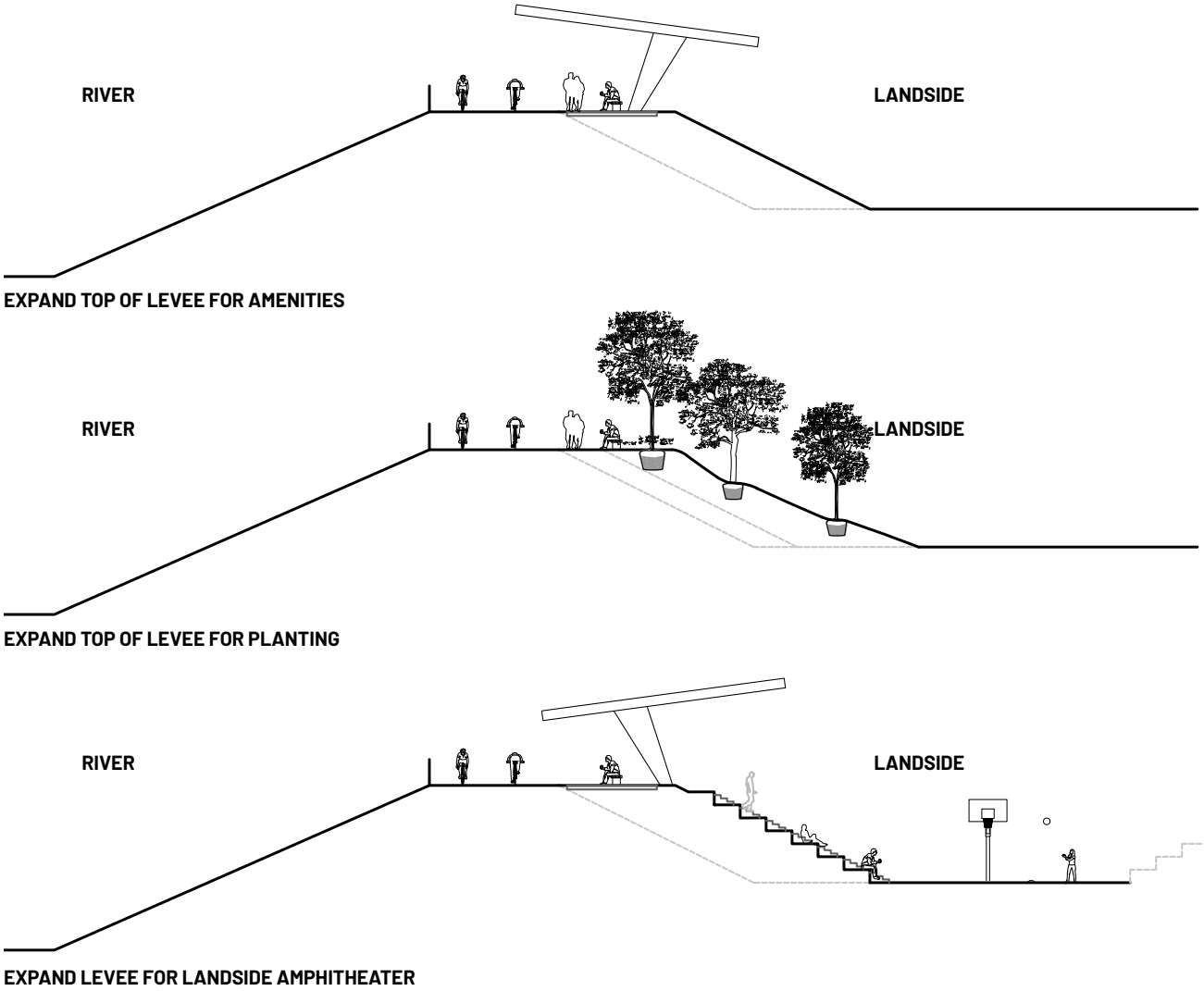


Figure 138. Ideas on variations of channel modifications help push the envelope of what is possible along the LA River. Hydraulic analysis and coordination with engineers is necessary to bring these ideas to fruition.

CHANNEL MODIFICATIONS: INNOVATION

Designers are encouraged to create innovative designs for integrating ecological function and programming into the channel edge conditions. All changes are subject to permit requirements. Proposed modifications should encourage accessibility for all.

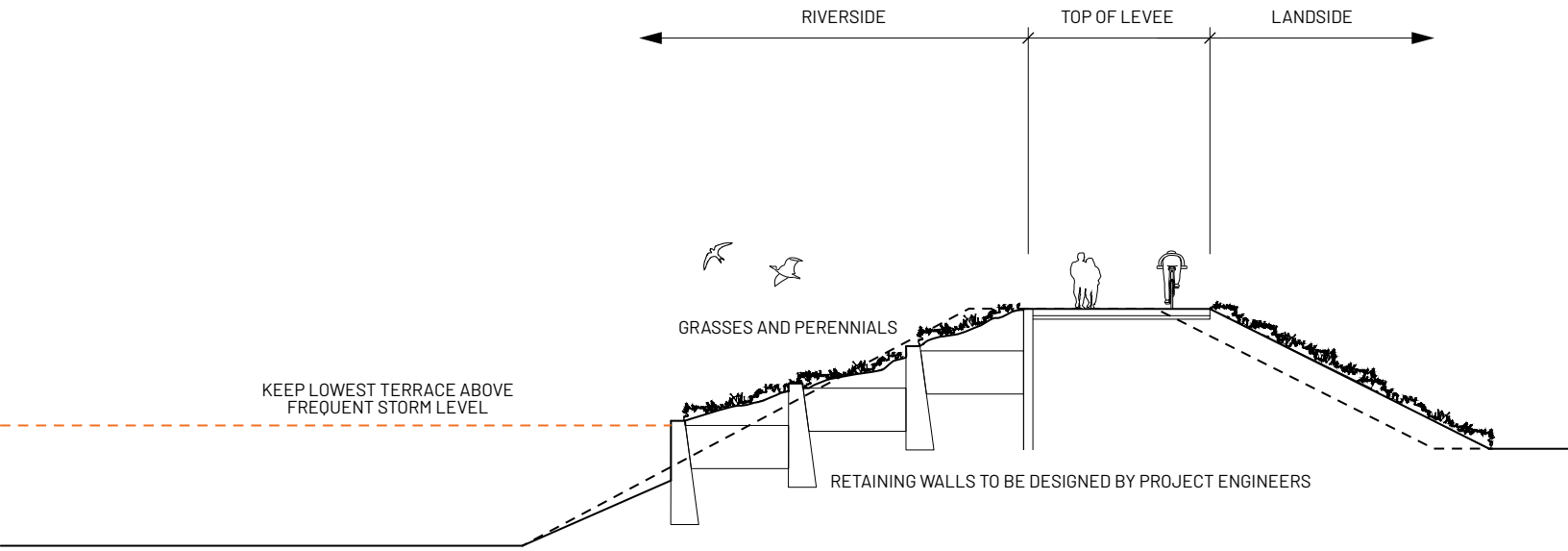
Design guidelines represent potential configurations based on general hydraulic considerations. Additional site-specific analyses, such as 2-D or 3-D numerical modeling and/or physical modeling, may be required to demonstrate hydraulic feasibility in terms of not reducing channel capacity, not significantly raising the design watersurface elevation, and minimizing and containing standing waves. These modifications are not a solution for all 51 miles of the LA River.

CHANNEL MODIFICATIONS SHOULD NOT INCREASE FLOOD RISK AND SHOULD BE UNDERTAKEN WITH A HIGHLY SKILLED DESIGN TEAM, INCLUDING QUALIFIED ENGINEERS AND LANDSCAPE ARCHITECTS

CHANNEL MODIFICATIONS: TRAPEZOIDAL CHANNEL

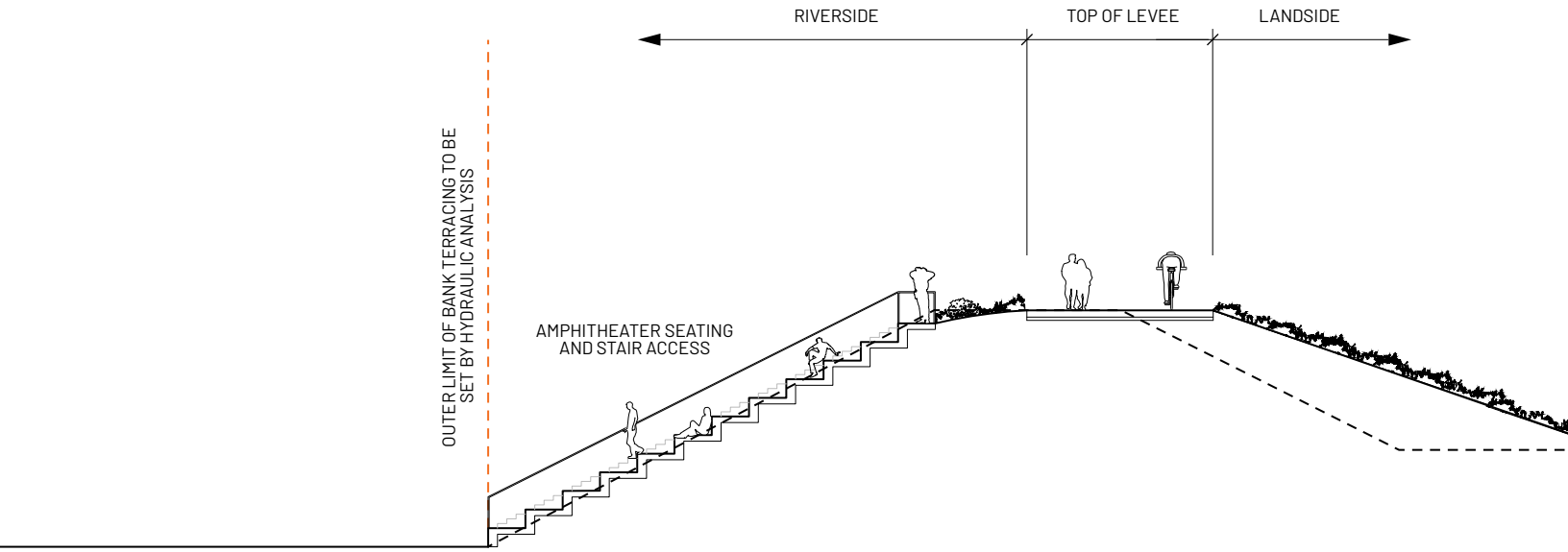
Any modification to an existing channel wall along the LA River is a significant project and investment. This should not be undertaken without qualified engineers who can evaluate the hydraulic and flood risk impacts of any proposed intervention. At a minimum, proposed modifications should not lower the level of flood risk reduction provided before the start of the project. These modifications are not a solution for all 51 miles of the LA River.

Given these parameters, there are two ways to consider terracing a trapezoidal channel where possible. The first method includes wide stepped terraces for planting. Wider planting beds help to retain soil moisture in the heat of summer. Still, additional irrigation and diligent maintenance will be required to ensure the health of the plants. Further, the lowest terrace should be elevated above a frequent storm level to prevent planting from being scoured or eroded during common rain events. In the case of a larger, less frequent flood event, the planting and soil in the terraces may still need to be replenished due to scouring and erosion. The second method of terracing would create hardscape steps and amphitheater seating along the trapezoidal wall. This terracing could be used by the public for special events or festivals that could occur in the channel with appropriate permission and outside of the flood season. While erosion would not be an issue with this method, the amphitheater and steps should still be inspected for cracks or other damage after a major flood event.



TRAPEZOIDAL CHANNEL PLANTING

Figure 139. The trapezoidal channel could be modified to create large terraces for habitat. Consultation with qualified engineers and hydraulic analysis is necessary. This is not a solution for all 51 miles of the LA River.



TRAPEZOIDAL CHANNEL AMPHITHEATER

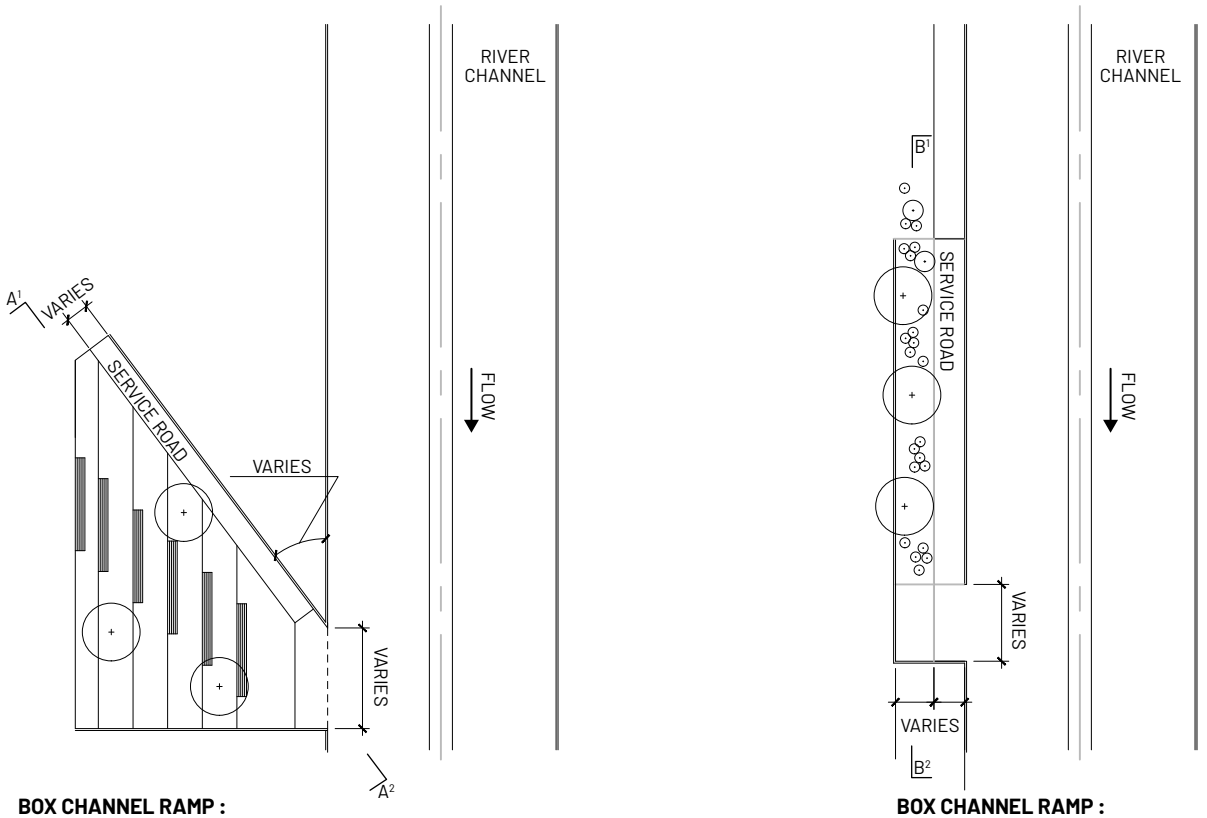
Figure 140. The trapezoidal channel could be modified to create a public amphitheater. Consultation with qualified engineers and hydraulic analysis is necessary. This is not a solution for all 51 miles of the LA River.

CHANNEL MODIFICATIONS SHOULD NOT INCREASE FLOOD RISK, AND SHOULD BE UNDERTAKEN WITH A HIGHLY SKILLED DESIGN TEAM, INCLUDING QUALIFIED ENGINEERS AND LANDSCAPE ARCHITECTS

CHANNEL MODIFICATIONS: RECTANGULAR CHANNEL

Any modification to an existing channel wall along the LA River is a significant project and investment. This should not be undertaken without qualified engineers who can evaluate the hydraulic and flood risk impacts of any proposed intervention. At a minimum, proposed modifications should not lower the level of flood risk reduction provided before the start of the project. These modifications are not a solution for all 51 miles of the LA River.

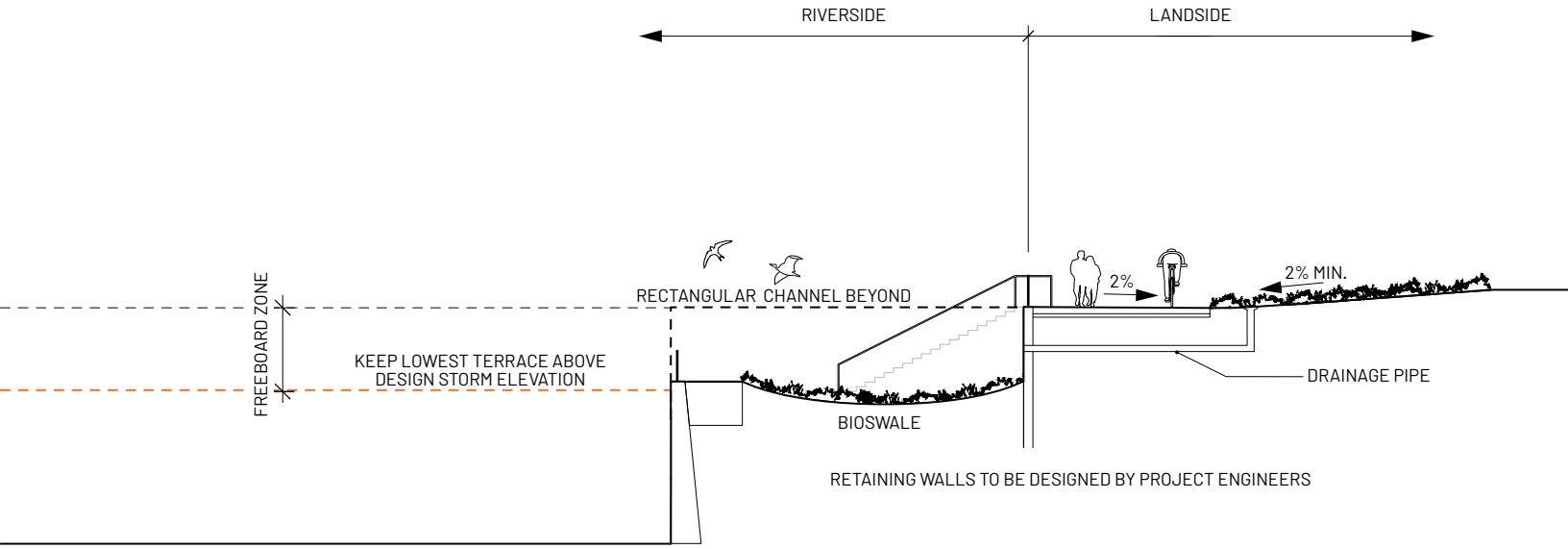
Methods to potentially modify the box channel are shown in the sections to the right and plans below. One method involves creating a larger terrace for planting, and potentially for stormwater capture and treatment before being released back into the LA River. The terrace should be elevated above the design storm events to prevent scour. The other method opens the wall of the rectangular section to allow for a ramp to enter the channel. The ramps will be used by maintenance vehicles but also can be widened and joined with a large public amphitheater or a vegetated slope. The vegetated slope allows for riparian-upland connection, so that wildlife can access the river as well.



BOX CHANNEL RAMP : AMPHITHEATER

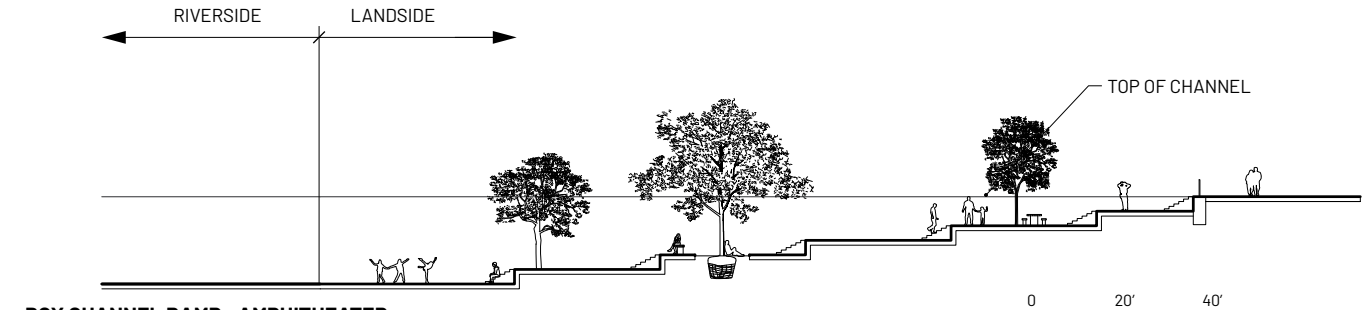
BOX CHANNEL RAMP : HABITAT CONNECTION

Figure 141. The rectangular channel could be modified to create large amphitheaters, a performance venue, or ramps for wildlife. Consultation with qualified engineers and hydraulic analysis is necessary. For sections of these conditions, See Figure 143 on page 183.



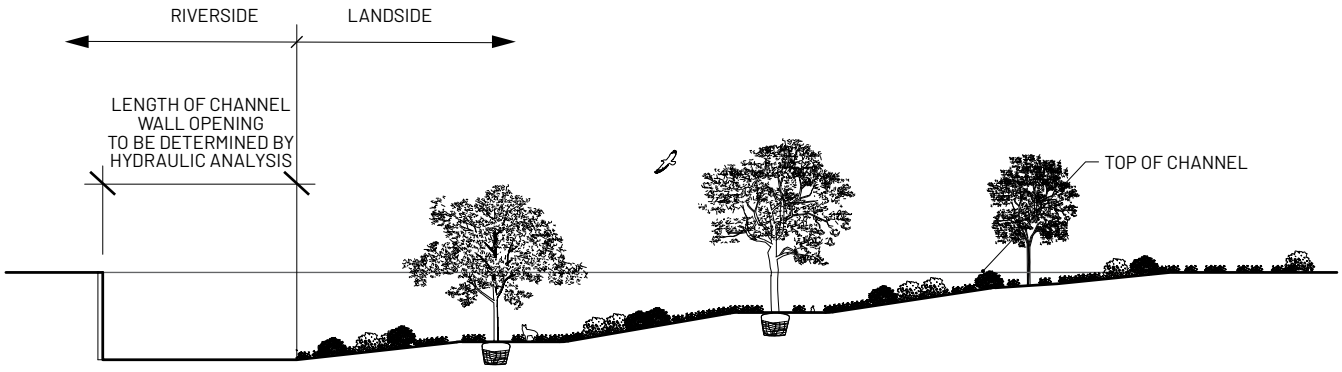
RECTANGULAR CHANNEL BIOSWALE

Figure 142. The rectangular channel could be modified to create a bioswale to collect and treat water before it enters the LA River. Consultation with qualified engineers and hydraulic analysis is necessary. This is not a solution for all 51 miles of the LA River.



BOX CHANNEL RAMP : AMPHITHEATER

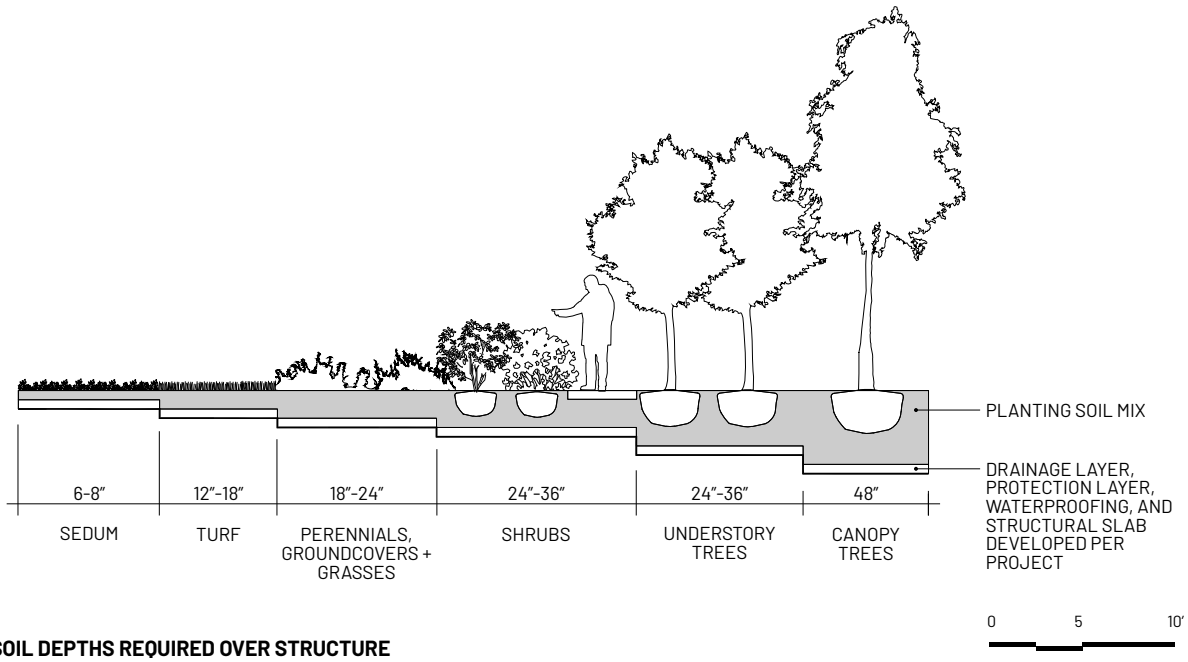
A1 A2



BOX CHANNEL RAMP : HABITAT CONNECTION

B1 B2

Figure 143. The rectangular channel could be modified to create large amphitheaters, a performance venue, or ramps for wildlife. Consultation with qualified engineers and hydraulic analysis is necessary.

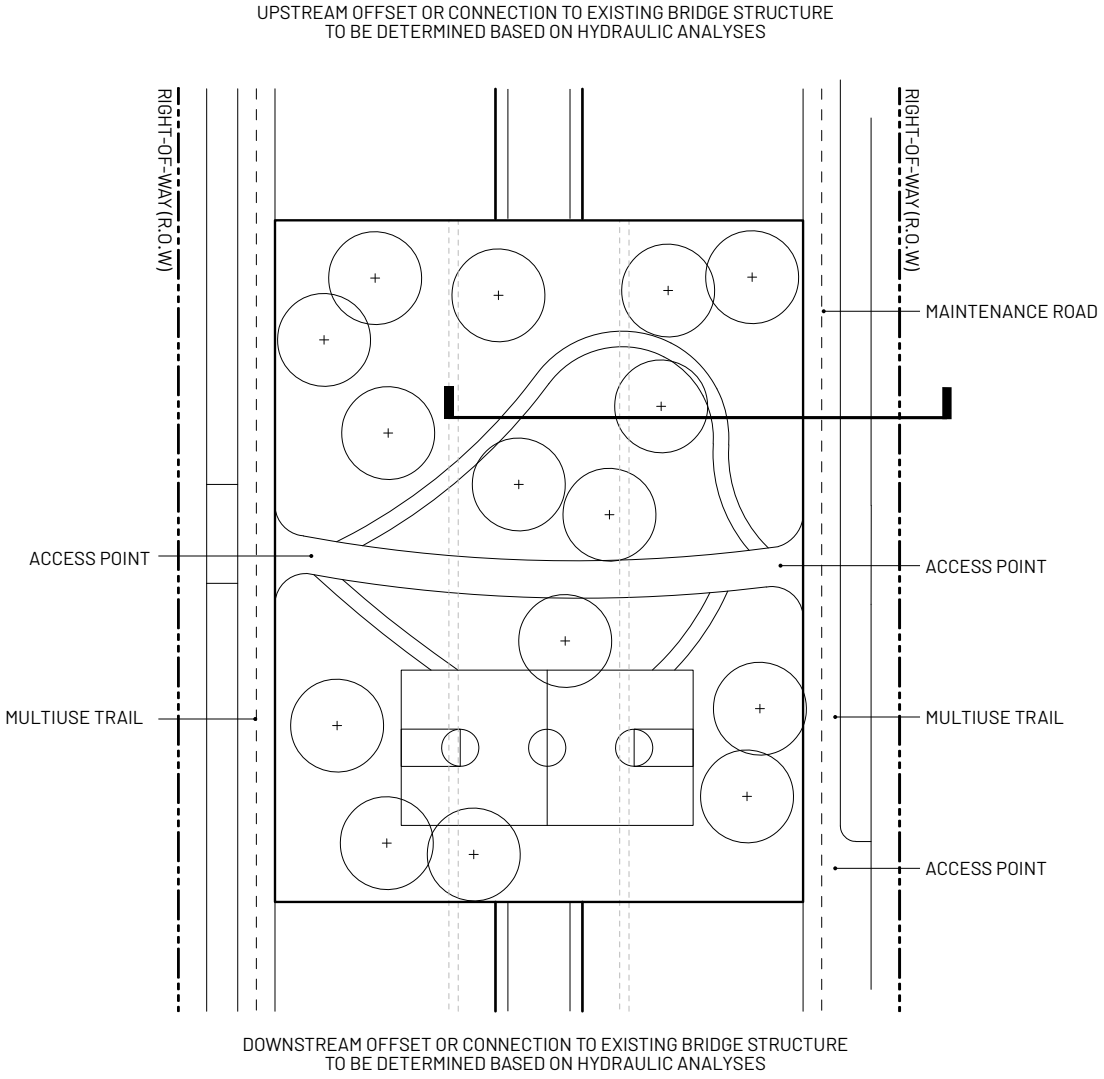


SOIL DEPTHS REQUIRED OVER STRUCTURE

Figure 144. To ensure the healthy growth of planting, the following soil depths should be implemented over structure. The required depths, drainage, and waterproofing need to be coordinated across the project team.

PLATFORM PARKS

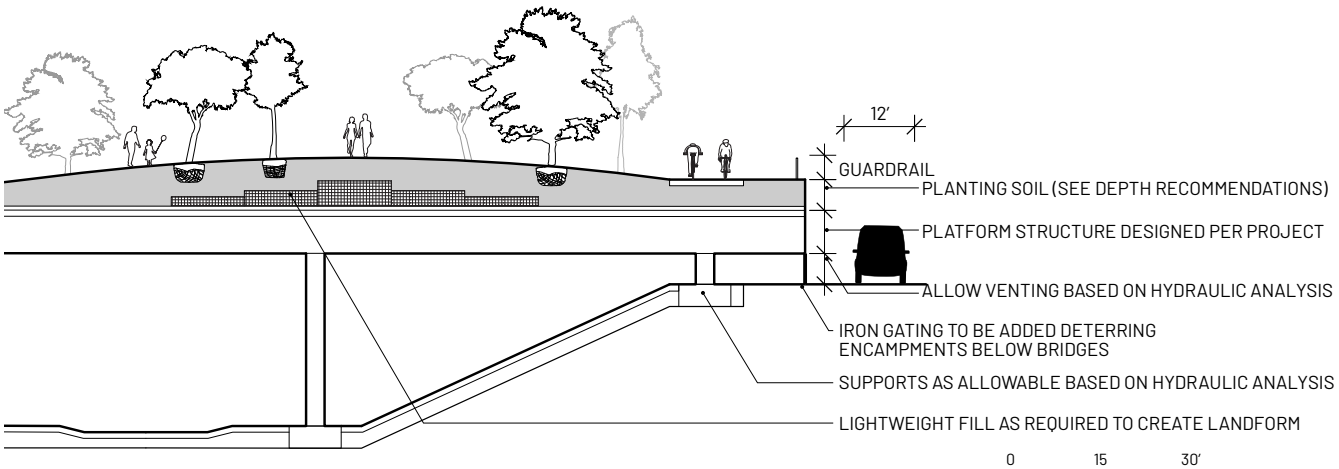
Platforms create a land bridge across the river channel. This modification is a major project and investment and should not be undertaken without both hydraulic and structural engineering. The platform strategy is most effective when there is a high need for connectivity or park space and there is limited or nonexistent landside right-of-way. The platform takes advantage of the right-of-way within the corridor itself to create an engaging public space and destination. Planting on the platform should be considered as a landscape over structure and adequate soil depths should be provided, as shown in Figure 50. Waterproofing and root barriers on the platform should be developed on a per project basis across the project team, and is crucial for ensuring proper drainage and structural integrity of the platform. This solution cannot be used over soft bottom portions of the channel or in the estuary, platforms cannot be used for development - only open space, and service trucks will need to have access underneath. Other design considerations include providing for guardrails, ADA access to the platform park, vertical clearance for maintenance vehicles, and the potential for artwork. Overall, the platform park should be welcoming, well-maintained, and programmed so as to serve the needs of the adjacent community.



PLATFORM CROSSING AND PARKWAY PLAN

0 15 30 60′

Figure 145. Platform program and design may vary to include a range of ecological functions, recreational amenities, or passive park space. Platforms cannot be used over soft bottom portions of the channel or in the estuary. Platforms cannot be used for development, only for open space. This is not a solution for all 51 miles of the LA River.



0 15 30′

PLATFORM CROSSING AND PARKWAY SECTION

Figure 146. Platform construction is complex and should be designed per project by the design team. ,Service trucks will need to have access underneath the plaform. Consultation with qualified engineers and hydraulic analysis is necessary. This is not a solution for all 51 miles of the LA River.

THE LA RIVER PROVIDES AN OPPORTUNITY TO EXPAND URBAN AGRICULTURE AND HOST ASSOCIATED URBAN AGRICULTURE EVENTS

PRODUCTIVE LANDSCAPES

Urban agriculture and other forms of productive landscapes should be encouraged in sites along the LA River, especially in communities with limited access to fresh food sources.

For continued success, urban agriculture projects should have strong ties to the community and community organizations that can conduct programming with the project itself. A continued presence and regularly scheduled events ensures that community members can become engaged stewards of the agricultural plots. Tying the project to programs such as a Community-Supported Agriculture (CSA) can provide fresh produce to community members at a lower cost.

Existing urban agriculture sites around the LA River and other initiatives provide useful precedents for expanding urban agriculture practices along the river corridor. The Urban Agriculture Incentive Zones Act (AB551) enacted by the state of California in 2014 provides incentives to landowners for putting vacant land into agricultural use.[22] The Urban Orchard Project planned by the Trust for Public Land aims to create a community garden and plant culturally significant fruit trees near the Rio Hondo confluence.[23] The Carmelitos Community Garden in Long Beach provides 60 raised beds for families to grow produce and also hosts a variety of youth programs and community events.[24] Alma Backyard Farms in Compton works with people impacted by the criminal justice system and provides on-site job training services.[25] Farm LA is also a non-profit focused on transforming vacant land in the Elysian Valley to productive land with drought tolerant vegetables such as beans and grains.[26] While these are only a snapshot of existing programs and others to come, the LA River provides an opportunity to expand urban agriculture and host associated urban agriculture events as well as opportunities for artwork.

Siting considerations for any urban agriculture projects include access to full sun and a frequent and consistent water source. Any vegetable plots would ideally be on a level surface such as a flatbed or raised box.

If urban agriculture is to be included in the planting plans of the site, those specific areas do not need to meet native planting requirements. However, under no circumstances are invasive species allowed to be planted. Under the Model Water Efficient Landscape Ordinance adopted in 2015, any areas solely dedicated to edible planting are considered a "Special Landscape Area" and can use higher amounts of water for irrigation than ornamental planting.[27] Only potable water should be used to irrigate edible plants.

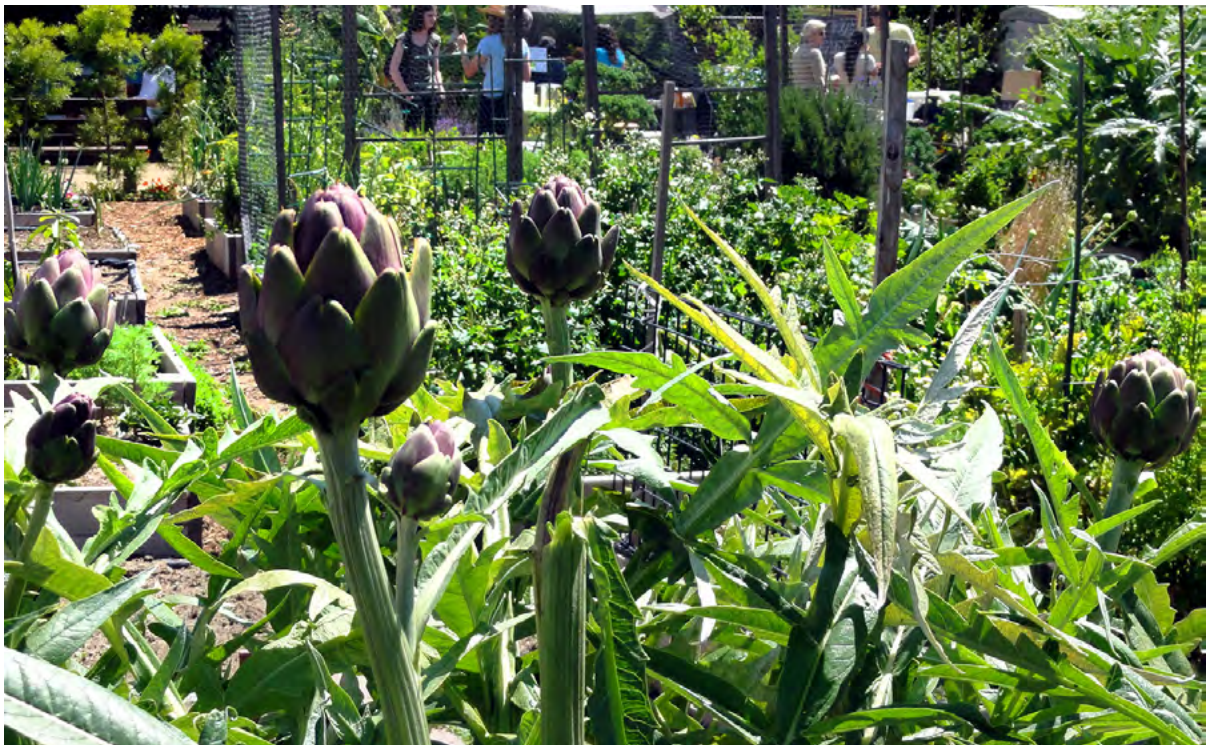


Figure 147. The creation of urban agricultural and community gardens along the LA River is encouraged and provides opportunities for education, access to fresh food, and a sense of stewardship in landscapes along the river. Productive landscapes are not subject to the same native planting or water requirements as other areas. Source: Craig Dietrich, 2011. https://www.flickr.com/photos/craigdietrich/5837953488/in/photostream/.

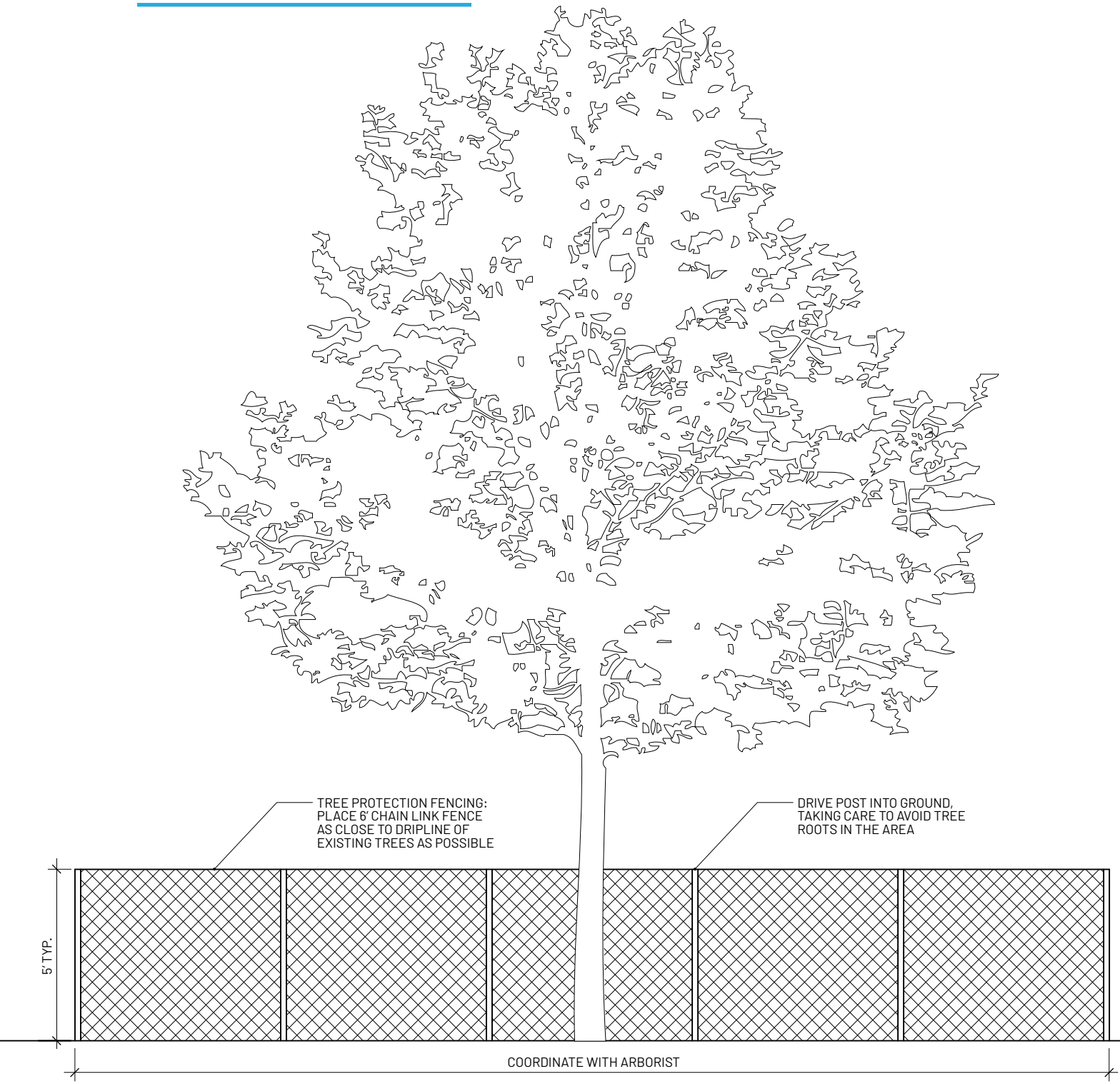
It is important to develop a maintenance plan for the plots that does not use pesticides or herbicides near crops. Consider planting insect repellent plants such as dill, thyme, lemongrass, lavender, basil, and chamomile. Additionally, strive to use organic mulch and compost. Rotate crops per season to prevent the buildup of diseases and insects specific to certain kinds of vegetables, and plan for the use of both warm season and cool season vegetables.[28]

Groundcover, shrub, vine, and canopy layers should all be considered when selecting edible plant species. It is important to consider species and foods that are culturally significant to the surrounding community. Plant species selection should also be conscious of any invasive pest or plant disease that could jeopardize the health of the plants and crop (such as the Asian Citrus Psyllid). Monitoring and maintenance programs should be adapted to any pest or disease as required. As with other plant species, only source material from qualified nurseries.

Examples of plant species that produce edible crop include, but are not limited to, the following:

- Trees: Avocado (*Persea americana guatemalensis*), Fig (*Ficus carcia*), Citrus (Oranges, Grapefruits, Lemons), Pomegranate (*Punica granatum 'Wonderful'*)
- Vegetables: Artichoke (*Cynara scolymus*), Kale (*Brassica oleracea var. acephala*), Squash (summer and winter varieties), Tomato, Eggplant (*Solanum melongena*)
- Cactii: Prickly pear (*Opuntia spp.*)
- Herbs: Oregano (*Origanum*), Rosemary (*Rosmarinus officinalis*), Garden sage (*Salvia officinalis*), Thyme (*Thymus*), Chives (*Allium schoenoprasum*)
- Vines: Raspberry (*Rubus*), Peas (*Pisum sativum*), Lima beans (*Phaseolus lunatus*)

ALL PROJECTS WITH EXISTING TREES MUST RETAIN AN ARBORIST TO REVIEW TREE HEALTH AND RECOMMEND PROCEDURES FOR PROTECTION, TRANSPLANTING, OR REMOVAL



TREE ROOT PROTECTION

Figure 148. Tree protection should be coordinated with the project arborist. Protection fencing should be placed along the dripline of existing trees.

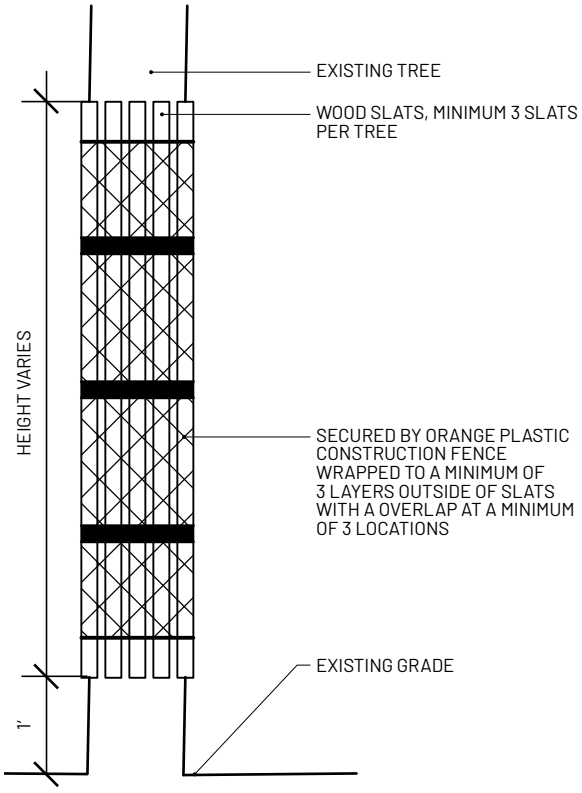
TREE AND PLANT PROTECTION

Tree and plant protection is important in both protecting existing vegetation during construction and ensuring the survival of young plants after installation. In projects where habitat succession is key, tree protection fencing may be useful in ensuring that plants can establish themselves without disturbance. All projects with existing trees must retain an arborist to review tree health and recommend procedures for protection, transplanting, or removal.

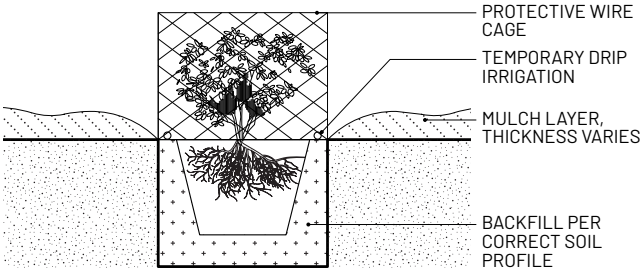
Tree protection zones are designated by tree protection fencing, which should be placed around the dripline of the existing trees. The zone should be established by the project landscape architect and arborist. Contractors are to keep soil disturbance within the tree protection zone to a minimum, excluding the use of heavy machinery. All digging in the zone is to be done by hand.

Tree trunk protection is another measure to further protect trees within the tree protection zone from damage during construction. Tree protection measures are temporary and meant to be in place during construction and removed afterward project completion. Adequate resources should be allocated for both installation and timely removal.

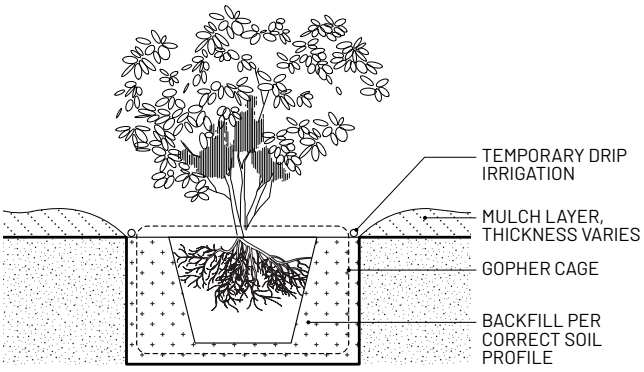
A combination of staking and installation of protective wire cages is recommended for small trees and shrubs to protect plants from vandalism and herbivory damage. In ground gopher cages may also be necessary to protect plant roots underground from squirrels, pocket gophers, and gophers.



TREE TRUNK PROTECTION



WILDLIFE SHRUB PROTECTION: CAGE



WILDLIFE SHRUB PROTECTION: GOPHER CAGE

Figure 149. (Left) Tree protection also includes wood slats around the trunk of existing trees and they should be removed after construction.
Figure 150. (Top Right) Protective wire cages around shrubs susceptible to wildlife grazing can help protect them during establishment.
Figure 151. (Bottom Right) Gopher cages help protect shrub rootballs from burrowing wildlife during establishment.

SITE PREPARATION AND SOIL

Planting failures are often a result of inadequate soil testing that would have guided a landscape architect, botanist, or ecologist towards a plant palette that could tolerate the present soil conditions. The landscape architect or planting designer should use the soil analysis results to determine the plant palette. Soil testing results are to be used to provide guidance for container planting, soil amending, and backfill conditioning. California native plants typically inhabit (and thrive in) areas with relatively low soil fertility. Therefore, the soils report fertility section must be interpreted by someone who is experienced and knowledgeable of California native plant horticultural requirements/parameters.

All existing soils should be tested to verify they are free of contaminants and debris and have the capacity to support adequate nutrients, drainage, and structure for a given planting design. Where possible, existing in situ soil materials should be amended in place after appropriate soil testing is conducted. Soil mix designs shall be based upon criteria of use. For example, soils designated for a given frame should balance the following criteria in the development of soil plans:

- **Ecological Rehabilitation** – Use a native soil type within the frame as a reference soil appropriate to the constructed context. A native reference soil will identify placement slope conditions, organic content, soil texture, and approximate pH as well as endemic vegetation supported by the soil material. Nutrient levels should also be based on this native reference soil condition.
- **Water Quality and Stormwater Management** - Refer to the Los Angeles County Public Works Low Impact Development Manual[29] for appropriate drainage classes and other functional criteria for vegetated swales, biofiltration, etc.
- **Recreational Areas** – Planted areas that receive high levels of foot traffic should be designed to resist compaction from foot traffic.

Further, all soils—amended, stockpiled or mixed—shall be tested for suitability. The Contractor shall submit representative samples of salvaged on-site topsoil, all plant mix materials, and organic material components which are intended to be used for planting soil mixes and final mixes to an independent Soil and Plant Testing Laboratory acceptable to the landscape architect. All tests shall be performed in accordance with the current standards of the Soil Science Society of America. All reports shall be sent to the landscape architect for approval. Samples of all soil materials to be brought to the site must be approved before delivery. Deficiencies in the soils shall be corrected by the Contractor, as directed by the landscape architect after review of the testing agency report.

Soil Amendment and Plant Mix analysis test methods shall show recommendations for soil additives, including organic and inorganic soil amendments, necessary to accomplish particular planting objectives noted.

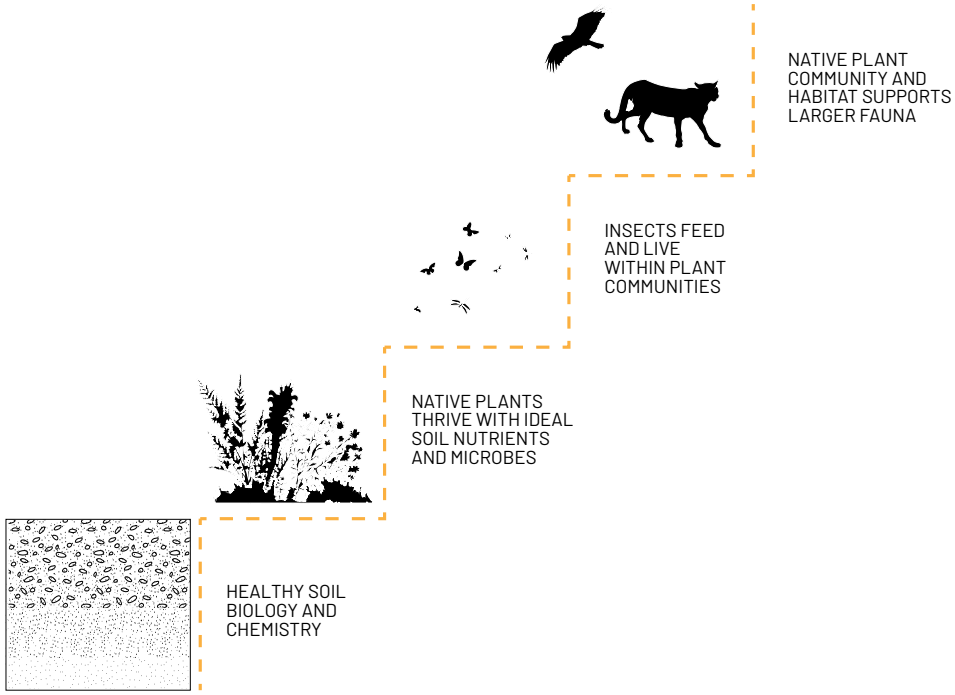


Figure 152. Ensuring proper soil testing and composition is crucial to supporting the life and structure of healthy functioning ecosystems. Soil mixes should be designed for it criteria of use, and all soils should be tested for suitability prior to installation.

The following are minimum test criteria that should be specified by the landscape architect:

- pH and Buffer pH
- Analysis for levels of toxic elements and compounds
- Particle size analysis to include sand sieve analysis shall be performed and compared to the USDA Soil Classification System
- Percent of organic matter shall be determined based on organic carbon
- Carbon-to-nitrogen ratio shall also be reported to qualify the soil organic matter suitability
- Saturated hydraulic conductivity
- Analysis for nutrient levels
- Soluble Salt by electrical conductivity
- Cation Exchange Capacity

Organic and biological approaches to soil improvement are encouraged for consideration in the planting and management program. These approaches may include the addition of biological infusions e.g., compost teas, mycorrhizal inoculations, and composted organic matter.

It is possible to alter soil conditions with a succession of plantings that will change the soil to eventually support a more diverse plant palette. At some project sites where soil contamination exists, it may be possible to utilize plants to assist in taking up toxins. However, that approach may be beyond most landscape budgets. Soil amendments are a possible alternative but should not be a part of standard planting specifications for these projects. Heavy soil contamination is a probable condition in areas along both entrenched and leveed conditions. Therefore, soils should be tested to determine its ability to retain and infiltrate water, soil fertility (macro and micro nutrients), biological activity, texture, toxics, salts, and heavy metals.

Importing soil mix materials will be required for some projects, particularly larger parks or gateways. All components for imported soil mixes should be sustainably sourced. Peat shall not be specified as a soil mix component. Landscape architects are encouraged to test and use innovative soils that promote the use of sustainable sources.

FOR BOXED TREES AND SHRUBS:
CAREFULLY REMOVE SIDES OF BOX AFTER PLACED IN PIT. WOOD BOTTOM MAY REMAIN IN PLACE. REMOVE ALL ROOT SECTIONS GROWING PARALLEL TO THE SURFACE OF THE ROOT BALL AND LOCATED AT THE ROOTBALL OUTER SURFACE GREATER THAN ¼". REMOVE SOIL AS NECESSARY TO UNCOVER ROOT FLARE

TREE AND SHRUB PLANTING

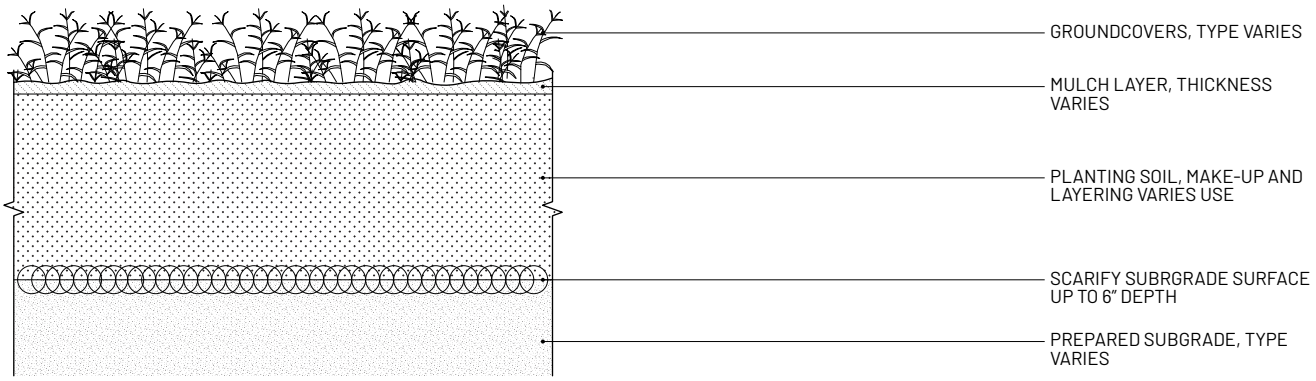
All plant material must be procured from a nursery that holds an appropriate nursery license with the California Department of Food and Agriculture (CDFA) to sell the requested plant material. Preference should be given to nurseries in southern California that are members of the Southern Californica Nursery Best Management Practices (BMP) Group. Contractor shall submit proof of license that all plant material was obtained by a pest free nursery in good standing with CDFA. Plant material quantities and handling standards must comply with the latest version of the American Standard for Nursery Stock (ANSI Z60.1) published by the American Horticulture Industry Association. Avoid purchasing plants affected by pathogens and use nurseries that incorporate best practices for pathogen avoidance.

Planting of seed and container plants is to occur in late fall through winter to benefit from seasonal rains. The project landscape architect is to prepare a specific planting schedule for each project. Plants are to be established from smaller plant sizes where practical. Plants shall be well shaped, vigorous, with healthy, well developed root systems and not be rootbound. Plants shall be healthy, and free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement, and abrasion. Plant pits shall be dug to produce roughened sides and flat, uncompacted bottoms. When pits are dug with an auger and the sides of the pits become glazed, the glazed surface shall be scarified. The size of plant pits shall be as indicated on drawings. Backfill for planting pits shall comprise amended site soil or manufactured soil media and organic compost depending on soil analysis results as specified by landscape architect.

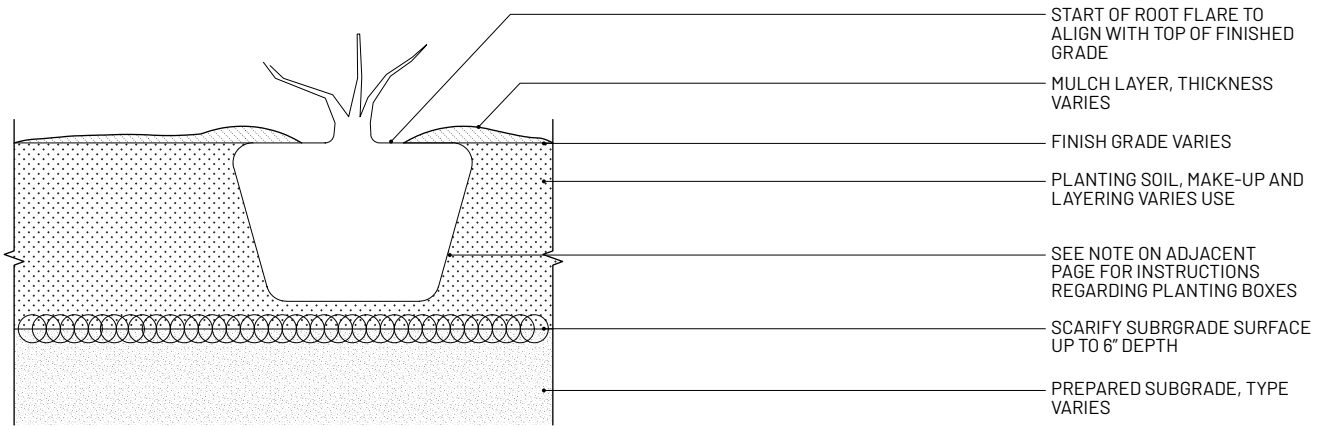
Seed and container plants of indigenous natives are to be obtained through contracts with qualified seed companies and nurseries. The contractor shall acquire all seed material of the required type, sizes, and quantities through sources approved by the project landscape architect. The contractor shall submit seed supplier's certification and contact information confirming that the collected seed is exclusively from LA River watershed sources. If LA River watershed seed sources cannot be obtained contractor shall state reasons why material is unavailable, such as insufficient quantities or lack of seed stock. Seed not required to be labeled under the California Food and Agricultural Code shall be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts, or a seed technologist certified by the Society of Commercial Seed Technologists not more than one year prior to application of seed. Seed treated with mercury compounds shall not be used. Seed shall be delivered to the site in original sealed packages bearing the supplier's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Weed seed shall not exceed 1% by weight of the total mixture. Wet, moldy, or otherwise damaged seed shall be rejected.

Each project is to be managed to provide adequate lead time for collection and propagation with the assistance of the project planting expert.

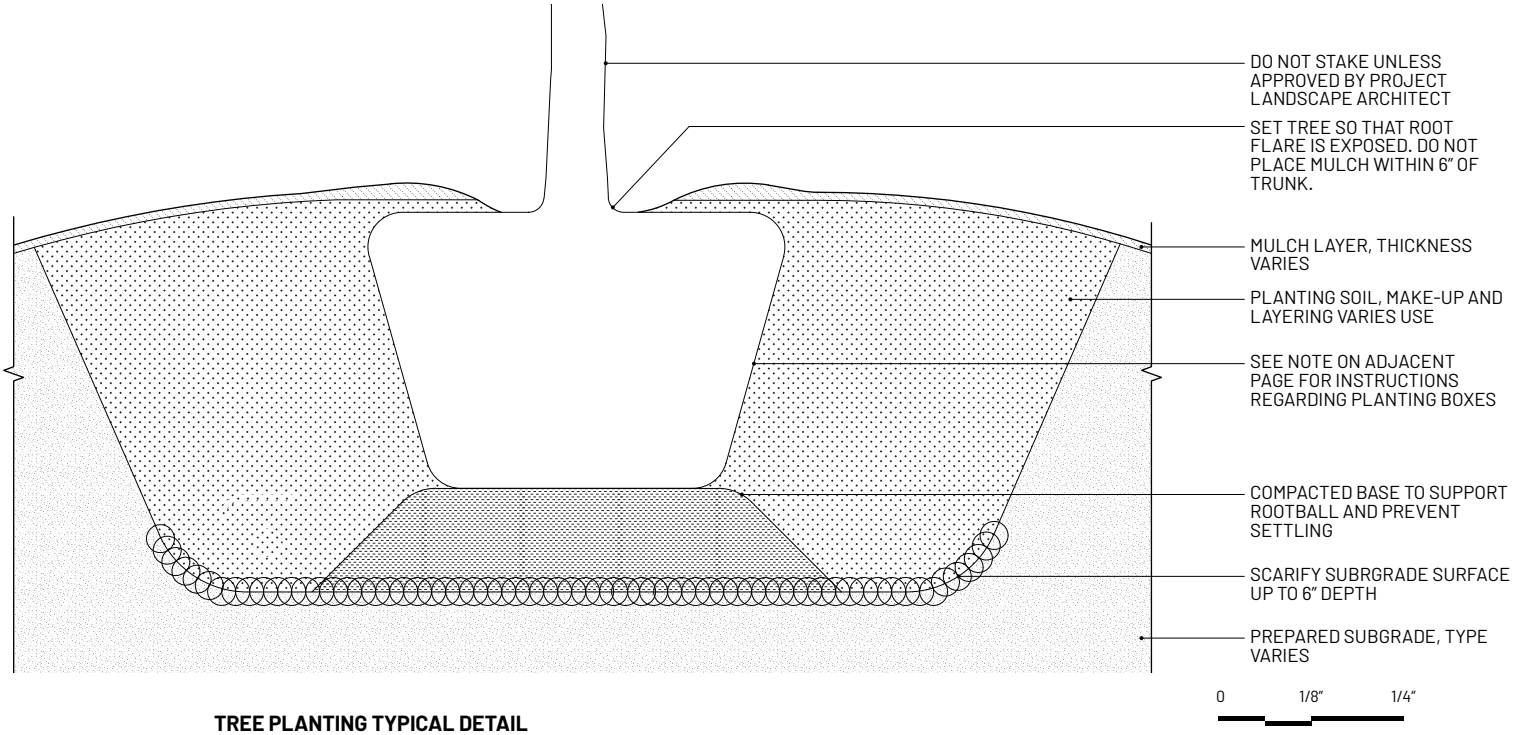
The subgrade should be scarified at least 6" deep before planting to ensure proper drainage. Seeded areas shall be lightly scarified. Finished grade shall be 1/2-inch below the adjoining grade of any paved area. New surfaces shall be blended to existing areas. All plants are to be thoroughly watered upon installation to compact soil and settle plants to natural soil depth. Planting areas that are not seeded are to be covered with 3-6" of organic mulch.



GROUNDCOVER PLANTING TYPICADETAIL



SHRUB PLANTING TYPICAL DETAIL



TREE PLANTING TYPICAL DETAIL

Figure 153. Planting installation methods should include scarifying the subgrade, aligning all root flares with the finished grade, and providing a compacted base for rootballs to provide the best growing conditions and allow the planted media to have the best chance of success.

MAINTENANCE BEST PRACTICES

EXTENDED MAINTENANCE PROGRAM

The project proponent is required to prepare a three year maintenance and monitoring program for all plantings and to designate who will be in charge of all short and long-term maintenance actions. This program is to define a schedule for observing and recording landscape performance with the goal of identifying actions that are needed to improve planting success. Such actions may include replacement plantings needed to replant areas where container plants have died or insufficient seed germination has occurred.

SUPPLEMENTAL IRRIGATION

The design and installation of supplemental irrigation systems to sustain new landscape plantings is discretionary. Ideally, planting projects will establish communities of native plants in a manner that encourages self-reliance and survival after the first three years of planting. In this regard, irrigation systems may be designed to assist in the initial plant establishment stages or during times of intense drought, but consistent long-term watering is to be discouraged. An exception would be specialty plantings in high use recreation areas, at road intersections, or in highly paved areas. These types of planting areas may require additional supplemental irrigation for an extended number of years to maintain the vitality of the landscape.

The application of supplemental irrigation water for California native species is recommended primarily during the winter months with the intent to avoid winter drought stress to newly planted plants. Winter irrigation can be very helpful in maintaining soil moisture when there are long periods of time between winter rains. Summer and fall watering may be limited in accordance with prevailing site and environmental conditions until the following winter rain cycle begins.

After the first year of establishment, the decision to provide additional supplemental irrigation during the summer should be made by the landscape architect.

Where possible, recycled or reclaimed water should be used on projects for irrigation. If recycled or reclaimed water is used, total dissolved salts from the sources should be analyzed as many California natives cannot tolerate high levels of dissolved salts.

All irrigation supply and system components shall comply with the LA County Low Impact Development Manual, LA County water sources, conservation standards, and the current California Green Building Standards Code. Consult LAC Public Works Plan Check for irrigation system design and documentation requirements. Drip irrigation systems, when installed, should be capable of providing multiple emitters to each container plant. In areas of large open landscapes, drip irrigation should be carefully monitored for performance. Often wildlife can chew or dig up flexible drip irrigation lines in large landscapes. If practical hard pipelines are more durable. Strategies for mitigating damage should be developed through an integrated pest management approach, identifying the likely source of damage. For example, ground squirrels may be addressed with netting and landscape fabric, coyotes may require hard piping or other means. Alternatives to drip irrigation can also be considered depending on project needs and code compliance. Additionally, alternatives to poly-ethylene drip piping or other easily damaged materials may be implemented depending on project needs, budget, and code compliance. As-built drawings of all irrigation systems shall be completed and submitted to LAC Public Works for future use.

Figure 154. Native planting along the LA River, as seen here at the North Valleyheart Riverwalk at river mile 39.7, should be incorporated into the trail access points. Source: OLIN, 2019.

PRUNING AND REMOVAL OF PLANTS

Landscape plantings are to be maintained in a manner that helps achieve natural form, diversity and density among plants. Trimming, pruning, and removal of plants is to be done under the guidance of a qualified native plant specialist and to avoid shearing and out-of-season cutting and pruning. Additional pruning and removal of plants shall be done to maintain public safety and access for service and emergency actions.

INVASIVE SPECIES REMOVAL AND SUPPLEMENTAL MULCHING

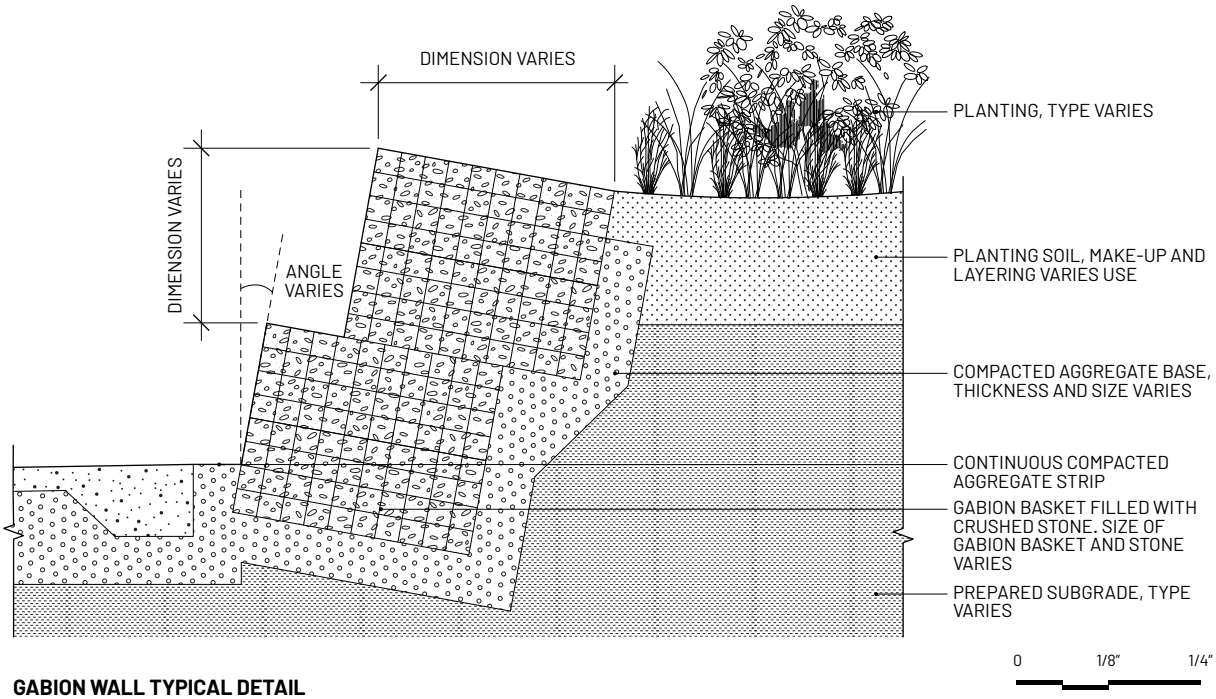
The monitoring and maintenance program shall provide for routine landscape inspections to inspect and test irrigation systems, manage weed growth, and to assess the need to provide periodic augmentation of mulches (to maintain a depth of 3-6"). Removal of invasive species by hand and mechanical means is recommended where feasible. Systemic herbicides that are glyphosate based such as Roundup or Rodeo SHOULD NOT be applied. Particularly aggressive invasive species, such as Arudo donax, spread by rhizomes and need careful consideration and monitoring when establishing a method for removal. Additional mulch is recommended to cover exposed soil and further inhibit the growth of weeds. Refer to LA County Weed Management Area Best Management Practices for Vegetation Management document (revised December 2015).[30]

WALLS

Site walls may be included in projects as barriers, seat walls, decorative elements with the potential for artwork, or to retain slope. Retaining walls are useful in projects that need to achieve a significant elevation change in a limited horizontal distance. They are a worthwhile investment where slopes need to be retained in a tight right-of-way condition.

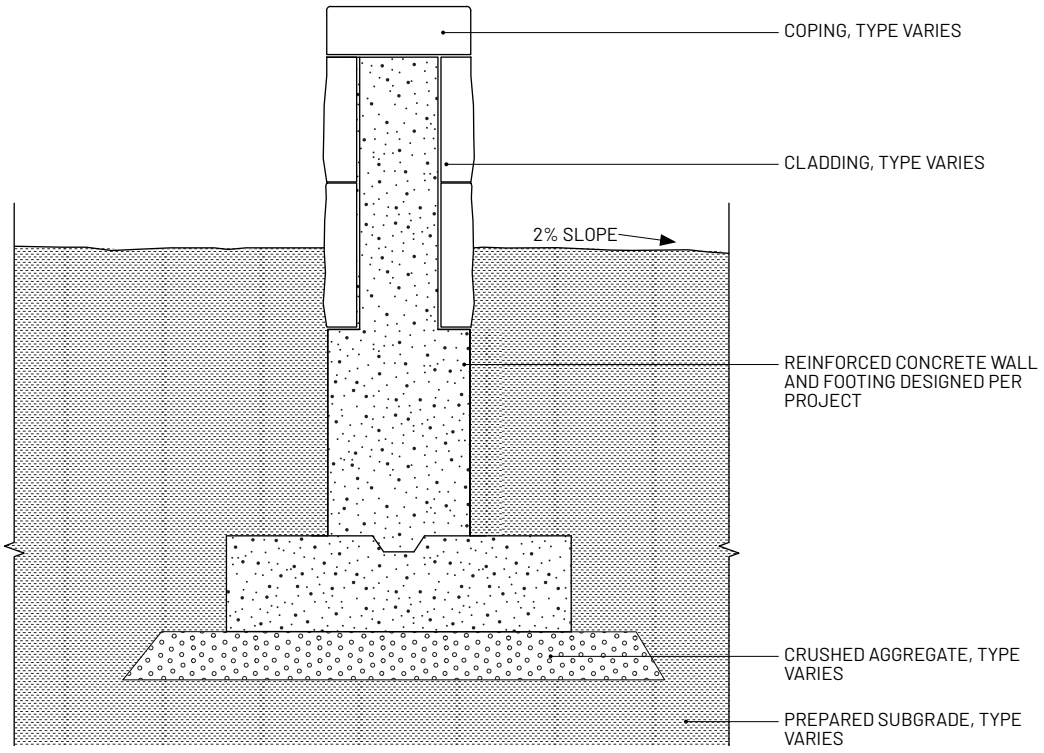
Options for retaining walls include gravity or cantilever walls, constructed from concrete and stone, or can be gabion walls, consisting of steel wire cages filled with stone. Gravity walls are monolithic pieces or stone or concrete, while cantilever walls consist of two parts - a stem and a base. Gravity walls are recommended for smaller heights, while cantilever walls are more economic for height differences of 4 to 10 ft. Gabion walls are often a more economical wall option and can allow substantial vegetation growth near the wall. Gabions are often placed against the slope at a specific angle back against the slope. All retaining walls should be designed with a structural engineer to prevent wall failure.[31]

Walls also provide an opportunity for art and community expression. Other wall treatments, such as planting or textured treatments can also be considered to deter vandalism.



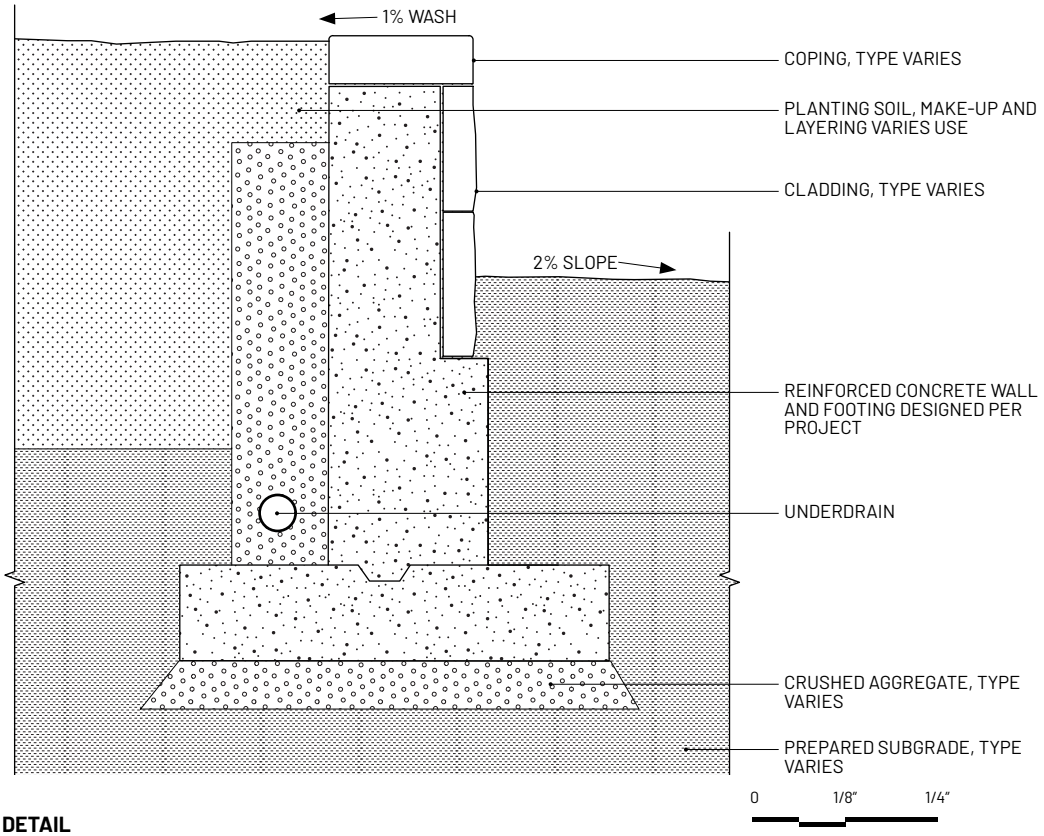
GABION WALL TYPICAL DETAIL

Figure 155. Gabion walls are often a more economical option for grade retention and allow for a substantial amount of planting near the wall. Gabion walls should be designed with a structural engineer.



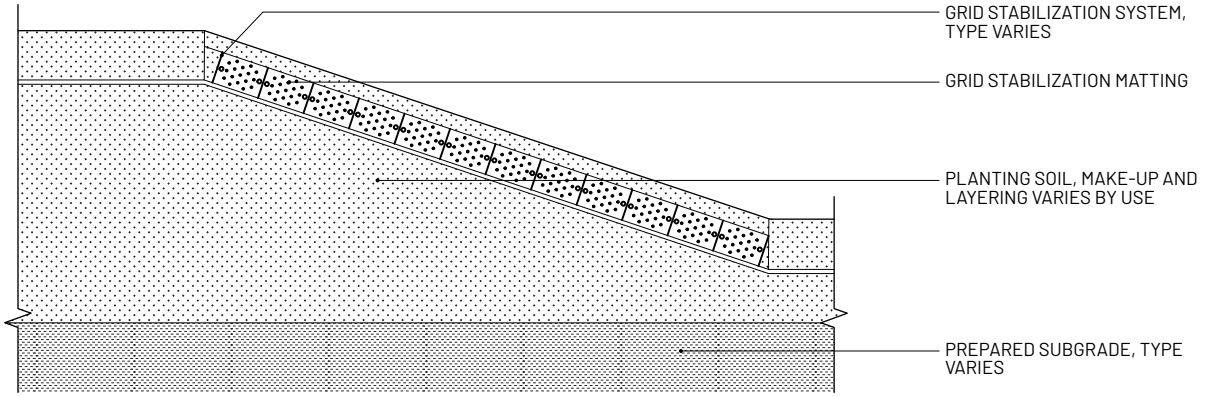
SITE WALL TYPICAL DETAIL

Figure 156. Site walls may function as barriers, seat walls, or decorative elements and should be designed with a structural engineer.

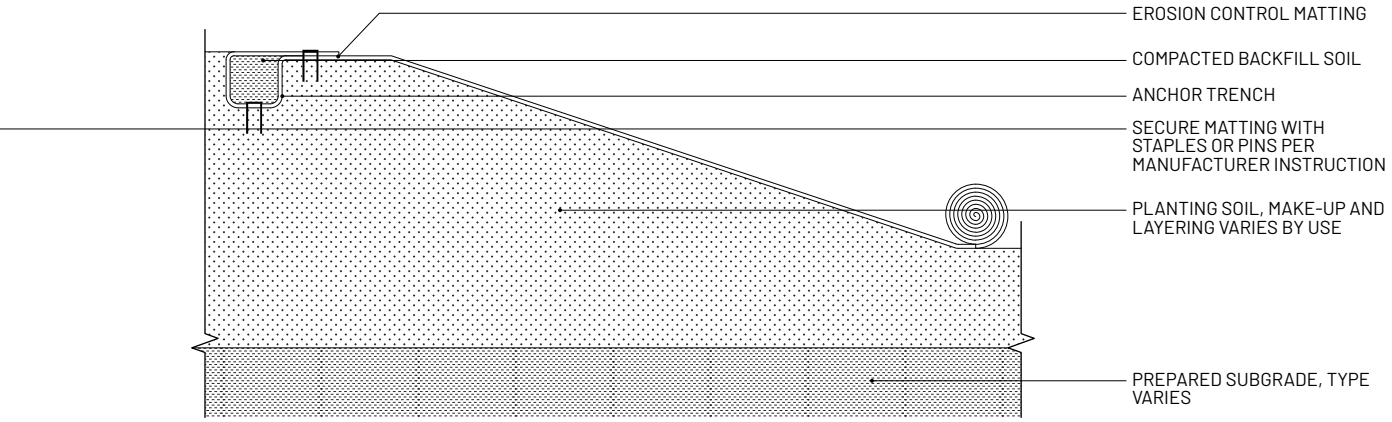


RETAINING WALL TYPICAL DETAIL

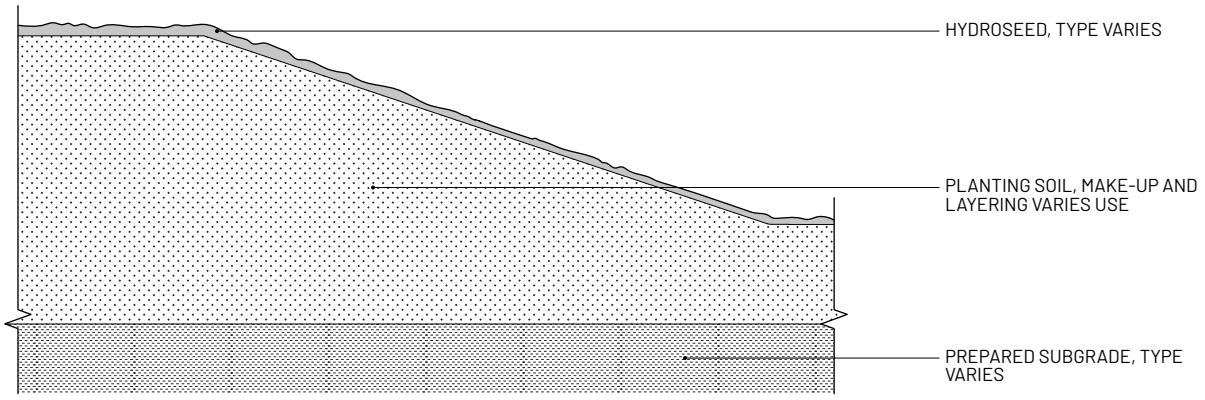
Figure 157. Retaining walls achieve a significant change in grade over a relatively narrow space and should be designed with a structural engineer.

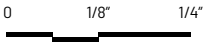


GEO-GRID EARTH STABILIZATION



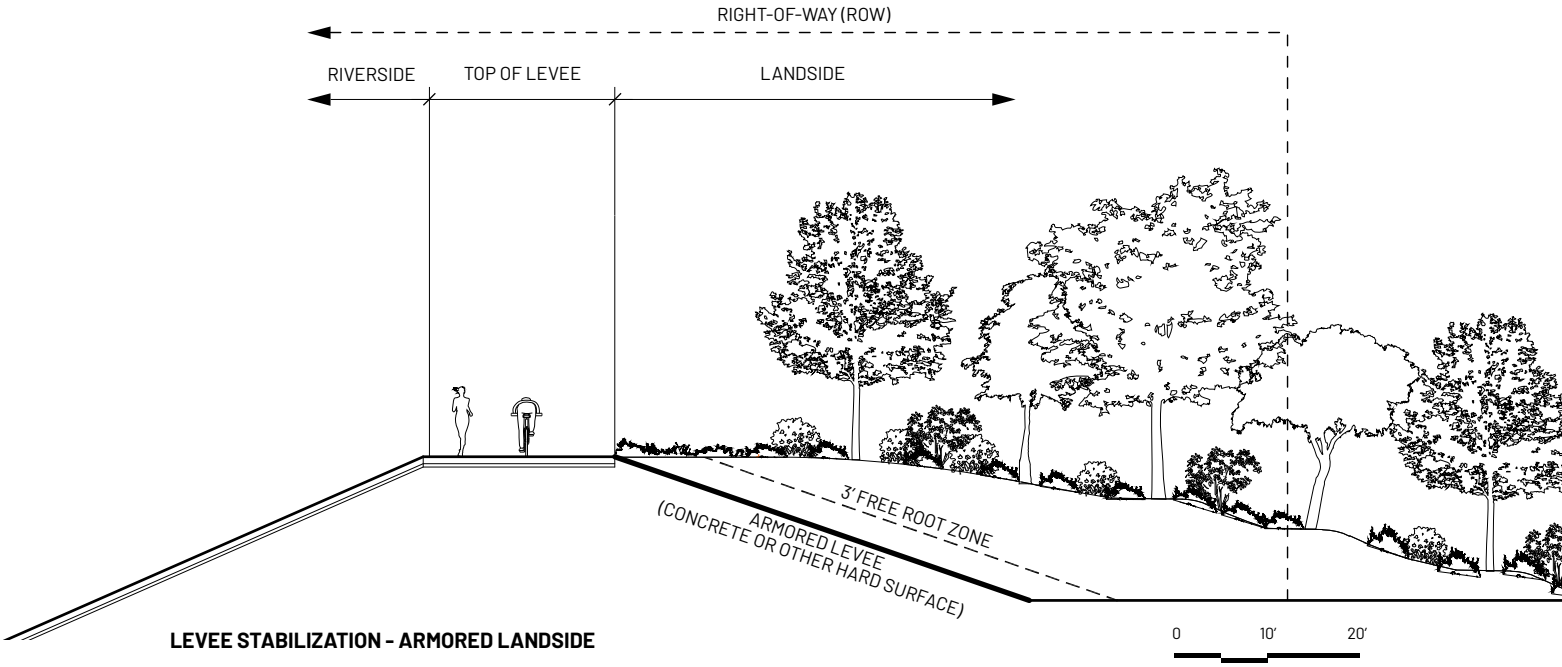
EROSION MAT STABILIZATION





HYDROSEED STABILIZATION

Figure 158. Geogrid mats, erosion mats, and hydroseeding are examples of strategies for slope stabilization on landside levee slopes. Slope stabilization should occur both during and after construction. The growth of deep rooting shrubs and groundcovers should be encouraged as a long-term slope stabilization method.



LEVEE STABILIZATION - ARMORED LANDSIDE

Figure 159. Armoring the landside slope of a levee is a technique that helps prevent levee failure under extreme overtopping events and strengthens the resilience of the levee over time. It also allows for the construction of a planting berm that supports tree and shrub planting.

SLOPE STABILIZATION AND EROSION MANAGEMENT

In projects where slopes do not have a tight landside right-of-way constraint, slopes can range up to a 3:1 slope with vegetation. During and after construction, any exposed slopes should be treated to avoid dust and sediment erosion. There are multiple methods available, including geo-grid matting, erosion control matting, and hydroseeding. Encouraging the long-term growth of deep rooting shrubs and groundcovers is the most robust and environmentally-conscious slope stabilization method. All of these techniques are meant to be deployed along the landside right-of-way only, as they would not be able to withstand the flood water velocities in the river channel.

Geogrid matting helps to stabilize steep slopes to prevent sliding. It often comes in a grid or waffle-like form, with gaps to allow planting to take hold. Erosion control matting reduces erosion by wind and runoff and also reduces runoff velocities and soil crusting. This protective covering should be of a natural, biodegradable woven material that helps to preserve soil moisture and lower soil temperatures, helping to establish more permanent vegetation over time while it biodegrades. Surface mulch for erosion control and weed abatement may comprise composted wood derivatives such as ground bark, chipped tree trimmings, or other wood waste material free of stones, sticks, and toxic substances harmful to plants and stabilized with nitrogen. Any stabilization of wood-based mulches with nitrogen should only be done at the direction of a landscape architect, botanist, ecologist or soil scientist experienced in the nutritional needs of native plant species. Hydroseeding is the act of spraying a mixture of native seeds, mulch, and binders onto a slope for temporary stabilization and to encourage the growth of both temporary and permanent vegetation. The binder in the mixture eliminates the need for matting to secure the mulch, thus allowing for easy application. Hydroseed fiber shall be produced from natural or recycled (pulp) fiber, such as wood chips or similar wood materials or from newsprint, chipboard, corrugated cardboard, or a combination of these processed materials, and shall be free of synthetic or plastic materials and shall be of such character that the fiber will disperse into a uniform slurry when mixed with water. The hydroseed and hydromulch mixtures should ideally be applied during the fall to take advantage of not only winter rains, but also the cold stratification that may enhance germination of many native plant seeds.[32]

For increased resiliency to flooding, armoring the landside of levees is a modification that would reduce the risk of levee failure under extreme overtopping events. Armoring methods such as hardening the levee with concrete or other hard material could be buried to allow for planting above.

HISTORIC FIRE OCCURRENCES

WILDFIRE

California native plant communities, especially chaparral and coastal sage scrub, are adapted to and thrive on occasional fires. Chaparral communities are shaped by infrequent, high-intensity wildfires rather than frequent fires; prior to mass development and presence of humans, natural, beneficial fires were likely to occur in intervals of 30 to 150 years, but with climate change and human activity, the increased frequency and intensity of wildfires are threatening native plants and habitats.[33]

Historically chaparral has been seen merely as fuel for fires and brush to be cleared rather than a native plant community worthy of being preserved.[34] However, more often the fuel for more intense wildfires is non-native, invasive grasses and forbs, which are rapid colonizers stoked by droughts and strong Santa Ana winds. Frequent fires cause native chaparral seeds and shrubs to die and limit shrub establishment, while invasive seeds are more likely to survive, further diminishing chaparral communities each recovery period. Restoring and protecting chaparral from excessive wildfire retains species diversity and slope stability, decreases erosion, increases water infiltration and carbon storage, and retains aesthetic integrity.[35]

While much of the LA River is in a densely urban context, planting projects near larger wildlife areas such as Griffith Park and Sepulveda Basin should be particularly careful not to increase fire risk. Furthermore, any existing larger ROW parcels that are converted to native vegetation should be sure the design and maintenance regime works to mitigate risks from fire.[36]

Wildfire mitigation strategies for native habitats along the LA River should focus upon eliminating invasive species, creating fuel breaks, and reducing fuel load where possible. The following can be considered as best practices:

- Remove invasive, non-native species during chaparral seeding or transplanting to aid in the establishment, survival, and recovery of native chaparral communities.[37]
- Prune dead plant material and remove plant debris to reduce fuel load. Pruning methods should maintain the natural form of trees and shrubs.[38]
- Consider spacing of canopy trees and large shrubs far enough to reduce the spread of fire.
- Maintain vertical separation between lower and upper fuel layers.[39]
- Minimize grasses and forbs, cut to four inches tall when they brown.[40]
- Reduce fuel load through mowing or machinery, grazing by animals such as goats, (NRCS Code 528), pruning (NRCS Code 660), removal, chipping, masticating, and/or sparingly through prescribed burning (NRCS Code 338).[41]

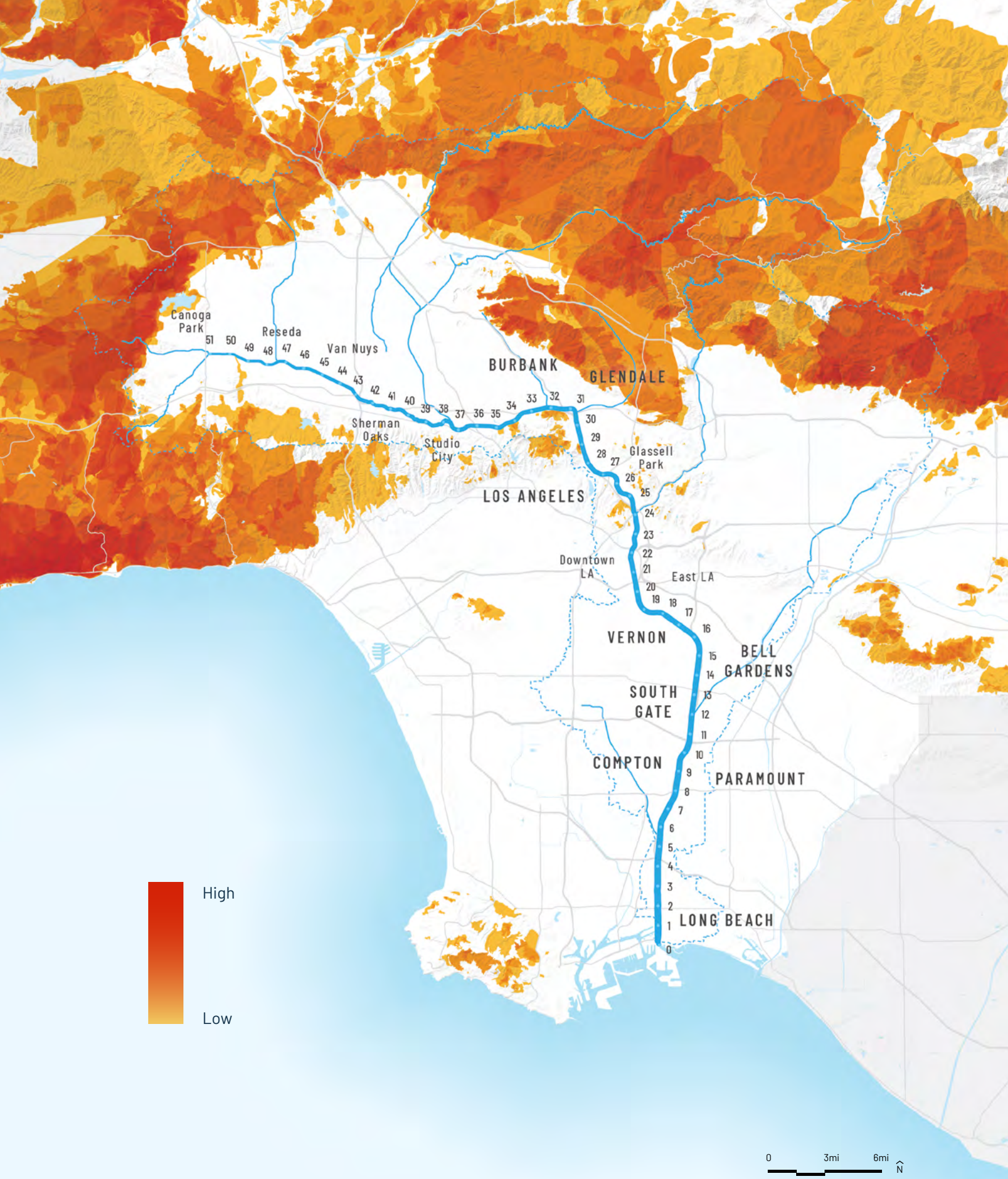


Figure 160. Historic Fire Occurrences Map. While native plant communities are adapted to occasional fires, the increased frequency of wildfires threatened the establishment of native shrubs and trees and favors non-native invasive species. Several design and maintenance strategies can help reduce this threat to native habitat. Source: State of California and the Department of Forestry and Fire Protection , Fire Perimeters Version 17_1, 2017.

PLANTING STRATEGIES

The historical vegetation of the LA River was a complicated landscape scale mosaic of predominantly willows, cottonwoods, sycamores, oaks, and marsh species. This historic, riparian vegetation is difficult to install within the confines of the present right-of-way due to limited access to water, changes in soil biotic activity and organic matter and other alterations resulting from the development of the river channel system. The landscape architect should keep in mind the species and communities that probably existed along project river reaches and determine whether or not those species can still thrive within the constraints now existing along the river right-of-way.

While restoration of riparian plant communities along the river is highly desirable ecologically, environmental conditions resulting from the existing infrastructure, maintenance requirements, and climate change may preclude the self-sustainability of such communities along much of the river. Therefore, many planting areas along the river may not be suitable for the historic riparian plant associations and other local native communities may be better suited depending on specific project goals and contexts.

Plantings are to be designed to include a range of native plants with the intent of achieving similar levels of species diversity as occurs in natural landscapes. Successional planting strategies from shorter lived perennials to established shrubs should be considered in planting design and maintenance. The diversity of the landscape plantings are to provide a variety of benefits ranging from soil development, erosion control, and habitat value to educational benefit, native community ceremonies and harvesting, and other community involvement.

In order to enhance ecological health and achieve the richest wildlife habitat opportunities, designers should seek to achieve diverse vertical structure in their projects by including the full range of vegetative layers present in both the short list or the native community - from tree canopy where applicable, through mid-layer and understory species as enumerated on the lists. The arrangement of plants in plan should aim to mimic natural plant communities in terms of species type, quantity, and association to other species in the community. This helps to ensure compatibility and mutual support among the installed plant species. When designing habitats targeted for specific wildlife species, a qualified botanist or ecologist should be consulted.

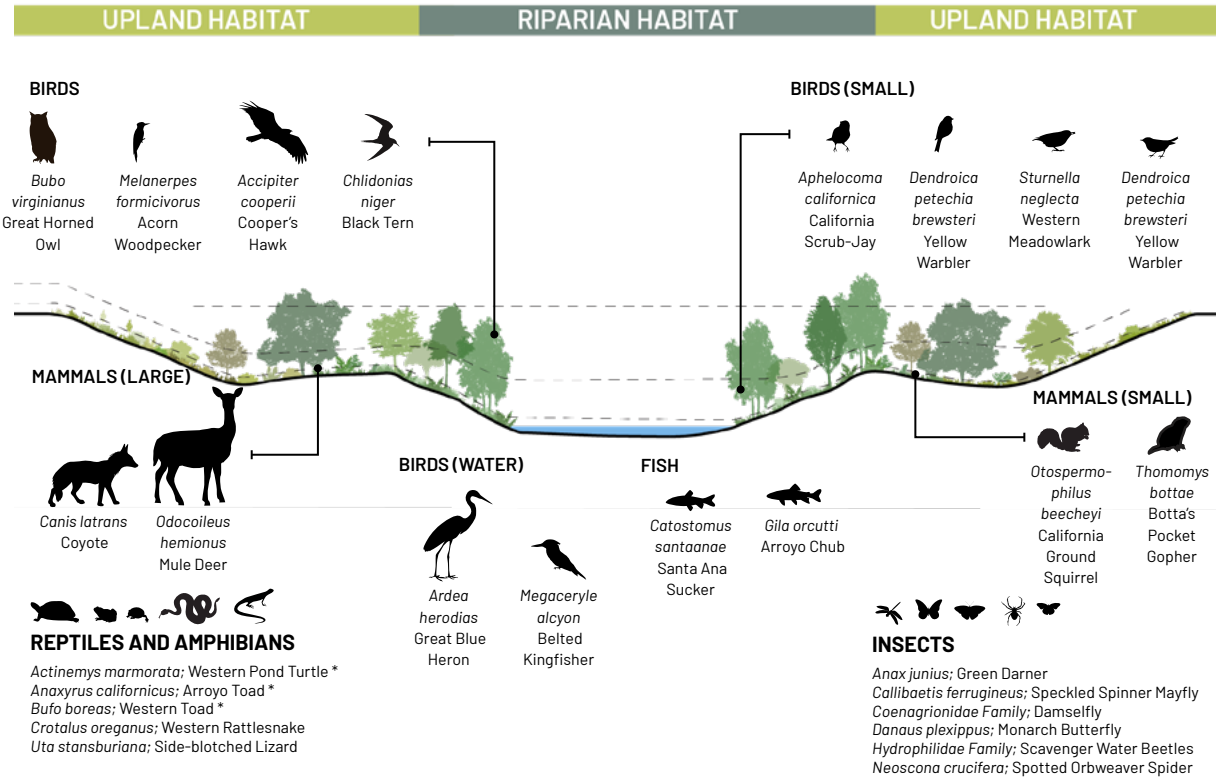
Impacts from any prevailing insect and disease outbreaks, particularly those that target native trees, should be carefully considered with any proposed planting and may influence species selection for a project. Overall, monocultures should be avoided and a diversity of species encouraged. Maintenance and monitoring plans should establish practices for the surveillance and treatment of species threatened by any insect or disease outbreaks.

Suitable conditions for native plant communities may also be achieved by strategic grading and drainage patterns that guide vegetated and urban runoff into artificial “riparian zones”. In areas with unrestricted soil depths, deep tillage of planting areas may be achieved by auguring the planting hole and breaking up hard subsoil layers. This strategy is strongly recommended for riparian tree species to provide a substrate through which developing tree roots can most readily reach the moisture they require for robust growth. The most common and broadly applicable strategy to ensure success of planting is the type and timing of supplemental irrigation during the three-year course of the establishment period. It is important to gradually wean plants off of irrigation to avoid shock related to stress from reduced water levels. Irrigation techniques should be applied to encourage deep rooting, such as allowing irrigation to run less frequently but for longer consecutive hours so that the soil can soak deeply. Match water application to soil type and root zone depth to reduce water run-off and loss of water below the active root zone of the target plant type.

The following guidelines may be implemented, in accordance with the LA County Low Impact Development Manual, LA County water sources, conservation standards, and the current California Green Building Standards Code to establish native plant materials utilizing drip irrigation:

PLANT COMMUNITY VERTICAL STRUCTURE

Figure 161. Vertical structure in planting varies depending on the type of native plant community. Woodland and forest communities tend to have large canopies, while scrub and chaparral communities tend to have primarily understory and shrub layers.



SOFT-BOTTOMED BASIN BIODIVERSITY PROFILE

Figure 162. Plant communities in different contexts can host diverse types wildlife. The example above shows a soft-bottom basin condition of either an existing or proposed river section. The species listed are meant to be a snapshot of a full list to be developed with a qualified ecologist and assume appropriate soil and plant community health to support the wildlife species. For more details, reference Chapter 6 of Appendix Volume II: Technical Backup Document.

- Provide separate drip zones to plant materials with differing watering requirements, target root zone depths, and application requirements.
- Irrigation to be applied to within the entire mature dripline of trees and shrubs.
- Where possible, utilize irrigation approaches that allow for the phased expansion of the drip irrigation area as trees and shrubs mature.

PLANT COMMUNITIES

The plant community lists have been developed through systematic review of several published sources regarding species distribution (see Bibliography in the Resources section), in combination with review of nursery and seed vendor lists. In most cases, these lists do not document every plant species that may be present within a native community and are not a substitute for a qualified botanist or ecologist for habitat-focused projects.

For example, many species of the alluvial fan sage scrub community are difficult to find in nurseries, including some of its signature species. However, this is the most appropriate community to install in the vicinity of Tujunga Wash and potentially other downstream locations. To facilitate reintroduction of this unusual community, additional coordination should be conducted to allow for localized contract growing and collection of plant propagules from local native sources.

Plant species nomenclature primarily follows Hickman, James C., ed. 1993. The Jepson Manual: Higher Plants of California. University of California Press, Berkeley and Los Angeles.

Plant community and association names are after Holland (1986) followed by Sawyer and Keeler-Wolf (1995).

Planting projects should follow this general criteria:

- Include the services of qualified planting experts who have proven experience with California native planting projects to assist in making decisions regarding the plant palette. These experts should include a registered landscape architect, arborist, and a qualified botanist or ecologist.
- Planting in the LA River channel should only occur where excess hydraulic capacity is confirmed.
- Plants currently existing in the public right-of-way are to be assessed for their value and role in new projects. Existing, non-native non-invasive species may be retained until senescence (plant aging and death) then replaced with appropriate native plants. Based on the specific goals and objectives of a project, a different approach to existing non-native species may be taken. Overall, long-term management actions and replacement plantings are to emphasize native species and non-invasive species for future climate regimes.
- Planting can provide an opportunity to incorporate installed artworks or landart.

Figure 163. The chaparral community is often found on exposed slopes and hillsides, such as this example in the Santa Monica Mountains. Source: Tracie Hall, https://www.flickr.com/photos/twobears2/5190609445/ (Topanga State Park, 2010)

Figure 164. The coast live oak woodland can be found on slopes or on river banks and terraces, such as this example in Malibu Creek State Park. Source: Tracie Hall, https://www.flickr.com/photos/twobears2/5193454253/in/photostream/ (Malibu Creek State Park, 2010).

ADDITIONAL NATIVE SPECIES NOT ON THE FOLLOWING PLANT LISTS MAY BE ADDED WITH THE DOCUMENTED RECOMMENDATION OF A QUALIFIED BOTANIST OR ECOLOGIST

NATIVE PLANT SPECIES APPROPRIATE USE

The following native plant species that are not included on the plant community lists may be planted:

- Annuals and bulbs (which have higher maintenance requirements)
- Cultivars of the native species listed (use with caution in projects that interface with wildlands)
- Additional LA County native species recommended by a qualified botanist or ecologist

The following plants should never be planted along the LA River:

- Invasive plant species defined by the California Invasive Plant Council (Cal-IPC) https://www.cal-ipc.org/

Additional information is on both native and invasive species is available through the California Native Plant Society: https://www.cnps.org/

In riparian or other native habitat areas, the following criteria for species selection should be followed:

- **95% minimum** of the total number of plants of the same pot size should be LA River Watershed native species (refer to the native plant community lists in this chapter).
- **5% maximum** of the total number of plants of the same pot size should be native to Los Angeles' Level III ecoregion (Southern California/Northern Baja Coast; Southern California Mountains).
- **10% minimum** of the total number of LA River Watershed native plants of the same pot size should be locally sourced in the LA River Watershed. Higher percentages should be achieved as local supply capacity increases.

NATIVE PLANT SPECIES TERMS & DEFINITIONS

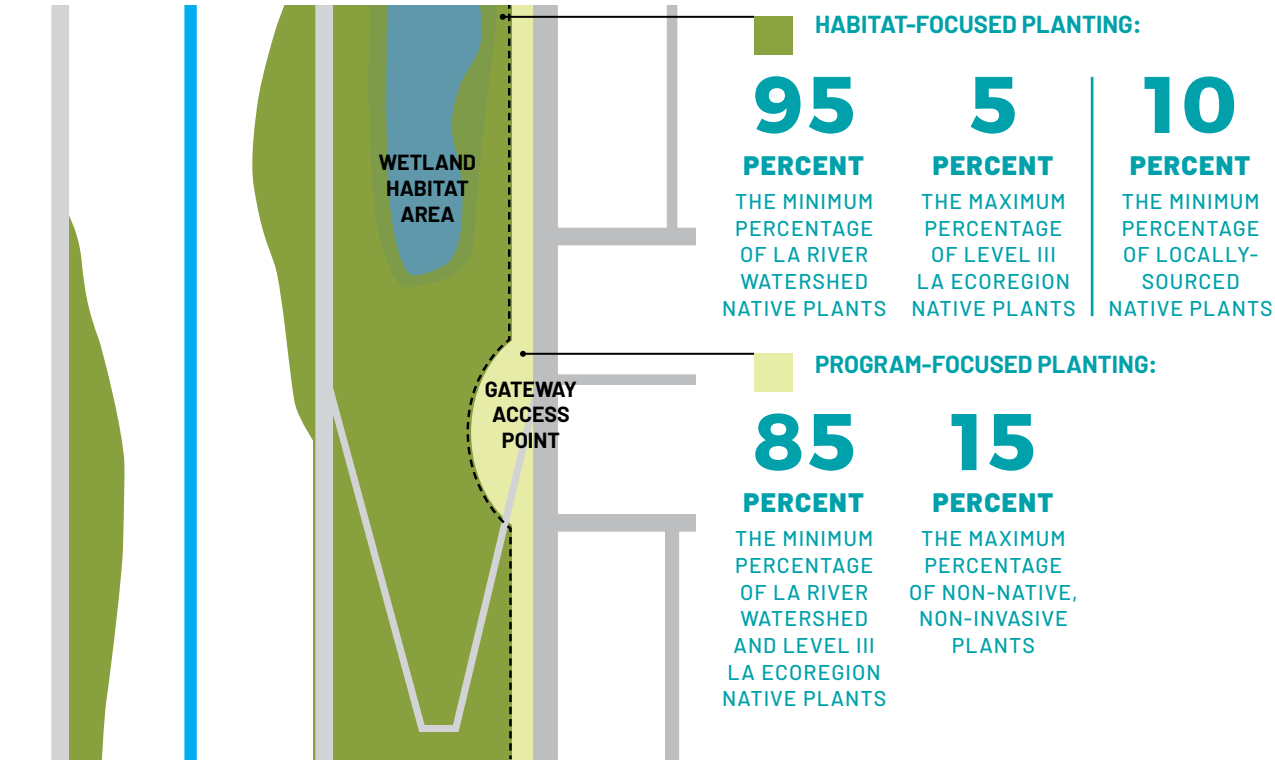
LA River Watershed Native Plant Species: Plant species that are a part of the balance of nature that has developed over hundreds or thousands of years in the LA River Watershed. (Source: USDA)

Invasive Plant Species: Plant species that are both non-native and able to establish on many sites, grow quickly, and spread to the point of disrupting plant communities or ecosystems, causing environmental harm and/or harm to human health. (Source: USDA)

Non-Native Plant Species: A plant species introduced with human help (intentionally or accidentally) to a new place or new type of habitat where it was not previously found. Not all non-native plants are invasive and may not reproduce or spread readily without continued human help. (Source: USDA)

Ecoregions: Areas where ecosystems (and the type, quality, and quantity of environmental resources) are generally similar. This framework is derived from mapping done in collaboration with EPA regional offices, other Federal agencies, state resource management agencies, and neighboring North American countries. (Source: US EPA)

Figure 165. Terms and Definitions for Native Plant Species. Terms are defined as used in this document. Source: USDA, US EPA.



***Planting in the LA River channel should only occur where excess hydraulic capacity is confirmed.**

Figure 166. Species planting at gateways and along street frontages can incorporate more climate-adapted species, while riparian and other habitat areas should prioritize planting locally-sourced LA River watershed native plant species.

In programmed areas, gateways, or areas where the project interfaces with the city street grid, the following criteria for species selection should be followed:

- **85% minimum** of the total number of plants of the same pot size should be native to the LA River Watershed (refer to the native plant community lists in this chapter) or the Level III ecoregions of Los Angeles and just east of Los Angeles, as appropriate per planting context and climate regimes (Southern California/Northern Baja Coast; Southern California Mountains; Mojave Basin and Range; Sonoran Basin and Range).
- **15% maximum** of the total number of plants of the same pot size can be climate-adapted, non-native, non-invasive species.

All plant species selections should be made based on the specific goals and needs of a project. These percentages are a baseline benchmark and projects are encouraged to go over and beyond these requirements to meet project goals. Any variance to these requirements may be considered on a case-by-case, plant-by-plant basis by the county.

PLANTING LIST KEY

APPLICATIONS

+
Enhances biodiversity, and provides habitat - especially for key indicator species for each community

^
Mature tree canopy, provides significant shade for pedestrians

*****
Tolerates heat

~
Tolerates flooding

!
Useful for soil/bank stabilization

o
Additional moderate to high levels of irrigation required if existing groundwater or riparian conditions are not available

SUN EXPOSURE

FS
Full sunlight

FS/PS
Full Sunlight to Partial Sunlight

PS
Part Shade

PS/FS
Part Shade to Full Shade

SOUTHERN COTTONWOOD-WILLOW RIPARIAN FOREST

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
SHRUBS							
Baccharis salicifolia	Mulefat	1-9	F, G	+ ^	All	3	
Pluchea sericea	Arrow weed	1-9	F, G	o	FS	3	
Rhus aromatica	Fragrant sumac	1-9	A, B, C	+	FS / PS	4	

FRAMES (SEE CH. 2 FOR MORE EXPLANATION)

1 - Estuary
Significant bird habitat; Brackish water all year long; Raised banks allow for planting; Opportunity for coastal wetlands

2 - South Plain
Significant bird habitat; Freshwater in channel; Algae mats could be preserved as food source for birds; Wide right-of-way provides opportunity for significant habitat areas, including wetland construction

3 - Central Plain
Lack of habitat and park space; Urban heat island mitigation and shade needed; Potential for habitat patches to connect significant ecological areas

4 - North Plain
Lack of habitat and park space; Urban heat island mitigation and shade needed; Harsh environment with pollution and soil contamination prevalent

5 - Heights
Lack of habitat and park space; Urban heat island mitigation and shade needed; Potential for habitat corridor connection and patches to connect significant ecological areas

6 - Narrows
Significant opportunity to enhance native habitat and connect to other important habitat corridors and patches; Natural riparian to upland connections are possible here

7 - East Valley
Dense residential context; Narrow right-of way; Significant opportunity to enhance native habitat and connect to other important habitat corridors and areas

8 - Mid Valley
Dense residential context; Narrow right-of way; Opportunities for park space, shade, and urban heat island mitigation; Opportunity to enhance native habitat and connect to other important habitat corridors and areas

9 - West Valley
Dense residential context; Significant opportunity to enhance native habitat and connect to other important habitat corridors and patches; Potential to connect to headwaters from this frame

CONSTRUCTED CONTEXTS

A
Steep slopes, fast draining, thin soil profile

B
Steep slopes, fast draining, thin soil profile (North-facing)

C
Level slope or terrace, fast draining with drier soils

D
Planting bed and soils surrounded by paving. Drier soils, hotter than usual ambient temperatures

E
Level slope or terrace, fast draining with intermittently flooded soils

F
Low-lying alluvial or gravelly soils that are seasonally flooded

G
Low-lying alluvial soils or gravelly soils with regular access to water

OCCURRENCE IN NATURAL COMMUNITIES

Dominant
Visually dominant in the mature landscape; usually refers to trees or large shrubs.

Subdominant
Visually subdominant.

Frequent
Refers to the numerical proportion of the species in the landscape. Especially in the case of grasses and herbaceous species, this category may indicate much higher numbers of individual plants than the dominant category, but these species do not dominate the casual vista.

Occasional
Refers to plants that occur occasionally in the designated plant community.

BLOOM SEASON

W
Winter

SP
Spring

SU
Summer

F
Fall

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
S	H	4-8	6-10	X	X		Occasional	X	Bees, Butterflies	White/Pink/White	X	X	X	X
S	M	6-8	6+	X			Occasional	X		Pink		X	X	
S-D	L	3-5	4-8		X		Frequent - Occasional		Birds	Yellow/Cream		X		

WATER USE

WUCOLS: Estimates water needs based on the latest prevailing legislation. These water use categories used to develop hydrozone plans and submitting permitting applications. See https://ucanr.edu/sites/WUCOLS/ for more information.

VL
Very low

L
Low

M
Medium

H
High

PLANT FORM

T
Tree

D
Deciduous

S
Shrub

SC
Succulent

G
Grass

GC
Groundcover

P
Perennial

V
Vine

A
Annual

PLANT PALETTE SELECTION IS HEAVILY DEPENDENT ON THE EXISTING CONDITIONS OF CHANNELIZATION (ENTRENCHED OR LEVEED), NATIVE OR IMPORTED SOIL CONDITIONS, ACCESS TO WATER, SUN EXPOSURE AMOUNT OF SHADE, RIGHTS-OF-WAY WIDTH VARIATIONS AND ADJACENT LAND USES

PLANT SPECIES INDEX

This index lists all species that appear in the following plant community lists. Some species occur in multiple communities.

Each community can be found starting on the following pages:

BOTANICAL NAME	COMMON NAME	PLANT COMMUNITIES
TREES		
Acer negundo	Box elder	CLORF, CWRF, SRW
Adenostoma sparsifolium	Red shanks	CH
Alnus rhombifolia	White alder	SH, SRW, PFEW
Arbutus 'Marina'	Marina madrone	CT
Calocedrus decurrens	Incense Cedar	CT
Celtis laevigata var. reticulata	Western hackberry	DS
Cercis occidentalis	Western redbud	CT
Chilopsis linearis	Desert willow	DS, CT
Chitalpa tashkentensis	Chitalpa	CT
Cordia boissieri	Texas Wild Olive	CT
Cupressus arizonica	Arizona cypress	CT
Dalbergia sissoo	Indian rosewood	CT
Forestiera neomexicana	Desert olive	CT
Fraxinus velutina var. coriacea	Velvet ash	CLORF, CWRF, SRW, VOW
Hesperocyparis forbesii	Tecate cypress	CT
Juglans californica var. californica	California walnut	SH, CH, CLORF, CLOW, SRW, WW
Laurus nobilis	Sweet Bay	CT
Lophostemon confertus	Brisbane Box	CT
Lyonothamnus floribundus ssp. asplenifolius	Ironwood	CT
Olneya tesota	Desert ironwood	CT
Parkinsonia florida	Blue palo verde	DS
Pinus canariensis	Canary Island pine	CT
Pinus coulteri	Coulter pine	CT
Pinus eldarica	Eldarica pine	CT
Pinus halepensis	Aleppo pine	CT
Pinus muricata	Bishop pine	CT
Pinus pinea	Stone pine	CT
Pinus torreyana	Torrey pine	CT
Platanus racemosa	California sycamore	SH, AFSS, CLORF, CWRF, SRW, VOW
Populus fremontii ssp. fremontii	Fremont cottonwood	SH, CLORF, CWRF, SRW, PFEW
Populus trichocarpa	Black cottonwood	CLORF, CWRF, SRW, PFEW
Quercus agrifolia var. agrifolia	Coast live oak	SH, AFSS, CLORF, CLOW, SRW, VOW, WW
Quercus chrysolepis	Canyon live oak	CT
Quercus douglasii	Blue Oak	CT
Quercus lobata	Valley oak	SH, VOW
Quercus wislizeni	Interior live oak	DS
Quillaja saponaria	Soapbark tree	CT
Salix gooddingii	Black willow	CWRF, SRW, PFEW
Salix laevigata	Red willow	CWRF, PFEW
Sambucus nigra ssp. caerulea	Mexican elderberry	SH, AFSS, CSS, CLORF, CLOW, CWRF, SRW, WW, PFEW
Searsia lancea	African sumac	CT
Tipuana tipu	Tipu tree	CT
Umbellularia californica	California bay laurel	SH, CLORF, CLOW, CWRF, SRW
Vitex agnus-castus	Chaste tree	CT
SHRUBS		
Adenostoma fasciculatum	Chamise	AFSS, CH
Amorpha fruticosa	False indigobush	CLORF, CLOW, SRW
Arctostaphylos glandulosa	Eastwood manzanita	CH
Arctostaphylos glauca	Bigberry manzanita	AFSS, CH
Artemisia californica	California sagebrush	SH, AFSS, CSS, CH, CLORF, CLOW
Atriplex canescens	Four-wing saltbush	DS
Atriplex lentiformis ssp. lentiformis	Saltbush	SH, CSS, DM
Baccharis pilularis var. consanguinea	Coyote brush	SH, CSS, CLORF, CLOW, SRW, DM
Baccharis salicifolia	Mulefat	SH, CLORF, CWRF, SRW, PFEW
Baccharis sarothroides	Broom baccharis	DS
Berberis nevinii	Nevin's barberry	SH, AFSS
Berberis pinnata	California barberry	CSS, CLORF, CLOW, SRW
Brickellia californica	California bricklebush	AFSS

BOTANICAL NAME	COMMON NAME	PLANT COMMUNITIES
Calliandra eriophylla	Fairy duster	DS
Ceanothus crassifolius	Hoaryleaf ceanothus	AFSS, CH
Ceanothus cuneatus	Buck brush	CH
Ceanothus leucodermis	Chaparral whitethorn	AFSS, CH, CLOW
Ceanothus megacarpus	Big-pod ceanothus	CH
Ceanothus oliganthus	Hairy ceanothus	CH, CLORF, CLOW
Ceanothus spinosus	Greenbark ceanothus	CH
Cercocarpus betuloides var. betuloides	Mountain mahogany	SH, AFSS, CH
Dendromecon rigida	Bush poppy	AFSS, CSS, CH
Diplacus longiflorus	Southern bush monkeyflower	CSS, CH
Encelia actoni	Acton brittlebush	DS
Encelia californica	Bush sunflower	SH, AFSS, CSS
Encelia farinosa	Brittlebush	DS
Ephedra viridis	Mountain ephedra	DS
Ericameria (Happlopappus) pinifolia	Pine goldenbush	AFSS, CSS
Ericameria nauseosa	Rabbitbrush	DS
Eriodictyon crassifolium	Thick-leaved yerba santa	AFSS, CSS
Eriodictyon trichocalyx var. trichocalyx	Hairy yerba santa	SH, AFSS
Eriogonum cinereum	Ashyleaf Buckwheat	SH, CSS, CH
Eriogonum fasciculatum var. fasciculatum	California buckwheat	AFSS, CSS, CLOW
Eriogonum fasciculatum var. foliolosum	Leafy California buckwheat	SH, AFSS, CSS, CH, CLORF, CLOW, DS
Eriogonum fasciculatum var. polifolium	Interior California buckwheat	AFSS, CH, DS
Fallugia paradoxa	Apache plume	DS
Frangula californica ssp. californica	California coffeeberry	SH, CH, CLORF, CLOW, SRW, VOW, DS
Gutierrezia californica	California matchweed	AFSS
Gutierrezia sarothrae	Matchweed	AFSS
Heteromeles arbutifolia	Toyon	SH, CSS, CH, CLORF, CLOW, SRW, WW
Hyptis emoryi	Desert lavender	DS
Isocoma menziesii ssp. vernonioides	Goldenbush	CSS, CH, CLORF, CLOW, DM

BOTANICAL NAME	COMMON NAME	PLANT COMMUNITIES
Isomeris arborea	Bladder pod	DS
Juniperus californica	California juniper	AFSS
Justicia californica	Chuparosa	DS
Keckiella cordifolia	Heart-leaved penstemon	CSS, CH, CLORF, CLOW, SRW
Larrea tridentata	Creosote bush	DS
Lepechinia fragrans	Fragrant pitcher plant	CH, CLOW
Lepidospartum squamatum	Scale broom	AFSS
Lonicera subspicata var. denudata	Chaparral honeysuckle	CH, CLORF, WW
Lupinus excubitus	Grape soda lupine	DS
Lycium andersonii	Water jacket	DS
Malacothamnus davidsonii	Davidson's bush mallow	SH, AFSS
Malacothamnus fasciculatus	Chaparral bush mallow	AFSS, CSS, WW
Malosma laurina	Laurel sumac	SH, AFSS, CSS, CH, CLORF, CLOW, SRW
Mimulus aurantiacus	Bush monkey flower	SH, CSS, CH, CLORF, CLOW, SRW, WW
Peritoma arborea	Bladderpod	SH, CSS, DS
Pluchea sericea	Arrow weed	SH, AFSS, CSS, CWRF, SRW
Prosopis glandulosa	Honey mesquite	DS
Prunus ilicifolia ssp. ilicifolia	Hollyleaf cherry	SH, AFSS, CSS, CH, CLORF, CLOW, SRW, WW
Quercus berberidifolia	Scrub oak	AFSS, CSS, CH
Rhamnus crocea	Spiny redberry	SH, AFSS, CSS, CH
Rhamnus ilicifolia	Hollyleaf redberry	SH, CSS, CH, CLORF, CLOW, SRW, WW
Rhus aromatica	Fragrant sumac	CH, CLORF, CLOW, CWRF, SRW
Rhus integrifolia	Lemonadeberry	SH, AFSS, CSS, CH, CLORF, CLOW, SRW
Rhus ovata	Sugar bush	SH, AFSS, CH, CLOW, WW
Ribes aureum var. gracillimum	Golden currant	SH, CLORF, CLOW, SRW, WW
Ribes californicum var. hesperium	Hillside gooseberry	SH, CH, CLORF, CLOW, SRW
Ribes malvaceum var. viridifolium	Chaparral currant	CH, CLOW
Ribes speciosum	Fuchsia-flowered gooseberry	SH, CH, CLORF, CLOW, SRW
Rosa californica	California wild rose	SH, CLORF, CLOW, CWRF, SRW

PLANT SPECIES INDEX

BOTANICAL NAME	COMMON NAME	PLANT COMMUNITIES
SHRUBS (continued)		
Salix exigua	Sandbar willow	SH, CWRF, SRW, PFEW
Salix lasiandra	Shining willow	CWRF, PFEW
Salix lasiolepis	Arroyo willow	SH, CWRF, SRW, PFEW
Salvia apiana	White sage	SH, AFSS, CSS, CH, CLORF, CLOW, DS
Salvia leucophylla	Purple sage	SH, CSS, CLOW, WW
Salvia mellifera	Black sage	SH, AFSS, CSS, CH, CLOW, WW
Scutellaria mexicana	Mexican bladdersage	DS
Simmondsia chinensis	Jojoba	DS
Sphaeralcea ambigua	Apricot mallow	DS
Tecoma stans	Yellow bells	DS
Trichostema lanatum	Woolly blue curls	CSS, CH
Venegasia carpesioides	Canyon sunflower	CLORF, CLOW, SRW
PERENNIALS		
Abutilon palmeri	Palmer's Indian mallow	DS
Acourtia microcephala	Sacapellote	CH
Alisma triviale	Water plantain	PFEW
Ambrosia psilostachya	Western ragweed	DM
Artemisia douglasiana	Mugwort	SH, CLORF, CLOW, CWRF, SRW, PFEW
Asclepias eriocarpa	Indian milkweed	CSS, CH, CLOW
Asclepias erosa	Desert milkweed	DS
Asclepias fascicularis	Narrow-leaved milkweed	CSS, CH, WW
Bidens laevis	Bur marigold	PFEW
Bloomeria crocea	Common goldenstar	DM
Corethrogyne filaginifolia var. filaginifolia	California aster	SH, AFSS, CSS, CH, CLORF, CLOW, VOW, WW
Croton californicus	California croton	AFSS, CSS
Delphinium cardinale	Scarlet larkspur	AFSS, CSS, CH
Dryopteris arguta	Coastal wood fern	CLORF, CLOW, WW
Epilobium canum ssp. canum	Hoary California fuchsia	SH, CSS, CH, DM
Epilobium canum ssp. latifolium	California fuchsia	SH, CSS, CH, CLOW
Equisetum hymale	Scouring rush	PFEW
Eriastrum densifolium ssp. elongatum	Woolly star	AFSS
Eriogonum elongatum	Longstem buckwheat	CH
Eriophyllum confertiflorum	Golden yarrow	AFSS, CSS, CH, CLORF, CLOW, CWRF, SRW, VOW, WW
Eschscholzia californica	California poppy	AFSS, CSS, CLOW, SRW, VOW, WW, DM
Galium angustifolium	Narrow-leaf bedstraw	AFSS

BOTANICAL NAME	COMMON NAME	PLANT COMMUNITIES
Grindelia camporum	Great valley gumweed	DM
Juncus patens	California grey rush	SH, CLORF, CWRF, SRW
Juncus textilis	Basket rush	SRW
Juncus torreyi	Rush	CLORF, CWRF, SRW
Linanthus californicus	Prickly phlox	CSS, CLOW
Lotus scoparius (Acmispon glaber)	Deerweed	AFSS, CSS, CH, CLORF, CLOW, SRW
Lupinus bicolor	Miniature lupine	DM
Lupinus latifolius var. parishii	Broad-leaf canyon lupine	CSS, CLORF, CLOW, SRW
Lupinus longifolius	Blue bush lupine	CH
Malacothrix saxatilis	Cliff aster	CSS, WW
Mimulus cardinalis	Scarlet monkeyflower	CWRF
Mirabilis californica (Mirabilis laevis)	Wishbone bush	AFSS, CSS
Pellaea andromedifolia	Coffee fern	AFSS, CSS
Pellaea mucronata	Bird's foot fern	AFSS, CSS
Penstemon centranthifolius	Scarlet bugler	SH, CH, CLOW
Penstemon heterophyllus var. australis	Foothill penstemon	SH, CH, CLOW, DM
Penstemon spectabilis	Showy penstemon	SH, AFSS, CSS, CH, CLOW
Polypodium californicum	California polypody fern	AFSS, CSS
Pseudognaphalium canescens	Wright's cudweed	DM
Romneya coulteri	Coulter's Matilija poppy	CSS, CH, DS
Sidalcea malviflora	Checker bloom	DM
Sisyrinchium bellum	Blue-eyed grass	CSS, CLOW, VOW, WW, DM
Solanum xanti	Purple or chaparral nightshade	AFSS, CSS, CH
Sparganium eurycarpum	Broadfruit bur-reed	PFEW
Thalictrum fendleri var. polycarpum	Meadow rue	CH, CLORF, CWRF, SRW, WW
Typha domingensis	Southern cattail	SRW
Typha latifolia	Broadleaf cattail	PFEW
GRASSES		
Agrostis exarata	Bent grass	CLORF, CWRF, SRW
Agrostis pallens	Seashore bent grass	DM
Aristida purpurea	Purple three awn	SH, DS
Bolboschoenus maritimus	Alkali bulrush	PFEW
Bothriochloa barbinodis	Cane bluegrass	CH
Bouteloua gracilis	Blue Grama	DS
Bromus carinatus var. carinatus	California brome	CSS, CH, CLORF, CLOW, SRW, VOW, WW, DM
Carex barbarae	Valley sedge	CWRF, SRW

BOTANICAL NAME	COMMON NAME	PLANT COMMUNITIES
Carex fracta	Fragile-sheathed sedge	PFEW
Carex senta	Swamp carex	PFEW
Carex spissa	San Diego sedge	CWRF, SRW, PFEW
Cyperus eragrostis	Tall flatsedge	PFEW
Elymus condensatus	Giant wildrye	SH, AFSS, CSS, CH, CLORF, CLOW, CWRF, SRW, VOW, WW
Elymus elymoides var. elymoides	Squirreltail	AFSS
Elymus glaucus ssp. glaucus	Blue wild rye	CSS, CH, CLORF, CLOW, WW, PFEW, DM
Elymus trachycaulus	Slender wheatgrass	DM
Festuca californica	California fescue	DM
Hordeum brachyantherum ssp. californicum	California meadow barley	DM
Juncus balticus	Wire rush	PFEW
Juncus macrophyllus	Long-leaved rush	PFEW
Juncus xiphioides	Iris-leaf rush	PFEW
Koeleria macrantha	Junegrass	CLOW, DM
Melica californica	California melicgrass	DM
Muhlenbergia rigens	Deergrass	SH, CH, CLORF, CLOW, SRW, VOW, DM
Poa secunda ssp. secunda (P. scabrella)	One-sided bluegrass	CLOW
Schoenoplectus acutus var. occidentalis	Tule	SRW
Schoenoplectus californicus	California bulrush	PFEW
Sporobolus airoides	Alkali sacaton	SH, CSS, DM, DS
Stipa cernua	Nodding needlegrass	CH, CLOW, VOW, DM
Stipa coronatum	Giant stipa	AFSS, CSS, CH, DM
Stipa hymenoides	Indian ricegrass	DS
Stipa lepida	Foothill needlegrass	AFSS, CSS, CH, CLOW, WW, DM
Stipa pulchra	Purple needlegrass	CH, CLOW, VOW, WW, DM
Stipa speciosa	Desert needlegrass	AFSS, DS
SUCCULENTS		
Agave deserti	Desert agave	DS
Cylindropuntia californica var. parkeri	Cane cholla	AFSS
Dudleya lanceolata	Lance-leaved live-forever	AFSS, CSS
Dudleya pulverulenta	Chalk dudleya	CSS, CH
Fouquieria splendens	Ocotillo	DS
Opuntia basilaris	Beaver tail	AFSS, DS
Opuntia littoralis	Coastal prickly pear	AFSS, WW
Yucca schidigera	Mojave yucca	DS
Yucca whipplei	Our lord's candle / chaparral yucca	SH, AFSS, CSS, CH, CLOW

BOTANICAL NAME	COMMON NAME	PLANT COMMUNITIES
VINES		
Calystegia macrostegia ssp. arida	Southern California morning glory	SH, AFSS, CSS, WW
Calystegia macrostegia ssp. intermedia	Island morning glory	SH, WW
Clematis lasiantha	Pipestems	SH, CH, CLORF, CLOW
Clematis ligusticifolia	Virgin's bower	SH, AFSS, CSS, CH, CLORF, CLOW, CWRF, SRW, VOW, WW
Funastrum cynanchoides var. hartwegii	Twining milkweed	AFSS, CSS
Lathyrus vestitus	Pacific sweet pea	AFSS, CSS, CH, CLORF, CLOW, VOW
Lathyrus vestitus var. alefeldii	Showy Pacific sweet pea	AFSS, CSS, CH, CLOW
Vitis girdiana	Desert grape	SH, CLORF, CWRF, SRW, VOW, DS
GROUNDCOVERS		
Achillea millefolium var. californicum	Yarrow	SH, CLOW, VOW, WW, DM
Anemopsis californica	Yerba mansa	PFEW
Carex praegracilis	Slender sedge	SH, CSS, CLORF, CLOW, CWRF, SRW, VOW, WW, PFEW
Elymus triticoides	Creeping wild rye	SH, CLORF, CWRF, SRW, VOW, WW
Euthamia occidentalis	Western goldenrod	SH, AFSS, CSS, CWRF, SRW, VOW, WW
Nasturtium officinale	Watercress	PFEW
Salvia spathacea	Pitcher sage	SH, CH, CLORF, CLOW, SRW, DM
Solidago californica	California goldenrod	SH, AFSS, CSS, CH, CLORF, CLOW, CWRF, SRW, VOW, WW
Solidago confinis	Southern goldenrod	SH, AFSS, CSS, CH, CLORF, CLOW, CWRF, SRW, VOW, WW
Stachys bullata	Pink hedgenettle	SH, CLORF, CLOW, SRW
Symphoricarpos mollis	Creeping snowberry	SH, CH, CLORF, CLOW, SRW, WW
ANNUALS		
Achyrachaena mollis	Blow wives	DM
Ambrosia acanthicarpa	Annual bursage	DM
Apiastrum angustifolium	Mock parsley	DM
Camissoniopsis bistorta	California sun cup	DM
Chaenactis glabriuscula	Yellow pincushion	DM
Cryptantha intermedia	Common cryptantha	DM
Deinandra fasciculata	Clustered tarweed	DM
Lasthenia californica	California goldfields	DM
Layia platyglossa	Coastal tidy tips	DM
Phacelia stellaris	Brand's star phacelia	DM
Lepidium nitidum	Peppergrass	DM

SHORTLIST

Shortlist (SH): The shortlist of native LA River watershed plants can be used throughout all reaches of the river to provide overall landscape continuity. This list is much shorter than the plant community lists to assure a strong visual image for the river, and is based upon the following criteria:

- Plants are native and appropriate to the LA River system.
- Plants are growable in nursery conditions.
- Plants have a high probability for success when planted within the designated area(s).
- Propagules of the plants are available within the LA River watershed.
- Plants have aesthetic appeal.
- Plants will provide potential wildlife habitat.
- Plants should require minimal maintenance and water following establishment when chosen carefully to be adapted to actual site conditions

Figure 167. ***Platanus racemosa.*** Source: Raffi Kojian, http://www.gardenology.org, https://commons.wikimedia.org/w/index.php?curid=9705655.
Figure 168. ***Quercus agrifolia.*** Source: Stickpen, https://commons.wikimedia.org/w/index.php?curid=9944130.
Figure 169. ***Umbellularia californica.*** Source: Krzysztof Ziarnek, Kenraiz, https://commons.wikimedia.org/w/index.php?curid=54448438
Figure 170. ***Frangula californica.*** Source: Krzysztof Ziarnek, Kenraiz, https://commons.wikimedia.org/w/index.php?curid=37322426.
Figure 171. ***Mimulus aurantiacus.*** Source: Franz Xaver, https://commons.wikimedia.org/w/index.php?curid=17165632.
Figure 172. ***Salvia mellifera.*** Source: Jerry Kirkhart, Black Sage, https://commons.wikimedia.org/w/index.php?curid=43169351.
Figure 173. ***Salvia spathacea.*** Source: peganum, https://commons.wikimedia.org/w/index.php?curid=37049932.
Figure 174. ***Solidago californica.*** Source: Stickpen, https://commons.wikimedia.org/w/index.php?curid=8092464.
Figure 175. ***Clematis ligusticifolia.*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=5376939.

Platanus racemosa

Quercus agrifolia

Umbellularia californica

Frangula californica ssp. californica

Mimulus aurantiacus

Salvia mellifera

Salvia spathacea

Solidago californica

Clematis ligusticifolia

SHORTLIST

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES							
Alnus rhombifolia	White alder	1-9	G	+ ^ ~ o	All	6	
Juglans californica var. californica	California walnut	3-9	B, E, F	+ ^ !	FS / PS	6	
Platanus racemosa	California sycamore	1-9	E,F	+ ^ ~	FS	6	
Populus fremontii ssp. fremontii	Fremont cottonwood	1-9	F, G	+ ^ ~ o	FS	8	
Quercus agrifolia var. agrifolia	Coast live oak	1-9	A, B, C	+ ^	FS	8	
Quercus lobata	Valley oak	3-6	A, C, E	+ ^ *	FS	8	
Sambucus nigra ssp. caerulea	Mexican elderberry	1-9	C, E, F	+ ^ ~ o	FS	6	
Umbellularia californica	California bay laurel	1-9	B, E, F	+ ^ !	FS / PS	6	
SHRUBS AND PERENNIALS							
Artemisia californica	California sagebrush	1-6, 9	A, C, D	* !	FS	3	
Artemisia douglasiana	Mugwort	1-9	A, B, C, E	! ~ o	All	3	
Aristida purpurea	Purple three awn	1-9	A, C, D, E	*	FS	1	
Atriplex lentiformis ssp. lentiformis	Saltbush	1-5	C, D, E	* !	FS	5	
Baccharis pilularis var. consanguinea	Coyote brush	1-5	A, C, D	* !	FS / PS	4	
Baccharis salicifolia	Mulefat	1-9	F, G	+ ~ o	All	3	
Berberis nevinii	Nevin's barberry	3-9	A, C, E	+	FS	5	
Cercocarpus betuloides var. betuloides	Mountain mahogany	1-9	B, C	+ ^ !	FS	6	
Corethrogyne filaginifolia var. filaginifolia	California aster	1-9	A, B		FS	2	
Elymus condensatus	Giant wildrye	1-9	A, B, C, E		All	2	
Encelia californica	Bush sunflower	1-9	A, C	* !	FS / PS	3	
Epilobium canum ssp. canum	Hoary California fuchsia	1-9	A, B	+	FS / PS	2	
Epilobium canum ssp. latifolium	California fuchsia	1-9	A, B	+	FS / PS	2	
Eriodictyon trichocalyx var. trichocalyx	Hairy yerba santa	5-9	A, C	+	FS	2	
Eriogonum cinereum	Ashyleaf Buckwheat	1-5	A, C	+	FS	3	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			PLANT COMMUNITIES
									W	SP	SU	F	
T-D	H	20-30	20-30			X	Birds, Butterflies	Green / Cream			X	X	SRW
T-D	L	15-25	20	X		X	Birds	Yellow		X			CH, CLORF, CLOW, SRW, WW
T-D	M	40	40	X		X	Birds, Butterflies	Yellow/Cream	X	X			AFSS, CLORF, CWRF, SRW, VOW
T-D	M	30	35			X	Birds, Butterflies	Cream	X	X			CLORF, CWRF, SRW
T	VL / L	40	40	X		X	Birds, Butterflies	Yellow		X			AFSS, CLORF, CLOW, SRW, VOW, WW
T-D	M	35	35	X		X	Birds, Butterflies	Green / Cream	X	X			VOW
T-D	L	15	20	X		X	Birds, Butterflies, Bees	Yellow/Cream		X	X		AFSS, CLORF, CLOW, CSS, CWRF, SRW, WW
T	L	30	30			X	Birds	Yellow/Cream		X			AFSS, CLORF, CLOW, CSS, CWRF, SRW, WW
S	VL	3	2-3	X	X	X	Birds, Butterflies	White + Yellow		X	X	X	AFSS, CH, CLORF, CLOW, CSS, SRW
P	M	3-5	3+	X		X	Birds, Butterflies	Yellow/Cream		X	X	X	CLORF, CWRF, SRW
G/P/GC	VL	1-3	2			X							DS
S	VL	6-8	5-10	X		X	Birds, Butterflies	Yellow/Brown			X		CSS
S	L	4-6	6-8	X		X	Bees, Butterflies	Yellow/Cream	X	X	X	X	CLORF, CLOW, CSS, SRW
S	H	4-8	6-10	X		X	Bees, Butterflies	White/Pink/White	X	X	X	X	CH, CSS
S	VL	6-12	6-12			X	Birds, Bees	Yellow / Green		X			AFSS
T/S	VL	6-20	12			X	Birds	Yellow/Cream	X	X			AFSS, CH
P	L	1-3	1-3			X	Birds, Butterflies, Bees	Purple/Pink/White	X				AFSS, CH, CLORF, CLOW, CSS, VOW, WW
G/P/GC	L	4-5	3+			X	Butterflies						CH, CLORF, CLOW, CSS, CWRF, SRW, VOW, WW
S	VL	3-4	3-6	X		X	Birds, Butterflies, Bees	Yellow	X	X			AFSS, CSS
P	VL	1-3	2-4				Birds, Butterflies	Red			X	X	CH, CSS
P	VL	1-3	2-4			X	Birds, Butterflies	Red			X	X	CH, CLOW, CSS
S	VL	2-5	3+	X			Butterflies	White			X		AFSS
S	VL	2-4	3-5			X	Birds, Butterflies, Bees	Yellow/Brown	X	X	X	X	CH, CSS

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
SHRUBS AND PERENNIALS (continued)							
Eriogonum fasciculatum var. foliolosum	Leafy California buckwheat	1-9	A, C	+ !	FS / PS	3	
Frangula californica ssp. californica	California coffeeberry	1-9	A, B, C, D	* !	All	6	
Heteromeles arbutifolia	Toyon	1-9	A, B, C, E, F	+ ^ !	FS / PS	6	
Juncus patens	California grey rush	1-9	E, F, G	~ o	FS / PS	2	
Malacothamnus davidsonii	Davidson's bush mallow	6-9	A, C, D	+	FS	8	
Malosma laurina	Laurel sumac	1-9	A, C	+ !	FS	6	
Mimulus aurantiacus	Bush monkey flower	1-9	A, B, C		FS / PS	2	
Muhlenbergia rigens	Deergrass	1-9	A, B, C, E, F		FS / PS	3	
Penstemon centranthifolius	Scarlet bugler	1-9	A, B, C, E, F	+	FS	2	
Penstemon heterophyllus var. australis	Foothill penstemon	1-3; 6-9	A, B, C		FS / PS	1	
Penstemon spectabilis	Showy penstemon	1-9	C		FS	1	
Peritoma arborea	Bladderpod	1-9	A, B, C	+ !	FS / PS	4	
Pluchea sericea	Arrow weed	1-9	F, G	o	FS	3	
Prunus ilicifolia ssp. ilicifolia	Hollyleaf cherry	5-9	A, B, C	+ !	FS / PS	4	
Rhamnus crocea	Spiny redberry	5-9	A, B, C	+ !	All	4	
Rhamnus ilicifolia	Hollyleaf redberry	5-9	A, B, C	+ !	All	5	
Rhus integrifolia	Lemonadeberry	1-9	A, B, C	+ !	FS / PS	6	
Rhus ovata	Sugar bush	1-9	A, C	+ * !	FS / PS	6	
Ribes aureum var. gracillimum	Golden currant	3-9	A, B, C, E, F		FS / PS	3	
Ribes californicum var. hesperium	Hillside gooseberry	3-9	B, F, G	+	PS	4	
Ribes speciosum	Fuchsia-flowered gooseberry	3-9	B, F	+	PS / FS	4	
Rosa californica	California wild rose	1-9	E, F, G		All	3	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			PLANT COMMUNITIES
									W	SP	SU	F	
S	VL	3-5	2-6	X	X	X	Birds, Butterflies, Bees	Red/Cream			X		AFSS, CH, CLORF, CLOW, CSS
S	VL	8	12			X	Birds, Butterflies, Bees	Cream		X	X		CH, CLORF, CLOW, SRW, VOW
S/T	VL	8-15	15			X	Birds, Bees	White			X		CH, CLORF, CLOW, CSS, SRW, WW
P/GC	L	2.5	3+			X							CLORF, CWRF, SRW
S	(Not Listed)	10	8				Birds, Butterflies	Pink		X	X		AFSS
S	VL	10	20	X		X	Birds	Cream	X	X			AFSS, CH, CLORF, CLOW, CSS, SRW
S	VL	2	2		X	X	Birds, Butterflies, Bees	Orange/Yellow	X	X	X		CH, CLORF, CLOW, CSS, SRW, WW
G/P/GC	L	3	4			X	Birds						CH, CLORF, CLOW, SRW, VOW
P	L	1	1-2			X	Birds, Butterflies, Bees	Red		X	X		CH, CLOW
P	L	1	2			X	Birds, Butterflies, Bees	Purple/Blue	X	X	X		CH, CLOW
P	L	3	3			X	Birds	Purple/Blue/Pink	X				AFSS, CSS, CH, CLOW
S	VL	3-5	5	X		X	Birds, Butterflies, Bees	Yellow/Green	X	X			CLOW, CSS
S	M	6-8	6+			X		Pink		X	X		AFSS, CSS, CWRF, SRW
S	VL	6-12	6-12			X	Birds, Butterflies, Bees	Cream	X	X			AFSS, CH, CLORF, CLOW, CSS, SRW, WW
S	VL	4	4			X	Birds, Butterflies, Bees	Yellow/Cream	X	X			AFSS, CH, CSS
S	VL	6	6			X	Birds, Butterflies, Bees	Yellow/Cream	X	X			CH, CLORF, CLOW, CSS, SRW
S	VL	8-10	15	X		X	Birds	Pink	X	X			AFSS, CH, CLORF, CLOW, CSS, SRW
S	VL	8-10	15	X		X	Birds	Pink/White	X	X			AFSS, CH, CLOW, WW
S-D	VL	6-8	6-8	X	X	X	Birds, Butterflies, Bees	Yellow/Cream	X	X			CLORF, CLOW, SRW, WW
S-D	L	5	5-8	X		X	Birds, Butterflies, Bees	Purple/Yellow	X	X			CH, CLORF, CLOW, SRW
S-D	VL	5-8	6-8	X		X	Birds, Butterflies, Bees	Red/Pink	X	X			CH, CLORF, CLOW, SRW
S	L	4-6	4+			X	Birds, Butterflies, Bees	Pink		X	X		CLORF, CLOW, CWRF, SRW

SHORTLIST

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
SHRUBS AND PERENNIALS (continued)							
Salix exigua	Sandbar willow	2-9	F, G	+ ~ o	FS	6	
Salix lasiolepis	Arroyo willow	1-9	G	+ ^ ~ o	FS / PS	5	
Salvia apiana	White sage	3-9	A, C, D	+ !	FS	3	
Salvia leucophylla	Purple sage	1-9	A, C, D	+ * !	FS	5	
Salvia mellifera	Black sage	1-9	A, C, D	+ !	FS	4	
Sporobolus airoides	Alkali sacaton	1-5	A, C, D	*	FS	2	
Yucca whipplei	Our lord's candle / chaparral yucca	5-9	A, C	+ *	FS	5	
GROUNDCOVERS							
Achillea millefolium var. californicum	Yarrow	1-9	A, B, C, D, E, F	!	FS / PS	1	
Carex praegracilis	Slender sedge	1-9	D, E, F, G	o	FS / PS	1	
Elymus triticoides	Creeping wild rye	1-9	B, E, F, G	!	All	2	
Euthamia occidentalis	Western goldenrod	3-9	E, F, G	o	FS / PS	1	
Salvia spathacea	Hummingbird sage	1-9	B, C, E		PS / FS	2	
Solidago californica	California goldenrod	3-9	A, B, F, G	o	FS / PS	1	
Solidago confinis	Southern goldenrod	3-9	E, F, G	o	FS / PS	1	
Stachys bullata	Pink hedgenettle	1-9	E, F, G	+ ~ o	PS / FS	2	
Symphoricarpos mollis	Creeping snowberry	3-9	B, E	!	PS / FS	2	
VINES							
Calystegia macrostegia ssp. arida	Southern California morning glory	3-9	B		FS / PS	1	
Calystegia macrostegia ssp. intermedia	Island morning glory	1-5	A, B		FS / PS	1	
Clematis lasiantha	Pipestems	3-9	A, B		FS / PS	2	
Clematis ligusticifolia	Virgin's bower	3-9	B, E, F, G	o	FS / PS	2	
Vitis girdiana	Desert grape	3-9	G	o	All	2	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			PLANT COMMUNITIES
									W	SP	SU	F	
S-D	H	10-25	10-12	X		X	Birds, Butterflies, Bees	Yellow	X	X			CWRF, PFEW
S/T-D	H	15	15			X	Birds, Butterflies, Bees	Cream	X	X			CWRF
S	VL	3	3-5	X		X	Birds, Butterflies, Bees	White	X	X	X		AFSS, CH, CLORF, CLOW, CSS, SRW
S	VL	5	6-8	X		X	Birds, Butterflies, Bees	Lavender/Purple		X	X		CLOW, CSS, WW
S	VL	4	6	X	X	X	Birds, Butterflies, Bees	Lavender/White	X	X	X		AFSS, CH, CLOW, CSS
G/P	L	3-4	2			X	Butterflies						DS
SC	(Not Listed)	3	5		X	X	Birds	Cream		X			AFSS, CH, CLOW, CSS
P/GC	L	.5-2	3	X		X	Birds, Butterflies, Bees	White		X	X		CLOW, VOW, WW
P/GC	M	.5-1	2+			X							CLORF, CLOW, CSS, CWRF, SRW, VOW, WW
G/P/GC	L	2	2+			X	Butterflies						CLORF, CWRF, SRW, VOW, WW
P/GC	L	2-4	2+			X		Yellow/Green			X	X	AFSS, CSS, CWRF, SRW, VOW, WW
P/GC	L	1	3+			X	Birds, Butterflies, Bees	Red/Pink	X	X	X		CH, CLORF, CLOW, SRW
P/GC	M	1	2+			X	Bees, Butterflies	Yellow			X	X	AFSS, CH, CLORF, CLOW, CSS, CWRF, SRW, VOW,WW
P/GC	M	1	2+				Bees	Yellow		X	X	X	AFSS, CH, CLORF, CLOW, CSS, CWRF, SRW, VOW,WW
P/GC	L	1-2	2+	X		X	Birds, Butterflies, Bees	Lavender/Purple		X	X	X	CLORF, SRW
S-D/GC	L	2	2+			X	Birds, Butterflies, Bees	Pink		X	X		CH, CLORF, CLOW, CWRF, SRW, WW
V/P	L	climbs		X			Bees	White	X	X	X		AFSS, WW
V/P	L	climbs		X		X	Bees	Pink/White	X	X	X		CSS, WW
V-D	VL	climbs				X		Cream		X	X		CH, CLORF, CLOW
V-D	L	climbs				X		Cream			X		AFSS, CH, CLORF, CLOW, CSS, CWRF, SRW, VOW, WW
V/S-D	L	climbs				X	Birds	Green		X			CLORF, CWRF, SRW, VOW

ALLUVIAL FAN SAGE SCRUB

Alluvial fan sage scrub (AFSS) (Scalebroom Association):
This community is found in rarely flooded, low-gradient deposits along streams. AFSS is a community that tolerates very dry conditions and is considered a 'disturbance' community. Alluvial fan sage scrub should be the signature community along the Tujunga Wash and is appropriate on particularly sandy, silty or gravelly soils.

- Very rare in LA River watershed due to channelization and urbanization.
- Typically found in stream beds or washes.
- Can tolerate periodic flooding.

Figure 176. ***Sambucus nigra ssp. caerulea.*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=1953423.
Figure 177. ***Lepidospartum squamatum.*** Source: Anthony Valois and the National Park Service, http://researchlearningcenter.org/bloom/species/Lepidospartum_squamatum.htm and https://commons.wikimedia.org/w/index.php?curid=6011633.
Figure 178. ***Artemisia californica.*** Source: Daderot, https://commons.wikimedia.org/w/index.php?curid=75807390.
Figure 179. ***Eriogonum fasciculatum var. fasciculatum.*** Source: Dominic, http://www.inaturalist.org/photos/2067855.
Figure 180. ***Eriodictyon trichocalyx.*** Source: Jim Morefield, https://www.inaturalist.org/photos/14141764.
Figure 181. ***Salvia apiana.*** Source: Laura Camp, https://www.flickr.com/photos/lauracamp/16355349843.
Figure 182. ***Cylindropuntia californica var. parkeri.*** Source: Stan Spencer, https://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+0409+1587.
Figure 183. ***Croton californicus.*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=5915540.
Figure 184. ***Yucca whipplei.*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=2826038.

Sambucus nigra ssp. caerulea

Lepidospartum squamatum

Artemisia californica

Eriogonum fasciculatum var. fasciculatum

Eriodictyon trichocalyx

Salvia apiana

Cylindropuntia californica var. parkeri

Croton californicus

Yucca whipplei

ALLUVIAL FAN SAGE SCRUB

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES							
Platanus racemosa	California sycamore	1-9	E,F	+ ^ ~ o	FS	6	
Quercus agrifolia var. agrifolia	Coast live oak	1-9	A, B, C	+ ^	FS	8	
Sambucus nigra ssp. caerulea	Mexican elderberry	1-9	C, E, F	+ ^ ~ o	FS	6	
SHRUBS							
Adenostoma fasciculatum	Chamise	3-6, 9	A, C, D	* !	FS	4	
Arctostaphylos glauca	Bigberry manzanita	5-9	B	+	FS	6	
Artemisia californica	California sagebrush	1-6, 9	A, C, D	* !	FS	3	
Berberis nevinii	Nevin's barberry	3-9	A, C, E	+	FS	5	
Brickellia californica	California bricklebush	5-9	B, C		FS / PS	3	
Ceanothus crassifolius	Hoaryleaf ceanothus	1-9	A, B, C	+ !	FS	6	
Ceanothus leucodermis	Chaparral whitethorn	6-9	B, C	!	FS / PS	6	
Cercocarpus betuloides var. betuloides	Mountain mahogany	1-9	B, C	+ !	FS	6	
Dendromecon rigida	Bush poppy	1-6, 9	A, C		FS	5	
Encelia californica	Bush sunflower	1-9	A, C	*!	FS / PS	3	
Ericameria (Happlopappus) pinifolia	Pine goldenbush	5-9	A, C		FS	3	
Eriodictyon crassifolium	Thick-leaved yerba santa	1-9	A, C	+	FS	2	
Eriodictyon trichocalyx var. trichocalyx	Hairy yerba santa	5-9	A, C	+	FS	2	
Eriogonum fasciculatum var. fasciculatum	California buckwheat	1-6, 9	A		FS / PS	4	
Eriogonum fasciculatum var. foliolosum	Leafy California buckwheat	1-9	A, C	+ !	FS / PS	3	
Eriogonum fasciculatum var. polifolium	Interior California buckwheat	3-9	A, C	+ * !	FS / PS	3	
Gutierrezia californica	California matchweed	3-9	A, C		FS	2	
Gutierrezia sarothrae	Matchweed	1-6, 9	A, C, D	*	FS	2	
Juniperus californica	California juniper	6-9	A, C	!	FS	6	
Lepidospartum squamatum	Scale broom	1-9	C, E	+	FS	4	
Malacothamnus davidsonii	Davidson's bush mallow	6-9	A, C, D	+	FS	8	
Malacothamnus fasciculatus	Chaparral bush mallow	1-9	A	+ !	FS	4	
Malosma laurina	Laurel sumac	1-9	A, C	+ !	FS	6	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
T-D	M	40	40	X	X		Occasional	X	Birds, Butterflies	Yellow/Cream	X	X		
T	VL / L	40	40	X	X		Occasional	X	Birds, Butterflies	Yellow		X		
T-D	L	15	20	X	X		Occasional	X	Birds, Butterflies, Bees	Yellow/Cream		X	X	
S	VL	4-8	6	X			Occasional	X	Birds, Butterflies, Bees	White		X	X	
T/S	VL	6-15	6-15				Occasional		Birds, Bees	White + Pink	X	X		
S	VL	3	2-3	X	X	X	Frequent - Occasional	X	Birds, Butterflies	White + Yellow		X	X	X
S	VL	6-12	6-12			X	Birds, Bees	X	Birds, Bees	Yellow / Green		X		
S	VL / L	2-4	3-5		X		Frequent - Occasional	X	Butterflies	Yellow			X	X
S	(Not Listed)	6-15	8-20				Occasional	X	Birds, Butterflies, Bees	White	X	X		
S	VL	10-12	10-20				Occasional		Birds, Butterflies, Bees	Blue/Purple +White	X	X		
T/S	VL	6-20	12	X			Occasional	X	Birds	Yellow/Cream	X	X		
S	VL	8-12	10-15				Occasional	X	Bees, Butterflies	Yellow	X	X		
S	VL	3-4	3-6	X	X		Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow	X	X		
S	(Not Listed)	3-6	3-6		X		Frequent - Occasional		Birds	Yellow		X	X	
S	VL	3-6	3+				Occasional	X	Birds, Butterflies, Bees	Lavender		X		
S	VL	2-5	3+	X	X		Frequent		Butterflies	White			X	
S/GC	VL	3	2-6		X		Subdominant		Bees, Butterflies	Red/Cream			X	
S	VL	3-5	2-6	X	X	X	Occasional	X	Birds, Butterflies, Bees	Red/Cream			X	
S	VL	3-5	2-6				Subdominant	X	Birds, Butterflies, Bees	Pink/Cream			X	
S	(Not Listed)	1-3	1-3		X		Frequent - Occasional	X	Bees	Yellow		X	X	X
S	VL	1-3	1-3				Frequent - Occasional	X	Bees	Yellow			X	
T/S	VL	10-15	15-20				Frequent - Occasional	X						
S	(Not Listed)	4	6		X		Dominant	X		Cream			X	X
S	(Not Listed)	10	8	X			Occasional		Birds, Butterflies	Pink		X	X	
S	VL	6	6+		X		Occasional	X	Birds, Butterflies	White + Pink		X	X	
S	VL	10	20	X	X		Occasional	X	Birds	Cream	X	X		

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
SHRUBS (continued)							
Pluchea sericea	Arrow weed	1-9	F, G	o	FS	3	
Prunus ilicifolia ssp. ilicifolia	Hollyleaf cherry	5-9	A, B, C	+ !	FS / PS	4	
Quercus berberidifolia	Scrub oak	1-9	A, B, C	+ !	FS	6	
Rhamnus crocea	Spiny redberry	5-9	A, B, C	+ !	All	4	
Rhus integrifolia	Lemonadeberry	1-9	A, B, C	+ !	FS / PS	6	
Rhus ovata	Sugar bush	1-9	A, C	+ * !	FS / PS	6	
Salvia apiana	White sage	3-9	A, C, D	+ !	FS	3	
Salvia mellifera	Black sage	1-9	A, C, D	+ !	FS	4	
PERENNIALS							
Corethrogyne filaginifolia var. filaginifolia	California aster	1-9	A, B		FS	2	
Croton californicus	California croton	1-9	C, E	*	FS	1	
Delphinium cardinale	Scarlet larkspur	1-6, 9	A		FS	2	
Eriastrum densifolium ssp. elongatum	Woolly star	6-9	C, E		FS	1	
Eriophyllum confertiflorum	Golden yarrow	1-9	A, B, C	+	FS / PS	1	
Eschscholzia californica	California poppy	1-9	C, D		FS / PS	1	
Galium angustifolium	Narrow-leaf bedstraw	1-9	A, C		FS / PS	1	
Lotus scoparius (Acmispon glaber)	Deerweed	1-6, 9	A, C	+ *	FS	2	
Mirabilis californica (Mirabilis laevis)	Wishbone bush	1-9	A, C, D	*	FS	2	
Pellaea andromedifolia	Coffee fern	3-9	C, E		PS	1	
Pellaea mucronata	Bird's foot fern	3-9	C, E	*	PS	1	
Penstemon spectabilis	Showy penstemon	1-9	C		FS	2	
Polypodium californicum	California polypody fern	6-9	B, G		PS / FS	1	
Solanum xanti	Purple or chaparral nightshade	1-9	A, C		FS / PS	2	
GRASSES							
Elymus condensatus	Giant wild rye	1-9	A, B, C, E		All	2	
Elymus elymoides var. elymoides	Squirreltail	6-9	C, E		FS	1	
Stipa coronatum	Giant stipa	1-9	A, E, F		FS / PS	2	
Stipa lepida	Foothill needlegrass	1-9	A, B, C, D		FS / PS	1	
Stipa speciosa	Desert needlegrass	3-9	A, C, D, E	*	FS	1	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
S	M	6-8	6+	X			Occasional	X		Pink		X	X	
S	VL	6-12	6-12	X			Occasional	X	Birds, Butterflies, Bees	Cream	X	X		
T/S	VL	8	8		X		Occasional	X	Birds, Butterflies	Cream	X	X		
S	VL	4	4	X			Occasional	X	Birds, Butterflies, Bees	Yellow/Cream	X	X		
S	VL	8-10	15	X	X		Occasional	X	Birds	Pink	X	X		
S	VL	8-10	15	X	X		Occasional	X	Birds	Pink/White	X	X		
S	VL	3	3-5	X	X		Frequent	X	Birds, Butterflies, Bees	White	X	X	X	
S	VL	4	6	X	X	X	Occasional	X	Birds, Butterflies, Bees	Lavender/White	X	X	X	
P	L	1-3	1-3	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Purple/Pink/White	X			
P	(Not Listed)	.5-1.5	.5-2		X		Frequent	X		Green		X	X	
P-D	(Not Listed)	2-6	1	X			Occasional		Birds	Red/Yellow			X	
P	VL	1-2	1-2				Frequent			Lavender			X	
P	VL	2	1-3			X	Frequent - Occasional	X	Bees, Butterflies	Yellow		X	X	X
A/P-D	VL	1	1-2		X		Occasional	X	Birds, Butterflies, Bees	Orange / Yellow		X		
P	(Not Listed)	1-2	1-2				Frequent			Cream		X	X	
P	VL	3	3		X		Frequent - Occasional	X	Bees, Butterflies	Yellow	X	X	X	
P-D	VL	1	3				Frequent - Occasional	X		Purple/White	X	X		
P	VL	1	2		X		Occasional							
P	VL	1	2		X		Occasional							
P	L	3	3				Occasional	X	Birds	Purple/Blue/Pink	X			
P-D/GC	VL	.5	1+				Occasional	X						
P-D	VL	2	3				Occasional	X		Purple/Blue	X	X	X	
G/P/GC	L	4-5	3+	X			Occasional	X	Butterflies					
G/P/GC	(Not Listed)	1-2	1-2				Occasional							
G/P/GC	(Not Listed)	2-4	1-2				Occasional	X						
G/P/GC	VL	2	2		X		Frequent - Occasional	X						
G/P/GC	(Not Listed)	1-2	1				Occasional							

ALLUVIAL FAN SAGE SCRUB

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
SUCCULENTS							
Cylindropuntia californica var. parkeri	Cane cholla	5-7	A, C	*	FS	4	
Dudleya lanceolata	Lance-leaved live-forever	1-9	A		FS / PS	1	
Opuntia basilaris	Beaver tail	3-5, 9	A, C	*	FS	2	
Opuntia littoralis	Coastal prickly pear	1-9	A		FS	3	
Yucca whipplei	Our lord's candle / chaparral yucca	5-9	A, C	+*	FS	5	
VINES							
Calystegia macrostegia ssp. arida	Southern California morning glory	3-9	B		FS / PS	1	
Clematis ligusticifolia	Virgin's bower	3-9	B, E, F, G	o	FS / PS	2	
Funastrum cynanchoides var. hartwegii	Twining milkweed	6-9	B, E	*	FS / PS	2	
Lathyrus vestitus	Pacific sweet pea	6-9	B		FS / PS	2	
Lathyrus vestitus var. alefeldii	Showy Pacific sweet pea	6-9	B		FS / PS	2	
GROUNDCOVERS							
Euthamia occidentalis	Western goldenrod	3-9	E, F, G	o	FS / PS	1	
Solidago californica	California goldenrod	3-9	A, B, F, G	o	FS / PS	1	
Solidago confinis	Southern goldenrod	3-9	E, F, G	o	FS / PS	1	

DESCRIPTIVE FEATURES

	PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
												W	SP	SU	F
	SC	VL	4	4				Subdominant			Yellow / Green		X	X	
	SC	VL	1	1		X		Occasional	X	Birds, Butterflies	Orange / Pink		X	X	
	SC	VL	1-2	2				Occasional			Pink		X		
	SC	VL	3	3+		X		Frequent - Occasional	X	Birds	Orange / Yellow		X		
	SC	(Not Listed)	3	5	X		X	Frequent	X	Birds	Cream		X		
	V/P	L	climbs		X			Occasional		Bees	White	X	X	X	
	V-D	L	climbs		X			Occasional	X		Cream			X	
	V/S-D	L	climbs					Occasional		Butterflies	Maroon/White			X	X
	V/P	(Not Listed)	climbs			X		Occasional	X		Pink/White	X	X		
	V/P	(Not Listed)	climbs					Occasional			Pink/Purple	X	X		
	P/GC	L	2-4	2+	X			Frequent - Occasional	X		Yellow / Green			X	X
	P/GC	M	1	2+	X			Frequent - Occasional	X	Bees, Butterflies	Yellow			X	X
	P/GC	M	1	2+	X			Frequent - Occasional		Bees	Yellow		X	X	X

COASTAL SAGE SCRUB

Coastal sage scrub (CSS) (California Sagebrush Associations):
Coastal sage scrub (California Sagebrush Associations): This ecologically important community should be interspersed with tree communities along the length of the river, especially in situations where environmental or infrastructure conditions (utility corridors or other confined spaces) are not suitable for trees. CSS is an appropriate complement to the sycamore riparian and coast live oak communities and can be used with them as a transitional planting across an elevational difference or as a successional planting strategy prior to the maturation of tree canopies. Along the lower reaches of the river, this community may be augmented with coastal bluff species, and other salt tolerant native species adapted to heterogeneous soil conditions along the levees. Augmentation to this plant palette should be made only with the approval of a qualified botanist or ecologist.

- Many species can tolerate salt.
- Typically found on embankments and slopes.
- Can be used as a transitional planting prior to maturation of tree canopies in sycamore riparian and coast live oak woodland.

Figure 185. ***Sambucus nigra ssp. caerulea.*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=1953423.
Figure 186. ***Baccharis pilularis var. consanguinea.*** Source: Miguel Vieira, https://commons.wikimedia.org/w/index.php?curid=9389145.
Figure 187. ***Artemisia californica.*** Source: Daderot, https://commons.wikimedia.org/w/index.php?curid=75807390.
Figure 188. ***Eriogonum fasciculatum var. fasciculatum.*** Source: Dominic, http://www.inaturalist.org/photos/2067855.
Figure 189. ***Isocoma menziesii ssp. vernonioides.*** Source: Miguel Vieira, https://commons.wikimedia.org/w/index.php?curid=9389145.
Figure 190. ***Epilobium canum ssp. canum.*** Source: Krzysztof Ziarnek, Kenraiz, https://commons.wikimedia.org/w/index.php?curid=54696863.
Figure 191. ***Corethrogyne filaginifolia var. filaginifolia.*** Source: John Rusk, https://www.flickr.com/photos/john_d_rusk/21207961929.
Figure 192. ***Yucca whipplei .*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=2826038.
Figure 193. ***Stipa lepida.*** Source: John Rusk, https://commons.wikimedia.org/w/index.php?curid=59287600.

Sambucus nigra ssp. caerulea

Baccharis pilularis var. consanguinea

Artemisia californica

Eriogonum fasciculatum var. fasciculatum

Isocoma menziesii ssp. vernonioides

Epilobium canum ssp. canum

Corethrogyne filaginifolia var. filaginifolia

Yucca whipplei

Stipa lepida

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES							
Sambucus nigra ssp. caerulea	Mexican elderberry	1-9	C, E, F	+ ^ ~ o	FS	6	
SHRUBS							
Artemisia californica	California sagebrush	1-6, 9	A, C, D	* !	FS	3	
Atriplex lentiformis ssp. lentiformis	Saltbush	1-5	C, D, E	* !	FS	5	
Baccharis pilularis var. consanguinea	Coyote brush	1-5	A, C, D	* !	FS / PS	4	
Berberis pinnata	California barberry	5-9	B, E, F	+ !	FS / PS	4	
Dendromecon rigida	Bush poppy	1-6, 9	A, C		FS	5	
Diplacus longiflorus	Southern bush monkeyflower	1-9	A, B, C, D, E		FS / PS	3	
Encelia californica	Bush sunflower	1-9	A, C	* !	FS / PS	3	
Ericameria (Happlopappus) pinifolia	Pine goldenbush	5-9	A, C		FS	3	
Eriodictyon crassifolium	Thick-leaved yerba santa	1-9	A, C	+	FS	2	
Eriogonum cinereum	Ashyleaf Buckwheat	1-5	A, C	+	FS	3	
Eriogonum fasciculatum var. fasciculatum	California buckwheat	1-6, 9	A		FS / PS	4	
Eriogonum fasciculatum var. foliolosum	Leafy California buckwheat	1-9	A, C	+ !	FS / PS	3	
Heteromeles arbutifolia	Toyon	1-9	A, B, C, E, F	+ ^ !	FS / PS	6	
Isocoma menziesii ssp. vernonioides	Goldenbush	1-9	A, C		FS / PS	2	
Keckiella cordifolia	Heart-leaved penstemon	1-9	A, B, C, E		All	3	
Malacothamnus fasciculatus	Chaparral bush mallow	1-9	A	+ !	FS	4	
Malosma laurina	Laurel sumac	1-9	A, C	+ !	FS	6	
Mimulus aurantiacus	Bush monkey flower	1-9	A, B, C		FS / PS	2	
Peritoma arborea	Bladderpod	1-9	A, B, C	+ !	FS / PS	4	
Pluchea sericea	Arrow weed	1-9	F, G	o	FS	3	
Prunus ilicifolia ssp. ilicifolia	Hollyleaf cherry	5-9	A, B, C	+ !	FS / PS	4	
Quercus berberidifolia	Scrub oak	1-9	A, B, C	+ !	FS	6	
Rhamnus crocea	Spiny redberry	5-9	A, B, C	+ !	All	4	
Rhamnus ilicifolia	Hollyleaf redberry	5-9	A, B, C	+ !	All	5	
Rhus integrifolia	Lemonadeberry	1-9	A, B, C	+ !	FS / PS	6	
Salvia apiana	White sage	3-9	A, C, D	+ !	FS	3	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
T-D	L	15	20	X	X		Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream		X	X	
S	VL	3	2-3	X	X	X	Dominant	X	Birds, Butterflies	White + Yellow		X	X	X
S	VL	6-8	5-10	X	X		Occasional	X	Birds, Butterflies	Yellow/Brown			X	
S	L	4-6	6-8	X	X		Subdominant	X	Bees, Butterflies	Yellow/Cream	X	X	X	X
S	L	4-6	4+				Occasional	X	Birds, Butterflies, Bees	Yellow	X	X		
S	VL	8-12	10-15				Occasional	X	Bees, Butterflies	Yellow	X	X		
S	(Not Listed)	1-3	1-3				Occasional		Bees, Butterflies	Yellow		X	X	
S	VL	3-4	3-6	X	X		Subdominant	X	Birds, Butterflies, Bees	Yellow	X	X		
S	(Not Listed)	3-6	3-6		X		Occasional		Birds	Yellow		X	X	
S	VL	3-6	3+				Occasional	X	Birds, Butterflies, Bees	Lavender		X		
S	VL	2-4	3-5	X			Occasional	X	Birds, Butterflies, Bees	Yellow/Brown	X	X	X	X
S/GC	VL	3	2-6		X		Dominant		Bees, Butterflies	Red/Cream			X	
S	VL	3-5	2-6	X	X	X	Occasional	X	Birds, Butterflies, Bees	Red/Crea			X	
S/T	VL	8-15	15	X			Occasional	X	Birds, Bees	White			X	
S	VL	1-3	3		X		Frequent - Occasional	X	Bees, Butterflies	Yellow		X	X	X
P/V-D	VL	4	4				Occasional	X	Birds	Red		X	X	
S	VL	6	6+		X		Occasional	X	Birds, Butterflies	White + Pink		X	X	
S	VL	10	20	X	X		Frequent	X	Birds	Cream	X	X		
S	VL	2	2	X		X	Frequent	X	Birds, Butterflies, Bees	Orange/Yellow	X	X	X	
S	VL	3-5	5	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Green	X	X		
S	M	6-8	6+	X			Occasional	X		Pink		X	X	
S	VL	6-12	6-12	X			Occasional	X	Birds, Butterflies, Bees	Cream	X	X		
T/S	VL	8	8		X		Occasional	X	Birds, Butterflies	Cream	X	X		
S	VL	4	4	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream	X	X		
S	VL	6	6	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream	X	X		
S	VL	8-10	15	X	X		Frequent - Occasional	X	Birds	Pink	X	X		
S	VL	3	3-5	X	X		Occasional	X	Birds, Butterflies, Bees	White	X	X	X	

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES (continued)							
Salvia leucophylla	Purple sage	1-9	A, C, D	+ * !	FS	5	
Salvia mellifera	Black sage	1-9	A, C, D	+ !	FS	4	
Trichostema lanatum	Woolly blue curls	1-9	E, F, G		FS	3	
PERENNIALS							
Asclepias eriocarpa	Indian milkweed	1-9	C, E, F	+	FS	3	
Asclepias fascicularis	Narrow-leaved milkweed	1-9	C, E, F, G	+	FS / PS	3	
Corethrogyne filaginifolia var. filaginifolia	California aster	1-9	A, B		FS	2	
Croton californicus	California croton	1-9	C, E	*	FS	1	
Delphinium cardinale	Scarlet larkspur	1-6, 9	A		FS	2	
Epilobium canum ssp. canum	Hoary California fuchsia	1-9	A, B	+	FS / PS	2	
Epilobium canum ssp. latifolium	California fuchsia	1-9	A, B	+	FS / PS	2	
Eriophyllum confertiflorum	Golden yarrow	1-9	A, B, C	+	FS / PS	1	
Eschscholzia californica	California poppy	1-9	C, D		FS / PS	1	
Linanthus californicus	Prickly phlox	1-9	A, B, E, F		FS / PS	2	
Lotus scoparius (Acmispon glaber)	Deerweed	1-6, 9	A, C	+ *	FS	2	
Lupinus latifolius var. parishii	Broad-leaf canyon lupine	6-9	B, E, F	+ o	FS / PS	2	
Malacothrix saxatilis	Cliff aster	1-9	A, B, C, D	+	FS	1	
Mirabilis californica (Mirabilis laevis)	Wishbone bush	1-9	A, C, D	*	FS	2	
Pellaea andromedifolia	Coffee fern	3-9	C, E		PS	1	
Pellaea mucronata	Bird's foot fern	3-9	C, E	*	PS	1	
Penstemon spectabilis	Showy penstemon	1-9	C		FS	2	
Polypodium californicum	California polypody fern	6-9	B, G		PS / FS	1	
Romneya coulteri	Coulter's Matilija poppy	1-9	A, C, D, E	*	FS	3	
Sisyrinchium bellum	Blue-eyed grass	1-9	E, F, G	o	FS / PS	1	
Solanum xanti	Purple or chaparral nightshade	1-9	A, C		FS / PS	2	
GRASSES							
Bromus carinatus var. carinatus	California brome	1-9	A, B, C, E, F, G	* !	FS / PS	1	
Elymus condensatus	Giant wild rye	1-9	A, B, C, E		All	2	
Elymus glaucus ssp. glaucus	Blue wild rye	1-9	A, B, C, E, F, G	+	All	3	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
S	VL	5	6-8	X	X		Frequent - Occasional	X	Birds, Butterflies, Bees	Lavender/Purple		X	X	
S	VL	4	6	X	X	X	Frequent	X	Birds, Butterflies, Bees	Lavender/White	X	X	X	
S	VL	2-4	4				Occasional	X	Birds, Butterflies, Bees	Pink/Blue/Lavender	X	X		
P-D	VL	3	1+		X		Occasional	X	Birds, Butterflies	Cream/Pink			X	
P-D	VL	3	2+		X		Occasional	X	Birds, Butterflies	White, Lavender			X	X
P	L	1-3	1-3	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Purple/Pink/White	X			
P	(Not Listed)	.5-1.5	.5-2		X		Occasional	X		Green		X	X	
P-D	(Not Listed)	2-6	1				Occasional		Birds	Red/Yellow			X	
P	VL	1-3	2-4	X			Frequent		Birds, Butterflies	Red			X	
P	VL	1-3	2-4	X			Occasional	X	Birds, Butterflies	Red			X	X
P	VL	2	1-3			X	Frequent - Occasional	X	Bees, Butterflies	Yellow		X	X	X
A/P-D	VL	1	1-2		X		Frequent	X	Birds, Butterflies, Bees	Orange / YellowP		X		
P	M	2	2				Occasional		Bees, Butterflies	Lavender	X	X	X	
P	VL	3	3		X		Frequent	X	Bees, Butterflies	Yellow	X	X	X	
P	L	4	4				Occasional	X	Bees, Butterflies	Blue/Purple		X		
P	M	1-2	1-2				Occasional		Bees, Butterflies	White	X		X	X
P-D	VL	1	3				Frequent - Occasional	X		Purple/White	X	X		
P	VL	1	2		X		Frequent							
P	VL	1	2		X		Occasional							
P	L	3	3				Occasional	X	Birds	Purple/Blue/Pink	X			
P-D/GC	VL	.5	1+				Occasional	X						
P	VL	6-8	6-8				Frequent	X	Bees, Butterflies	White/Yellow		X	X	
P-D	L	1	1				Frequent - Occasional	X	Butterflies	Purple	X	X		
P-D	VL	2	3				Frequent	X		Purple/Blue	X	X	X	
G/P/GC	(Not Listed)	1.5-3	1+				Frequent	X	Butterflies	Yellow		X		
G/P/GC	L	4-5	3+	X			Occasional	X	Butterflies					
G/P/GC	L	1.5-3	1+				Occasional	X	Butterflies					

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
GRASSES (continued)							
Stipa coronatum	Giant stipa	1-9	A, E, F		FS / PS	2	
Stipa lepida	Foothill needlegrass	1-9	A, B, C, D		FS / PS	1	
SUCCULENTS							
Dudleya lanceolata	Lance-leaved live-forever	1-9	A		FS / PS	1	
Dudleya pulverulenta	Chalk dudleya	1-9	A, B	*	FS / PS	1	
Yucca whipplei	Our lord's candle / chaparral yucca	5-9	A, C	+ *	FS	5	
VINES							
Calystegia macrostegia ssp. arida	Southern California morning glory	3-9	B		FS / PS	1	
Clematis ligusticifolia	Virgin's bower	3-9	B, E, F, G	o	FS / PS	2	
Funastrum cynanchoides var. hartwegii	Twining milkweed	6-9	B, E	*	FS / PS	2	
Lathyrus vestitus	Pacific sweet pea	6-9	B		FS / PS	2	
Lathyrus vestitus var. alefeldii	Showy Pacific sweet pea	6-9	B		FS / PS	2	
GROUNDCOVERS							
Carex praegracilis	Slender sedge	1-9	D, E, F, G	o	FS / PS	1	
Euthamia occidentalis	Western goldenrod	3-9	E, F, G	o	FS / PS	1	
Solidago californica	California goldenrod	3-9	A, B, F, G	o	FS / PS	1	

DESCRIPTIVE FEATURES

	PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
												W	SP	SU	F
	G/P/GC	(Not Listed)	2-4	1-2				Occasional	X						
	G/P/GC	VL	2	2		X		Frequent - Occasional	X						
	SC	VL	1	1		X		Occasional	X	Birds, Butterflies	Orange / Pink		X	X	
	SC	VL	1	1		X		Occasional	X	Birds, Bees	Orange/Pink/Red				
	SC	(Not Listed)	3	5	X		X	Frequent - Occasional	X	Birds	Cream		X		
	V/P	L	climbs		X			Frequent - Occasional		Bees	White	X	X	X	
	V-D	L	climbs		X			Occasional	X		Cream			X	
	V/S-D	L	climbs					Occasional		Butterflies	Maroon/White			X	X
	V/P	(Not Listed)	climbs			X		Occasional	X		Pink/White	X	X		
	V/P	(Not Listed)	climbs					Occasional			Pink/Purple	X	X		
	P/GC	M	.5-1	2+	X			Occasional	X						
	P/GC	L	2-4	2+	X			Frequent - Occasional	X		Yellow / Green			X	X
	P/GC	M	1	2+	X			Frequent - Occasional	X	Bees, Butterflies	Yellow			X	X

CHAPARRAL

Chaparral (CH) (Chaparral Associations):
Chaparral (Chaparral Associations): Chaparral is considered an upland or drier community that is found on all slope aspects. CH soils are typically shallow and often nutrient-poor. It is suitable as an occasional alternative to the coastal sage scrub and California walnut woodland communities. This community includes tree-like shrubs that can provide some shading in tree-restricted zones. Rigorous design and maintenance of CH plantings can minimize fire hazards associated with this plant community.

- Requires fast draining, nutrient poor soil that is typical of slopes.
- Many species are deciduous in the summer, and over-watering during this time severely compromises the plants' survival.
- Can generally tolerate heat and drier conditions.

Figure 194. ***Juglans californica.*** Source: Consultaplantas, https://commons.wikimedia.org/w/index.php?curid=44978241.
Figure 195. ***Cercocarpus betuloides.*** Source: Lazaregagnidze, https://commons.wikimedia.org/w/index.php?curid=32918241.
Figure 196. ***Ceanothus oliganthus.*** Source: Anthony Valois and the National Park Service, 2004. http://researchlearningcenter.org/bloom/species/Ceanothus_oliganthus.htm.
Figure 197. ***Prunus ilicifolia ssp. ilicifolia.*** Source: John Rusk, https://commons.wikimedia.org/w/index.php?curid=59290247.
Figure 198. ***Heteromeles arbutifolia.*** Source: Miguel Vieira, https://commons.wikimedia.org/w/index.php?curid=19525268.
Figure 199. ***Rhus ovata.*** Source: Bri Weldon, https://www.flickr.com/photos/briweldon/5228764249.
Figure 200. ***Eriophyllum confertiflorum.*** Source: Björn S..., https://www.flickr.com/photos/40948266@N04/43163438812.
Figure 201. ***Lotus scoparius (Acmispon glaber).*** Source: glmory, https://commons.wikimedia.org/w/index.php?curid=32092287.
Figure 202. ***Stipa pulchra.*** Source: Matt Lavin. https://www.flickr.com/photos/plant_diversity/35034340452.

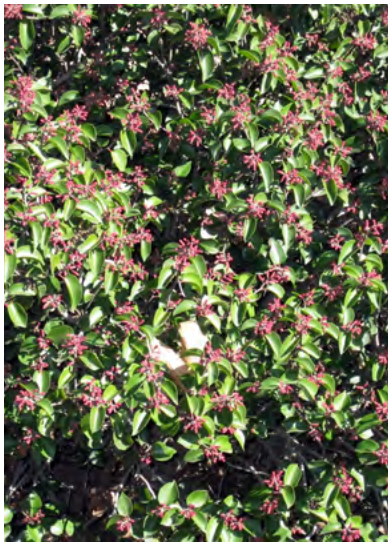
Juglans californica

Cercocarpus betuloides

Ceanothus oliganthus

Prunus ilicifolia ssp. ilicifolia

Heteromeles arbutifolia



Rhus ovata

Eriophyllum confertiflorum

Lotus scoparius (Acmispon glaber)

Stipa pulchra

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES							
Adenostoma sparsifolium	Red shanks	3-9	A, C, E	+ * !	FS	5	
Juglans californica var. californica	California walnut	3-9	B, E, F	+ ^ !	FS / PS	6	
SHRUBS							
Adenostoma fasciculatum	Chamise	3-6, 9	A, C, D	* !	FS	4	
Arctostaphylos glandulosa	Eastwood manzanita	5-9	B	+	FS / PS	6	
Arctostaphylos glauca	Bigberry manzanita	5-9	B	+	FS	6	
Artemisia californica	California sagebrush	1-6, 9	A, C, D	* !	FS	3	
Ceanothus crassifolius	Hoaryleaf ceanothus	1-9	A, B, C	+ !	FS	6	
Ceanothus cuneatus	Buck brush	1-9	A, B, C	+ !	FS	5	
Ceanothus leucodermis	Chaparral whitethorn	5-9	B	+ !	FS / PS	6	
Ceanothus megacarpus	Big-pod ceanothus	1-9	A, B, C	+ !	FS	6	
Ceanothus oliganthus	Hairy ceanothus	1-9	A, B, C	+ !	FS	6	
Ceanothus spinosus	Greenbark ceanothus	1-9	A, C	+ !	FS / PS	6	
Cercocarpus betuloides var. betuloides	Mountain mahogany	1-9	B, C	+ !	FS	6	
Dendromecon rigida	Bush poppy	1-6, 9	A, C		FS	5	
Diplacus longiflorus	Southern bush monkeyflower	1-9	A, B, C, D, E		FS / PS	3	
Eriogonum cinereum	Ashyleaf Buckwheat	1-5	A, C	+	FS	3	
Eriogonum fasciculatum var. foliolosum	Leafy California buckwheat	1-9	A, C	+ !	FS / PS	3	
Eriogonum fasciculatum var. polifolium	Interior California buckwheat	3-9	A, C	+ *!	FS / PS	3	
Frangula californica ssp. californica	California coffeeberry	1-9	A, B, C, D	*!	All	6	
Heteromeles arbutifolia	Toyon	1-9	A, B, C, E, F	+ ^!	FS / PS	6	
Isocoma menziesii ssp. vernonioides	Goldenbush	1-9	A, C		FS / PS	2	
Keckiella cordifolia	Heart-leaved penstemon	1-9	A, B, C, E		All	3	
Lepechinia fragrans	Fragrant pitcher sage	3-9	A, B, C	+ * !	FS / PS	3	
Lonicera subspicata var. denudata	Chaparral honeysuckle	1-9	A, B		FS	2	
Malosma laurina	Laurel sumac	1-9	A, C	+ !	FS	6	
Mimulus aurantiacus	Bush monkey flower	1-9	A, B, C		FS / PS	2	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
T/S	VL	8-20	15				Occasional	X	Birds, Bees	White			X	X
T-D	L	15-25	20	X	X		Occasional	X	Birds	Yellow		X		
S	VL	4-8	6	X			Occasional	X	Birds, Butterflies, Bees	White		X	X	
S	VL	3-12	8				Occasional		Birds, Butterflies, Bees	White + Pink	X	X		
T/S	VL	6-15	6-15				Occasional		Birds, Bees	White + Pink	X	X		
S	VL	3	2-3	X	X	X	Frequent	X	Birds, Butterflies	White + Yellow		X	X	X
S	(Not Listed)	6-15	8-20				Frequent	X	Birds, Butterflies, Bees	White	X	X		
S	VL	5-12	5-12				Occasional	X	Birds, Butterflies, Bees	White	X	X	X	
S	VL	10-12	10-20				Occasional	X	Birds, Butterflies, Bees	Blue/Lavender	X	X		
S	VL	6-15	8-20				Subdominant	X	Birds, Butterflies, Bees	White/Lavender	X	X		
S	(Not Listed)	8-10	8-10				Occasional	X	Birds, Butterflies, Bees	Blue/Purple	X	X		
S/T	VL	8-20	10-20				Subdominant	X	Birds, Butterflies, Bees	Blue/White	X	X		
T/S	VL	6-20	12	X			Frequent	X	Birds	Yellow/Cream	X	X		
S	VL	8-12	10-15				Occasional	X	Bees, Butterflies	Yellow	X	X		
S	(Not Listed)	1-3	1-3				Occasional		Bees, Butterflies	Yellow		X	X	
S	VL	2-4	3-5	X			Occasional	X	Birds, Butterflies, Bees	Yellow/Brown	X	X	X	X
S	VL	3-5	2-6	X	X	X	Occasional	X	Birds, Butterflies, Bees	Red/Cream			X	
S	VL	3-5	2-6				Subdominant	X	Birds, Butterflies, Bees	Pink/Cream			X	
S	VL	8	12	X			Frequent	X	Birds, Butterflies, Bees	Cream		X	X	
S/T	VL	8-15	15	X			Subdominant	X	Birds, Bees	White			X	
S	VL	1-3	3		X		Occasional	X	Bees, Butterflies	Yellow		X	X	X
P/V-D	VL	4	4				Occasional	X	Birds	Red		X	X	
S	L	3-5	3-5				Occasional	X	Birds, Butterflies	Purple/Lavender		X	X	X
V/S	L	climbs					Occasional	X	Birds	Yellow/Cream		X	X	
S	VL	10	20	X	X		Occasional	X	Birds	Cream	X	X		
S	VL	2	2	X		X	Occasional	X	Birds, Butterflies, Bees	Orange/Yellow	X	X	X	

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
SHRUBS (continued)							
Prunus ilicifolia ssp. ilicifolia	Hollyleaf cherry	5-9	A, B, C	+ !	FS / PS	4	
Quercus berberidifolia	Scrub oak	1-9	A, B, C	+ !	FS	6	
Rhamnus crocea	Spiny redberry	5-9	A, B, C	+ !	All	4	
Rhamnus ilicifolia	Hollyleaf redberry	5-9	A, B, C	+ !	All	5	
Rhus aromatica	Fragrant sumac	1-9	A, B, C, E, F	+	FS / PS	4	
Rhus integrifolia	Lemonadeberry	1-9	A, B, C	+ !	FS / PS	6	
Rhus ovata	Sugar bush	1-9	A, C	+ * !	FS / PS	6	
Ribes californicum var. hesperium	Hillside gooseberry	3-9	B, F, G	+	PS	4	
Ribes malvaceum var. viridifolium	Chaparral currant	3-9	B, F	+	PS	3	
Ribes speciosum	Fuchsia-flowered gooseberry	3-9	B, F	+	PS / FS	4	
Romneya coulteri	Coulter's Matilija poppy	1-9	A, C, D, E	*	FS	3	
Salvia apiana	White sage	3-9	A, C, D	+ !	FS	3	
Salvia mellifera	Black sage	1-9	A, C, D	+ !	FS	4	
Trichostema lanatum	Woolly blue curls	1-9	E, F, G		FS	3	
PERENNIALS							
Acourtia microcephala	Sacapellote	1-9	A, B, C	+	FS	1	
Asclepias eriocarpa	Indian milkweed	1-9	C, E, F	+	FS	3	
Asclepias fascicularis	Narrow-leaved milkweed	1-9	C, E, F, G	+	FS / PS	3	
Corethrogyne filaginifolia var. filaginifolia	California aster	1-9	A, B		FS	2	
Delphinium cardinale	Scarlet larkspur	1-6; 9	A, C, E		FS	2	
Epilobium canum ssp. canum	Hoary California fuchsia	1-9	A, B	+	FS / PS	2	
Epilobium canum ssp. latifolium	California fuchsia	1-9	A, B	+	FS / PS	2	
Eriogonum elongatum	Longstem buckwheat	1-9	A, B, C	+	FS	1	
Eriophyllum confertiflorum	Golden yarrow	1-9	A, B, C	+	FS / PS	1	
Lotus scoparius (Acmispon glaber)	Deerweed	1-6, 9	A, C	+ *	FS	2	
Lupinus longifolius	Blue bush lupine	1-9	A, B		FS / PS	2	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
S	VL	6-12	6-12	X			Subdominant	X	Birds, Butterflies, Bees	Cream	X	X		
T/S	VL	8	8		X		Subdominant	X	Birds, Butterflies	Cream	X	X		
S	VL	4	4	X			Frequent	X	Birds, Butterflies, Bees	Yellow/Cream	X	X		
S	VL	6	6	X			Frequent	X	Birds, Butterflies, Bees	Yellow/Cream	X	X		
S-D	L	3-5	4-8		X		Occasional		Birds	Yellow/Cream		X		
S	VL	8-10	15	X	X		Frequent	X	Birds	Pink	X	X		
S	VL	8-10	15	X	X		Frequent	X	Birds	Pink/White	X	X		
S-D	L	5	5-8	X	X		Occasional	X	Birds, Butterflies, Bees	Purple/Yellow	X	X		
S-D	VL	5-8	5		X		Occasional	X	Birds, Butterflies, Bees	Pink/Purple	X	X		
S-D	VL	5-8	6-8	X	X		Occasional	X	Birds, Butterflies, Bees	Red/Pink	X	X		
P	VL	6-8	6-8				Frequent	X	Bees, Butterflies	White/Yellow		X	X	
S	VL	3	3-5	X	X		Occasional	X	Birds, Butterflies, Bees	White	X	X	X	
S	VL	4	6	X	X	X	Frequent	X	Birds, Butterflies, Bees	Lavender/White	X	X	X	
S	VL	2-4	4				Occasional	X	Birds, Butterflies, Bees	Pink/Blue/Lavender	X	X		
P	(Not Listed)	4	1				Occasional		Butterflies	Pink			X	
P-D	VL	3	1+		X		Occasional	X	Birds, Butterflies	Cream/Pink			X	
P-D	VL	3	2+		X		Occasional	X	Birds, Butterflies	White, Lavender			X	X
P	L	1-3	1-3	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Purple/Pink/White	X			
P-D	(Not Listed)	2-6	1				Occasional		Birds, Bees	Red/Yellow		X	X	
P	VL	1-3	2-4	X			Occasional		Birds, Butterflies	Red			X	X
P	VL	1-3	2-4	X			Occasional	X	Birds, Butterflies	Red			X	X
P	VL	6	1				Occasional		Birds, Butterflies, Bees	Cream/Pink			X	X
P	VL	2	1-3			X	Frequent	X	Bees, Butterflies	Yellow		X	X	X
P	VL	3	3		X		Frequent	X	Bees, Butterflies	Yellow	X	X	X	
P	(Not Listed)	4	4		X		Occasional		Birds, Bees	Purple/Blue	X	X	X	X

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
PERENNIALS (continued)							
Penstemon centranthifolius	Scarlet bugler	1-9	A, B, C, E, F	+	FS	2	
Penstemon heterophyllus var. australis	Foothill penstemon	1-3; 6-9	A, B, C		FS / PS	1	
Penstemon spectabilis	Showy penstemon	1-9	C		FS	2	
Solanum xanti	Purple or chaparral nightshade	1-9	A, C		FS / PS	2	
GRASSES							
Bothriochloa barbinodis	Cane bluegrass	1-9	A, C		FS	1	
Bromus carinatus var. carinatus	California brome	1-9	A, B, C, E, F, G	*!	FS / PS	1	
Elymus condensatus	Giant wild rye	1-9	A, B, C, E		All	2	
Elymus glaucus ssp. glaucus	Blue wild rye	1-9	A, B, C, E, F, G	+	All	3	
Muhlenbergia rigens	Deergrass	1-9	A, B, C, E, F		FS / PS	3	
Stipa cernua	Nodding needlegrass	1-9	A, B, C, E		FS / PS	1	
Stipa coronatum	Giant stipa	1-9	A, E, F		FS / PS	2	
Stipa lepida	Foothill needlegrass	1-9	A, B, C, D		FS / PS	1	
Stipa pulchra	Purple needlegrass	1-9	A, B, C, E	*!	FS / PS	1	
SUCCULENTS							
Dudleya pulverulenta	Chalk dudleya	1-9	A, B	*	FS / PS	1	
Yucca whipplei	Our lord's candle / chaparral yucca	5-9	A, C	+*	FS	5	
VINES							
Clematis lasiantha	Pipestems	3-9	A, B		FS / PS	2	
Clematis ligusticifolia	Virgin's bower	3-9	B, E, F, G	o	FS / PS	2	
Lathyrus vestitus	Pacific sweet pea	6-9	B		FS / PS	2	
Lathyrus vestitus var. alefeldii	Showy Pacific sweet pea	6-9	B		FS / PS	2	
GROUNDCOVERS							
Salvia spathacea	Hummingbird sage	1-9	B, C, E		PS / FS	2	
Solidago californica	California goldenrod	3-9	A, B, F, G	o	FS / PS	1	
Solidago confinis	Southern goldenrod	3-9	E, F, G	o	FS / PS	1	
Symphoricarpos mollis	Creeping snowberry	3-9	B, E	!	PS / FS	2	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
P	L	1	1-2				Occasional	X	Birds, Butterflies, Bees	Red		X	X	
P	L	1	2				Occasional	X	Birds, Butterflies, Bees	Purple/Blue	X	X	X	
P	L	3	3				Occasional	X	Birds	Purple/Blue/Pink	X			
P-D	VL	2	3				Frequent	X		Purple/Blue	X	X	X	
G/P/GC	L	2-4	1				Occasional	X		Yellow	X	X	X	X
G/P/GC	(Not Listed)	1.5-3	1+				Frequent	X	Butterflies	Yellow		X		
G/P/GC	L	4-5	3+	X			Occasional	X	Butterflies					
G/P/GC	L	1.5-3	1+				Occasional	X	Butterflies					
G/P/GC	L	3	4	X			Occasional	X	Birds					
G/P/GC	VL	2	2				Occasional	X						
G/P/GC	(Not Listed)	2-4	1-2				Occasional	X						
G/P/GC	VL	2	2		X		Occasional	X						
G/P/GC	VL	2	2		X		Occasional	X	Butterflies	Cream		X		
SC	VL	1	1		X		Occasional	X	Birds, Bees	Orange/Pink/Red				
SC	(Not Listed)	3	5	X		X	Frequent	X	Birds	Cream		X		
V-D	VL	climbs		X			Occasional	X		Cream		X	X	
V-D	L	climbs		X			Occasional	X		Cream			X	
V/P	(Not Listed)	climbs			X		Occasional	X		Pink/White	X	X		
V/P	(Not Listed)	climbs					Occasional			Pink/Purple	X	X		
P/GC	L	1	3+	X			Occasional	X	Birds, Butterflies, Bees	Red/Pink	X	X	X	
P/GC	M	1	2+	X			Frequent - Occasional	X	Bees, Butterflies	Yellow			X	X
P/GC	M	1	2+	X			Frequent - Occasional		Bees	Yellow		X	X	X
S-D/GC	L	2	2+	X			Occasional	X	Birds, Butterflies, Bees	Pink		X	X	

SOUTHERN COAST LIVE OAK RIPARIAN FOREST

Southern coast live oak riparian forest (CLORF) (Coast Live Oak Association):
This forest community is found along bottomlands and outer floodplains along larger streams on fine-grained, rich alluvium. This community differs structurally from coast live oak riparian woodland in having a relatively closed tree canopy at maturity, and thus supports understory species adapted to partial or full shade. CLORF may be appropriate for relatively moist zones, particularly with north-facing slopes, such as in the Sepulveda Basin vicinity.

- Understory is adapted to partial or full shade.
- Typically found in stream beds, moist areas, or north-facing slopes.
- Can tolerate periodic flooding.

Figure 203. ***Quercus agrifolia.*** Source: Stickpen, https://commons.wikimedia.org/w/index.php?curid=9944130.
Figure 204. ***Fraxinus velutina var. coriacea.*** Source: Kenraiz, https://commons.wikimedia.org/w/index.php?curid=75992775.
Figure 205. ***Platanus racemosa.*** Source: Raffi Kojian, http://www.gardenology.org, https://commons.wikimedia.org/w/index.php?curid=9705655.
Figure 206. ***Populus trichocarpa.*** Source: Daniel Mayer, https://commons.wikimedia.org/w/index.php?curid=7381945.
Figure 207. ***Keckiella cordifolia.*** Source: Björn S..., https://commons.wikimedia.org/wiki/File:Heartleaf_Keckiella_-_Keckiella_cordifolia_(43818527031).jpg
Figure 208. ***Ribes aureum var. gracillimum.*** Source: John Rusk, https://www.flickr.com/photos/john_d_rusk/8941180855.
Figure 209. ***Artemisia douglasiana.*** Source: Römert, https://commons.wikimedia.org/w/index.php?curid=19802958.
Figure 210. ***Rosa californica.*** Source: Bill Leikam, https://commons.wikimedia.org/w/index.php?curid=40893617.
Figure 211. ***Dryopteris arguta.*** Source: John Rusk, https://commons.wikimedia.org/w/index.php?curid=59291429.

Quercus agrifolia

Fraxinus velutina var. coriacea

Platanus racemosa

Populus trichocarpa

Keckiella cordifolia

Ribes aureum var. gracillimum

Artemisia douglasiana

Rosa californica

Dryopteris arguta

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES							
Acer negundo	Box elder	5-9	E, F, G	+ ^ ~ o	FS / PS	6	
Fraxinus velutina var. coriacea	Velvet ash	1-9	B, E, F, G	+ ^ ! o	FS / PS	6	
Juglans californica var. californica	California walnut	3-9	B, E, F	+ ^ !	FS / PS	6	
Platanus racemosa	California sycamore	1-9	E,F	+ ^ ~ o	FS	6	
Populus fremontii ssp. fremontii	Fremont cottonwood	1-9	F, G	+ ^ ~ o	FS	8	
Populus trichocarpa	Black cottonwood	1-9	F, G	+ ^ ~ o	FS	8	
Quercus agrifolia var. agrifolia	Coast live oak	1-9	A, B, C	+ ^	FS	8	
Sambucus nigra ssp. caerulea	Mexican elderberry	1-9	C, E, F	+ ^ ~ o	FS	6	
Umbellularia californica	California bay laurel	1-9	B, E, F	+ ^ !	FS / PS	6	
SHRUBS							
Amorpha fruticosa	indigobush	1-9	B, F, G	+ ~ o	FS / PS	3	
Artemisia californica	California sagebrush	1-6, 9	A, C, D	* !	FS	3	
Baccharis pilularis var. consanguinea	Coyote brush	1-5	A, C, D	* !	FS / PS	4	
Baccharis salicifolia	Mulefat	1-9	F, G	+ ~ o	All	3	
Berberis pinnata	California barberry	5-9	B, E, F	+ !	FS / PS	4	
Ceanothus oliganthus	Hairy ceanothus	1-9	A, B, C	+ !	FS	6	
Eriogonum fasciculatum var. foliolosum	Leafy California buckwheat	1-9	A, C	+ !	FS / PS	3	
Frangula californica ssp. californica	California coffeeberry	1-9	A, B, C, D	* !	All	6	
Heteromeles arbutifolia	Toyon	1-9	A, B, C, E, F	+ ^ !	FS / PS	6	
Isocoma menziesii ssp. vernonioides	Goldenbush	1-9	A, C		FS / PS	2	
Keckiella cordifolia	Heart-leaved penstemon	1-9	A, B, C, E		All	3	
Lonicera subspicata var. denudata	Chaparral honeysuckle	1-9	A, B		FS	2	
Malosma laurina	Laurel sumac	1-9	A, C	+ !	FS	6	
Mimulus aurantiacus	Bush monkey flower	1-9	A, B, C		FS / PS	2	
Prunus ilicifolia ssp. ilicifolia	Hollyleaf cherry	5-9	A, B, C	+ !	FS / PS	4	
Rhamnus ilicifolia	Hollyleaf redberry	5-9	A, B, C	+ !	All	5	
Rhus aromatica	Fragrant sumac	1-9	A, B, C, E, F	+	FS / PS	4	
Rhus integrifolia	Lemonadeberry	1-9	A, B, C	+ !	FS / PS	6	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
T-D	M	30-60	40				Occasional	X	Birds, Butterflies	Yellow/Cream	X	X		
T-D	M	20-30	20-30		X		Frequent - Occasional	X	Birds, Butterflies	Yellow		X		
T-D	L	15-25	20	X	X		Occasional	X	Birds	Yellow		X		
T-D	M	40	40	X	X		Subdominant	X	Birds, Butterflies	Yellow/Cream	X	X		
T-D	M	30	35				Occasional	X	Birds, Butterflies	Cream	X	X		
T-D	M	30	30+				Frequent - Occasional	X	Birds, Butterflies	Yellow	X	X		
T	VL / L	40	40	X	X		Dominant	X	Birds, Butterflies	Yellow		X		
T-D	L	15	20	X	X		Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream		X	X	
T	L	30	30				Frequent - Occasional	X	Birds	Yellow/Cream; SP		X		
S-D	M	3-8	3-8				Occasional	X	Birds, Butterflies	Purple/Yellow	X	X		
S	VL	3	2-3	X	X	X	Occasional	X	Birds, Butterflies	White + Yellow		X	X	X
S	L	4-6	6-8	X	X		Occasional	X	Bees, Butterflies	Yellow/Cream	X	X	X	X
S	H	4-8	6-10	X	X		Occasional	X	Bees, Butterflies	White/Pink/White	X	X	X	X
S	L	4-6	4+				Occasional	X	Birds, Butterflies, Bees	Yellow	X	X		
S	(Not Listed)	8-10	8-10				Occasional	X	Birds, Butterflies, Bees	Blue/Purple	X	X		
S	VL	3-5	2-6	X	X	X	Occasional	X	Birds, Butterflies, Bees	Red/Cream			X	
S	VL	8	12	X			Frequent	X	Birds, Butterflies, Bees	Cream		X	X	
S/T	VL	8-15	15	X			Occasional	X	Birds, Bees	White			X	
S	VL	1-3	3		X		Occasional	X	Bees, Butterflies	Yellow		X	X	X
P/V-D	VL	4	4				Occasional	X	Birds	Red		X	X	
V/S	L	climbs					Occasional	X	Birds	Yellow/Cream		X	X	
S	VL	10	20	X	X		Frequent	X	Birds	Cream	X	X		
S	VL	2	2	X		X	Occasional	X	Birds, Butterflies, Bees	Orange/Yellow	X	X	X	
S	VL	6-12	6-12	X			Frequent	X	Birds, Butterflies, Bees	Cream	X	X		
S	VL	6	6	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream	X	X		
S-D	L	3-5	4-8		X		Frequent - Occasional		Birds	Yellow/Cream		X		
S	VL	8-10	15	X	X		Occasional	X	Birds	Pink	X	X		

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
SHRUBS (continued)							
Ribes aureum var. gracillimum	Golden currant	3-9	A, B, C, E, F		FS / PS	3	
Ribes californicum var. hesperium	Hillside gooseberry	3-9	B, F, G	+	PS	4	
Ribes speciosum	Fuchsia-flowered gooseberry	3-9	B, F	+	PS / FS	4	
Rosa californica	California wild rose	1-9	E, F, G		All	3	
Salvia apiana	White sage	3-9	A, C, D	+ !	FS	3	
Venegasia carpesioides	Canyon sunflower	1-9	B, E, F	+ !	All	3	
PERENNIALS							
Artemisia douglasiana	Mugwort	1-9	A, B, C, E	! ~ o	All	3	
Dryopteris arguta	Coastal wood fern	1-9	E, F, G	o	PS / FS	1	
Eriophyllum confertiflorum	Golden yarrow	1-9	A, B, C	+	FS / PS	1	
Juncus patens	California grey rush	1-9	E, F, G	~ o	FS / PS	2	
Juncus torreyi	Rush	1-9	E, F, G	~ o	FS / PS	1-2	
Lotus scoparius (Acmispon glaber)	Deerweed	1-6, 9	A, C	+ *	FS	2	
Lupinus latifolius var. parishii	Broad-leaf canyon lupine	6-9	B, E, F	+ o	FS / PS	2	
Thalictrum fendleri var. polycarpum	Meadow rue	6-9	B, F, G	o	PS / FS	2	
GRASSES							
Agrostis exarata	Bent grass	1-9	A, B, C, E, F, G		FS / PS	1-2	
Bromus carinatus var. carinatus	California brome	1-9	A, B, C, E, F, G	* !	FS / PS	1	
Elymus condensatus	Giant wild rye	1-9	A, B, C, E		All	2	
Elymus glaucus ssp. glaucus	Blue wild rye	1-9	A, B, C, E, F, G	+	All	3	
Muhlenbergia rigens	Deergrass	1-9	A, B, C, E, F		FS / PS	3	
VINES							
Clematis lasiantha	Pipestems	3-9	A, B		FS / PS	2	
Clematis ligusticifolia	Virgin's bower	3-9	B, E, F, G	o	FS / PS	2	
Lathyrus vestitus	Pacific sweet pea	6-9	B		FS / PS	2	
Vitis girdiana	Desert grape	3-9	G	o	All	2	
GROUNDCOVERS							
Carex praegracilis	Slender sedge	1-9	D, E, F, G	o	FS / PS	1	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
S-D	VL	6-8	6-8	X	X	X	Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream	X	X		
S-D	L	5	5-8	X	X		Occasional	X	Birds, Butterflies, Bees	Purple/Yellow	X	X		
S-D	VL	5-8	6-8	X	X		Occasional	X	Birds, Butterflies, Bees	Red/Pink	X	X		
S	L	4-6	4+	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Pink		X	X	
S	VL	3	3-5	X	X		Occasional	X	Birds, Butterflies, Bees	White	X	X	X	
S	L	4	4				Occasional	X	Birds, Bees	Yellow	X	X		
P	M	3-5	3+	X	X		Frequent	X	Birds, Butterflies	Yellow/Cream		X	X	X
P	L	1-2	2+		X		Frequent							
P	VL	2	1-3			X	Frequent - Occasional	X	Bees, Butterflies	Yellow		X	X	X
P/GC	L	2.5	3+	X			Occasional	X						
P	M	2-3	3+				Occasional			Red/Brown			X	
P	VL	3	3		X		Occasional	X	Bees, Butterflies	Yellow	X	X	X	
P	L	4	4				Occasional	X	Bees, Butterflies	Blue/Purple		X		
P	M	2	2				Occasional	X		Yellow		X	X	
G/P/GC	(Not Listed)	2-4	2				Frequent		Butterflies					
G/P/GC	(Not Listed)	1.5-3	1+				Frequent	X	Butterflies	Yellow; SP		X		
G/P/GC	L	4-5	3+	X			Occasional	X	Butterflies					
G/P/GC	L	1.5-3	1+				Frequent - Occasional	X	Butterflies					
G/P/GC	L	3	4	X			Occasional	X	Birds					
V-D	VL	climbs		X			Occasional	X		Cream		X	X	
V-D	L	climbs		X			Occasional	X		Cream			X	
V/P	(Not Listed)	climbs			X		Occasional	X		Pink/White	X	X		
V/S-D	L	climbs		X			Occasional	X	Birds	Green		X		
P/GC	M	.5-1	2+	X			Occasional	X						

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
GROUNDCOVERS (continued)							
Corethrogyne filaginifolia var. filaginifolia	California aster	1-9	A, B		FS	2	
Elymus triticoides	Creeping wild rye	1-9	B, E, F, G	!	All	2	
Salvia spathacea	Hummingbird sage	1-9	B, C, E		PS / FS	2	
Solidago californica	California goldenrod	3-9	A, B, F, G	o	FS / PS	1	
Solidago confinis	Southern goldenrod	3-9	E, F, G	o	FS / PS	1	
Stachys bullata	Pink hedgenettle	1-9	E, F, G	+ ~ o	PS / FS	2	
Symphoricarpos mollis	Creeping snowberry	3-9	B, E	!	PS / FS	2	

DESCRIPTIVE FEATURES

	PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
												W	SP	SU	F
	P/GC	L	1-3	1-3	X			Occasional	X	Birds, Butterflies, Bees	Purple/Pink/White	X			
	G/P/GC	L	2	2+	X			Occasional	X	Butterflies					
	P/GC	L	1	3+	X			Occasional	X	Birds, Butterflies, Bees	Red/Pink	X	X	X	
	P/GC	M	1	2+	X			Frequent - Occasional	X	Bees, Butterflies	Yellow			X	X
	P/GC	M	1	2+	X			Frequent - Occasional		Bees	Yellow		X	X	X
	P/GC	L	1-2	2+	X	X		Frequent - Occasional	X	Birds, Butterflies, Bees	Lavender/Purple		X	X	X
	S-D/GC	L	2	2+	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Pink		X	X	

COAST LIVE OAK WOODLAND

Coast live oak woodland (CLOW) (Coast Live Oak Association):
CLOW is commonly found on slopes that are often very steep or on raised stream banks and terraces. Its soils are mostly sandstone or shale-derived. Coast live oak (Quercus agrifolia) woodland is a tree-dominated community comprising fewer trees and considerably drier soils than southern coast live oak forest.

- Requires fast draining, nutrient poor soil that is typical of slopes.
- Many species are deciduous in the summer, and over-watering during this time severely compromises the plants' survival.
- Can generally tolerate relatively dry conditions.

Figure 212. ***Quercus agrifolia.*** Source: Stickpen, https://commons.wikimedia.org/w/index.php?curid=9944130.
Figure 213. ***Sambucus nigra ssp. caerulea*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=1953423
Figure 214. ***Umbellularia californica.*** Source: Krzysztof Ziarnek, Kenraiz, https://commons.wikimedia.org/w/index.php?curid=54448438.
Figure 215. ***Prunus ilicifolia ssp. ilicifolia.*** Source: John Rusk, https://commons.wikimedia.org/w/index.php?curid=59290247.
Figure 216. ***Ribes californicum*** Source: Tom Hilton, https://commons.wikimedia.org/wiki/File:Ribes_californicum.jpg.
Figure 217. ***Rhus aromatica.*** Source: David J. Stang, https://commons.wikimedia.org/w/index.php?curid=61092418.
Figure 218. ***Sisyrinchium bellum.*** Source: Franco Folini, https://www.flickr.com/photos/livenature/4350730696.
Figure 219. ***Bromus carinatus var. carinatus.*** Source: Matt Lavin, https://commons.wikimedia.org/w/index.php?curid=25134214.
Figure 220. ***Muhlenbergia rigens.*** Source: Krzysztof Ziarnek, Kenraiz, https://commons.wikimedia.org/w/index.php?curid=54450777.


Quercus agrifolia


Sambucus nigra ssp. caerulea


Umbellularia californica


Prunus ilicifolia ssp. ilicifolia


Ribes californicum


Rhus aromatica


Sisyrinchium bellum


Bromus carinatus var. carinatus


Muhlenbergia rigens

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES							
Juglans californica var. californica	California walnut	3-9	B, E, F	+ ^ !	FS / PS	6	
Quercus agrifolia var. agrifolia	Coast live oak	1-9	A, B, C	+ ^	FS	8	
Sambucus nigra ssp. caerulea	Mexican elderberry	1-9	C, E, F	+ ^ ~ o	FS	6	
Umbellularia californica	California bay laurel	1-9	B, E, F	+ ^ !	FS / PS	6	
SHRUBS							
Amorpha fruticosa	indigobush	1-9	B, F, G	+ ~ o	FS / PS	3	
Artemisia californica	California sagebrush	1-6, 9	A, C, D	* !	FS	3	
Baccharis pilularis var. consanguinea	Coyote brush	1-5	A, C, D	* !	FS / PS	4	
Berberis pinnata	California barberry	5-9	B, E, F	+ !	FS / PS	4	
Ceanothus leucodermis	Chaparral whitethorn	5-9	B	+ !	FS / PS	6	
Ceanothus oliganthus	Hairy ceanothus	1-9	A, B, C	+ !	FS	6	
Eriogonum fasciculatum var. fasciculatum	California buckwheat	1-6, 9	A		FS / PS	4	
Eriogonum fasciculatum var. foliolosum	Leafy California buckwheat	1-9	A, C	+ !	FS / PS	3	
Frangula californica ssp. californica	California coffeeberry	1-9	A, B, C, D	* !	All	6	
Heteromeles arbutifolia	Toyon	1-9	A, B, C, E, F	+ ^ !	FS / PS	6	
Isocoma menziesii ssp. vernonioides	Goldenbush	1-9	A, C		FS / PS	2	
Keckiella cordifolia	Heart-leaved penstemon	1-9	A, B, C, E		All	3	
Lepechinia fragrans	Fragrant pitcher sage	3-9	A, B, C	+ * !	FS / PS	3	
Malosma laurina	Laurel sumac	1-9	A, C	+ !	FS	6	
Mimulus aurantiacus	Bush monkey flower	1-9	A, B, C		FS / PS	2	
Prunus ilicifolia ssp. ilicifolia	Hollyleaf cherry	5-9	A, B, C	+ !	FS / PS	4	
Rhamnus ilicifolia	Hollyleaf redberry	5-9	A, B, C	+ !	All	5	
Rhus aromatica	Fragrant sumac	1-9	A, B, C, E, F	+	FS / PS	4	
Rhus integrifolia	Lemonadeberry	1-9	A, B, C	+ !	FS / PS	6	
Rhus ovata	Sugar bush	1-9	A, C	+ * !	FS / PS	6	
Ribes aureum var. gracillimum	Golden currant	3-9	A, B, C, E, F		FS / PS	3	
Ribes californicum var. hesperium	Hillside gooseberry	3-9	B, F, G	+	PS	4	

DESCRIPTIVE FEATURES

	PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
												W	SP	SU	F
	T-D	L	15-25	20	X	X		Occasional	X	Birds	Yellow		X		
	T	VL / L	40	40	X	X		Dominant	X	Birds, Butterflies	Yellow		X		
	T-D	L	15	20	X	X		Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream		X	X	
	T	L	30	30				Frequent - Occasional	X	Birds	Yellow/Cream		X		
	S-D	M	3-8	3-8				Occasional	X	Birds, Butterflies	Purple/Yellow	X	X		
	S	VL	3	2-3	X	X	X	Occasional	X	Birds, Butterflies	White + Yellow		X	X	X
	S	L	4-6	6-8	X	X		Occasional	X	Bees, Butterflies	Yellow/Cream	X	X	X	X
	S	L	4-6	4+				Occasional	X	Birds, Butterflies, Bees	Yellow	X	X		
	S	VL	10-12	10-20				Occasional	X	Birds, Butterflies, Bees	Blue/Lavender	X	X		
	S	(Not Listed)	8-10	8-10				Occasional	X	Birds, Butterflies, Bees	Blue/Purple	X	X		
	S/GC	VL	3	2-6		X		Occasional		Bees, Butterflies	Red/Cream			X	
	S	VL	3-5	2-6	X	X	X	Occasional	X	Birds, Butterflies, Bees	Red/Cream			X	
	S	VL	8	12	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Cream		X	X	
	S/T	VL	8-15	15	X			Occasional	X	Birds, Bees	White			X	
	S	VL	1-3	3		X		Occasional	X	Bees, Butterflies	Yellow		X	X	X
	P/V-D	VL	4	4				Occasional	X	Birds	Red		X	X	
	S	L	3-5	3-5				Occasional	X	Birds, Butterflies	Purple/Lavender		X	X	X
	S	VL	10	20	X	X		Occasional	X	Birds	Cream	X	X		
	S	VL	2	2	X		X	Occasional	X	Birds, Butterflies, Bees	Orange/Yellow	X	X	X	
	S	VL	6-12	6-12	X			Frequent	X	Birds, Butterflies, Bees	Cream	X	X		
	S	VL	6	6	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream	X	X		
	S-D	L	3-5	4-8		X		Frequent - Occasional		Birds	Yellow/Cream		X		
	S	VL	8-10	15	X	X		Occasional	X	Birds	Pink	X	X		
	S	VL	8-10	15	X	X		Frequent - Occasional	X	Birds	Pink/White	X	X		
	S-D	VL	6-8	6-8	X	X	X	Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream	X	X		
	S-D	L	5	5-8	X	X		Occasional	X	Birds, Butterflies, Bees	Purple/Yellow	X	X		

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
SHRUBS (continued)							
Ribes malvaceum var. viridifolium	Chaparral currant	3-9	B, F	+	PS	3	
Ribes speciosum	Fuchsia-flowered gooseberry	3-9	B, F	+	PS / FS	4	
Rosa californica	California wild rose	1-9	E, F, G		All	3	
Salvia apiana	White sage	3-9	A, C, D	+ !	FS	3	
Salvia leucophylla	Purple sage	1-9	A, C, D	+ * !	FS	5	
Salvia mellifera	Black sage	1-9	A, C, D	+ !	FS	4	
Venegasia carpesioides	Canyon sunflower	1-9	B, E, F	+ !	All	3	
PERENNIALS							
Artemisia douglasiana	Mugwort	1-9	A, B, C, E	! ~ o	All	3	
Asclepias eriocarpa	Indian milkweed	1-9	C, E, F	+	FS	3	
Corethrogyne filaginifolia var. filaginifolia	California aster	1-9	A, B		FS	2	
Dryopteris arguta	Coastal wood fern	1-9	E, F, G	o	PS / FS	1	
Epilobium canum ssp. latifolium	California fuchsia	1-9	A, B	+	FS / PS	2	
Eriophyllum confertiflorum	Golden yarrow	1-9	A, B, C	+	FS / PS	1	
Eschscholzia californica	California poppy	1-9	C, D		FS / PS	1	
Linanthus californicus	Prickly phlox	1-9	A, B, E, F		FS / PS	2	
Lotus scoparius (Acmispon glaber)	Deerweed	1-6, 9	A, C	+ *	FS	2	
Lupinus latifolius var. parishii	Broad-leaf canyon lupine	6-9	B, E, F	+ o	FS / PS	2	
Penstemon centranthifolius	Scarlet bugler	1-9	A, B, C, E, F	+	FS	2	
Penstemon heterophyllus var. australis	Foothill penstemon	1-3; 6-9	A, B, C		FS / PS	1	
Penstemon spectabilis	Showy penstemon	1-9	C		FS	2	
Sisyrinchium bellum	Blue-eyed grass	1-9	E, F, G	o	FS / PS	1	
GRASSES							
Bromus carinatus var. carinatus	California brome	1-9	A, B, C, E, F, G	* !	FS / PS	1	
Elymus condensatus	Giant wild rye	1-9	A, B, C, E		All	2	
Elymus glaucus ssp. glaucus	Blue wild rye	1-9	A, B, C, E, F, G	+	All	3	
Koeleria macrantha	Junegrass	1-9	A, B, C, D	+ *	FS / PS	1	
Muhlenbergia rigens	Deergrass	1-9	A, B, C, E, F		FS / PS	3	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
S-D	VL	5-8	5		X		Occasional	X	Birds, Butterflies, Bees	Pink/Purple	X	X		
S-D	VL	5-8	6-8	X	X		Occasional	X	Birds, Butterflies, Bees	Red/Pink	X	X		
S	L	4-6	4+	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Pink		X	X	
S	VL	3	3-5	X	X		Occasional	X	Birds, Butterflies, Bees	White	X	X	X	
S	VL	5	6-8	X	X		Occasional	X	Birds, Butterflies, Bees	Lavender/Purple		X	X	
S	VL	4	6	X	X	X	Occasional	X	Birds, Butterflies, Bees	Lavender/White	X	X	X	
S	L	4	4				Occasional	X	Birds, Bees	Yellow	X	X		
P	M	3-5	3+	X	X		Frequent	X	Birds, Butterflies	Yellow/Cream		X	X	X
P-D	VL	3	1+		X		Occasional	X	Birds, Butterflies	Cream/Pink			X	
P	L	1-3	1-3	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Purple/Pink/White	X			
P	L	1-2	2+		X		Frequent							
P	VL	1-3	2-4	X			Frequent	X	Birds, Butterflies	Red			X	X
P	VL	2	1-3			X	Frequent - Occasional	X	Bees, Butterflies	Yellow		X	X	X
A/P-D	VL	1	1-2		X		Occasional	X	Birds, Butterflies, Bees	Orange / Yellow		X		
P	M	2	2				Occasional		Bees, Butterflies	Lavender	X	X	X	
P	VL	3	3		X		Occasional	X	Bees, Butterflies	Yellow	X	X	X	
P	L	4	4				Occasional	X	Bees, Butterflies	Blue/Purple		X		
P	L	1	1-2				Occasional	X	Birds, Butterflies, Bees	Red		X	X	
P	L	1	2				Occasional	X	Birds, Butterflies, Bees	Purple/Blue	X	X	X	
P	L	3	3				Occasional	X	Birds	Purple/Blue/Pink	X			
P-D	L	1	1				Frequent	X	Butterflies	Purple	X	X		
G/P/GC	(Not Listed)	1.5-3	1+				Frequent	X	Butterflies	Yellow		X		
G/P/GC	L	4-5	3+	X			Occasional	X	Butterflies					
G/P/GC	L	1.5-3	1+				Frequent - Occasional	X	Butterflies					
G/P/GC	L	1-2	1				Occasional	X	Butterflies					
G/P/GC	L	3	4	X			Occasional	X	Birds					

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
GRASSES (continued)							
Poa secunda ssp. secunda (P. scabrella)	One-sided bluegrass	1-9	A, B, C, E	* !	FS / PS	1	
Stipa cernua	Nodding needlegrass	1-9	A, B, C, E		FS / PS	1	
Stipa lepida	Foothill needlegrass	1-9	A, B, C, D		FS / PS	1	
Stipa pulchra	Purple needlegrass	1-9	A, B, C, E	* !	FS / PS	1	
SUCCULENTS							
Yucca whipplei	Our lord's candle / chaparral yucca	5-9	A, C	+ *	FS	5	
VINES							
Clematis lasiantha	Pipestems	3-9	A, B		FS / PS	2	
Clematis ligusticifolia	Virgin's bower	3-9	B, E, F, G	o	FS / PS	2	
Lathyrus vestitus	Pacific sweet pea	6-9	B		FS / PS	2	
Lathyrus vestitus var. alefeldii	Showy Pacific sweet pea	6-9	B		FS / PS	2	
GROUNDCOVERS							
Achillea millefolium var. californicum	Yarrow	1-9	A, B, C, D, E, F	!	FS / PS	1	
Carex praegracilis	Slender sedge	1-9	D, E, F, G	o	FS / PS	1	
Salvia spathacea	Hummingbird sage	1-9	B, C, E		PS / FS	2	
Solidago californica	California goldenrod	3-9	A, B, F, G	o	FS / PS	1	
Solidago confinis	Southern goldenrod	3-9	E, F, G	o	FS / PS	1	
Stachys bullata	Pink hedgenettle	1-9	E, F, G	+ ~ o	PS / FS	2	
Symphoricarpos mollis	Creeping snowberry	3-9	B, E	!	PS / FS	2	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
G/P/GC	L	1	1				Frequent - Occasional	X	Butterflies	Yellow		X		
G/P/GC	VL	2	2				Frequent - Occasional	X						
G/P/GC	VL	2	2		X		Frequent - Occasional	X						
G/P/GC	VL	2	2		X		Frequent - Occasional	X	Butterflies	Cream		X		
SC	(Not Listed)	3	5	X		X	Occasional	X	Birds	Cream		X		
V-D	VL	climbs		X			Occasional	X		Cream		X	X	
V-D	L	climbs		X			Occasional	X		Cream			X	
V/P	(Not Listed)	climbs			X		Occasional	X		Pink/White	X	X		
V/P	(Not Listed)	climbs					Occasional			Pink/Purple	X	X		
P/GC	L	.5-2	3	X	X		Occasional	X	Birds, Butterflies, Bees	White		X	X	
P/GC	M	.5-1	2+	X			Occasional	X						
P/GC	L	1	3+	X			Occasional	X	Birds, Butterflies, Bees	Red/Pink	X	X	X	
P/GC	M	1	2+	X			Frequent - Occasional	X	Bees, Butterflies	Yellow			X	X
P/GC	M	1	2+	X			Frequent - Occasional		Bees	Yellow		X	X	X
P/GC	L	1-2	2+	X	X		Frequent - Occasional	X	Birds, Butterflies, Bees	Lavender/Purple		X	X	X
S-D/GC	L	2	2+	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Pink		X	X	

SOUTHERN COTTONWOOD-WILLOW RIPARIAN FOREST

Southern cottonwood-willow riparian forest (CWRF) (Cottonwood-Willow Association):
This water-loving community is found where soils are intermittently or seasonally saturated: riparian corridors, floodplains subject to high intensity flooding, low-gradient depositions along rivers, streams, seeps, stream and river banks, and terraces. Generally a depth to perennial ground water of not more than ten feet is required to support this cottonwood-willow community, which may achieve either forest or woodland structure at maturity.

- Requires regularly saturated soils - typically found in areas where depth to groundwater is less than 10'.
- Typically found in stream beds, moist areas, or river banks and terraces.
- Can tolerate seasonal high-intensity flooding.

Figure 221. ***Populus fremontii.*** Source: CK Kelly, https://www.inaturalist.org/photos/10765354.
Figure 222. ***Salix laevigata.*** Source: no attribution necessary.
Figure 223. ***Salix exigua.*** Source: Thayne Tuason, https://commons.wikimedia.org/w/index.php?curid=67414102.
Figure 224. ***Salix lasiandra.*** Source: Matt Lavin, https://commons.wikimedia.org/w/index.php?curid=22760167.
Figure 225. ***Salix lasiolepis.*** Source: Par Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=7556942.
Figure 226. ***Mimulus cardinalis.*** Source: Dcrjsr, https://commons.wikimedia.org/w/index.php?curid=42183047.
Figure 227. ***Juncus patens.*** Source: Daderot, https://commons.wikimedia.org/w/index.php?curid=37530402.
Figure 228. ***Agrostis exarata.*** Source: sarahnwilson, https://www.inaturalist.org/photos/19749167.
Figure 229. ***Carex praegracilis.*** Source: Katie Hetrick, https://commons.wikimedia.org/wiki/File:Carex_praegracilis_-_Spring_in_the_Mary_Wattis_Brown_Garden_of_California_Native_Plants.jpg.

Populus fremontii

Salix laevigata

Salix exigua

Salix lasiandra

Salix lasiolepis

Mimulus cardinalis

Juncus patens

Agrostis exarata

Carex praegracilis

SOUTHERN COTTONWOOD-WILLOW RIPARIAN FOREST

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES							
Acer negundo	Box elder	5-9	E, F, G	+ ^ ~ o	FS / PS	6	
Fraxinus velutina var. coriacea	Velvet ash	1-9	B, E, F, G	+ ^ ! o	FS / PS	6	
Platanus racemosa	California sycamore	1-9	E,F	+ ^ ~ o	FS	6	
Populus fremontii ssp. fremontii	Fremont cottonwood	1-9	F, G	+ ^ ~ o	FS	8	
Populus trichocarpa	Black cottonwood	1-9	F, G	+ ^ ~ o	FS	8	
Salix gooddingii	Black willow	1-9	F, G	+ ^ ~ o	FS	6	
Salix laevigata	Red willow	1-9	F, G	+ ^ ~ o	FS / PS	6	
Sambucus nigra ssp. caerulea	Mexican elderberry	1-9	C, E, F	+ ^ ~ o	FS	6	
Umbellularia californica	California bay laurel	1-9	B, E, F	+ ^ !	FS / PS	6	
SHRUBS							
Baccharis salicifolia	Mulefat	1-9	F, G	+ ~ o	All	3	
Pluchea sericea	Arrow weed	1-9	F, G	o	FS	3	
Rhus aromatica	Fragrant sumac	1-9	A, B, C, E, F	+	FS / PS	4	
Rosa californica	California wild rose	1-9	E, F, G		All	3	
Salix exigua	Sandbar willow	2-9	F, G	+ ~ o	FS	6	
Salix lasiandra	Shining willow	1-9	F, G	+ ^ ~ o	FS / PS	5	
Salix lasiolepis	Arroyo willow	1-9	G	+ ^ ~ o	FS / PS	5	
PERENNIALS							
Artemisia douglasiana	Mugwort	1-9	A, B, C, E	! ~ o	All	3	
Eriophyllum confertiflorum	Golden yarrow	1-9	A, B, C	+	FS / PS	1	
Juncus patens	California grey rush	1-9	E, F, G	~ o	FS / PS	2	
Juncus torreyi	Rush	1-9	E, F, G	~ o	FS / PS	1-2	
Mimulus cardinalis	Scarlet monkeyflower	1-9	E, F, G	+ ~ o	All	2	
Thalictrum fendleri var. polycarpum	Meadow rue	6-9	B, F, G	o	PS / FS	2	
GRASSES							
Agrostis exarata	Bent grass	1-9	A, B, C, E, F, G		FS / PS	1-2	
Carex barbarae	Valley sedge	1-9	F, G	~ o	FS / PS	1-2	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
T-D	M	30-60	40				Occasional	X	Birds, Butterflies	Yellow/Cream	X	X		
T-D	M	20-30	20-30		X		Occasional	X	Birds, Butterflies	Yellow		X		
T-D	M	40	40	X	X		Subdominant	X	Birds, Butterflies	Yellow/Cream	X	X		
T-D	M	30	35				Dominant	X	Birds, Butterflies	Cream	X	X		
T-D	M	30	30+				Frequent	X	Birds, Butterflies	Yellow	X	X		
T-D	H	25	25				Frequent	X	Birds, Butterflies, Bees	Green	X	X		
T-D	H	15-20	15-20				Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow	X	X		
T-D	L	15	20	X	X		Subdominant	X	Birds, Butterflies, Bees	Yellow/Cream		X	X	
T	L	30	30				Frequent - Occasional	X	Birds	Yellow/Cream		X		
S	H	4-8	6-10	X	X		Occasional	X	Bees, Butterflies	White/Pink/White	X	X	X	X
S	M	6-8	6+	X			Occasional	X		Pink		X	X	
S-D	L	3-5	4-8		X		Frequent - Occasional		Birds	Yellow/Cream		X		
S	L	4-6	4+	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Pink		X	X	
S-D	H	10-25	10-12	X	X		Subdominant	X	Birds, Butterflies, Bees	Yellow	X	X		
S/T-D	H	15	15				Dominant	X	Birds, Butterflies, Bees	Yellow		X		
S/T-D	H	15	15	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Cream	X	X		
P	M	3-5	3+	X	X		Frequent	X	Birds, Butterflies	Yellow/Cream		X	X	X
P	VL	2	1-3			X	Frequent - Occasional	X	Bees, Butterflies	Yellow		X	X	X
P/GC	L	2.5	3+	X			Frequent - Occasional	X						
P	M	2-3	3+				Frequent - Occasional			Red/Brown			X	
P	H	2	2			X	Occasional	X	Birds, Butterflies	Red		X	X	X
P	M	2	2				Occasional	X		Yellow		X	X	
G/P/GC	(Not Listed)	2-4	2				Frequent		Butterflies					
G/P/GC	(Not Listed)	1-3	3				Frequent	X	Butterflies	Cream/Purple/Red			X	

SOUTHERN COTTONWOOD-WILLOW RIPARIAN FOREST

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
GRASSES (continued)							
Carex spissa	San Diego sedge	1-9	F, G	~ o	FS	1	
Elymus condensatus	Giant wild rye	1-9	A, B, C, E		All	2	
VINES							
Clematis ligusticifolia	Virgin's bower	3-9	B, E, F, G	o	FS / PS	2	
Vitis girdiana	Desert grape	3-9	G	o	All	2	
GROUNDCOVERS							
Carex praegracilis	Slender sedge	1-9	D, E, F, G	o	FS / PS	1	
Elymus triticoides	Creeping wild rye	1-9	B, E, F, G	!	All	2	
Euthamia occidentalis	Western goldenrod	3-9	E, F, G	o	FS / PS	1	
Solidago californica	California goldenrod	3-9	A, B, F, G	o	FS / PS	1	
Solidago confinis	Southern goldenrod	3-9	E, F, G	o	FS / PS	1	

DESCRIPTIVE FEATURES

	PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
												W	SP	SU	F
	G/P/GC	M	2-4	2-4				Occasional	X	Butterflies	Brown/Green/Yellow		X		
	G/P/GC	L	4-5	3+	X			Occasional	X	Butterflies					
	V-D	L	climbs		X			Occasional	X		Cream			X	
	V/S-D	L	climbs		X			Occasional	X	Birds	Green		X		
	P/GC	M	.5-1	2+	X			Occasional	X					X	X
	G/P/GC	L	2	2+	X			Occasional	X	Butterflies					
	P/GC	L	2-4	2+	X			Frequent - Occasional	X		Yellow / Green			X	X
	P/GC	M	1	2+	X			Frequent - Occasional	X	Bees, Butterflies	Yellow			X	X
	P/GC	M	1	2+	X			Frequent - Occasional		Bees	Yellow		X	X	X

SOUTHERN SYCAMORE RIPARIAN WOODLAND

Southern sycamore riparian woodland (SRW) (California Sycamore Association):
This community is found along riparian corridors where soils are permanently saturated at depth. SRW is normally appropriate to braided, depositional channels of intermittent streams, gullies, springs, seeps, streams and riverbanks, and terraces adjacent to floodplains subject to high-intensity flooding. Soils supporting this community are alluvial, open, and rocky. This water-loving community should dominate river landscapes where water is available naturally.

- Will require additional water where it is not available naturally.
- Typically found in stream beds, moist areas, or north-facing slopes.
- Can tolerate seasonal high-intensity flooding.

Figure 230. ***Platanus racemosa.*** Source: Raffi Kojian, http://www.gardenology.org, https://commons.wikimedia.org/w/index.php?curid=9705655.
Figure 231. ***Fraxinus velutina var. coriacea.*** Source: Kenraiz, https://commons.wikimedia.org/w/index.php?curid=75992775.
Figure 232. ***Populus fremontii.*** Source: CK Kelly, https://www.inaturalist.org/photos/10765354.
Figure 233. ***Amorpha fruticosa.*** Source: Leonora (Ellie) Enking, https://www.flickr.com/photos/33037982@N04/14428257254.
Figure 234. ***Baccharis salicifolia.*** Source: Krzysztof Ziarnek, Kenraiz, https://commons.wikimedia.org/w/index.php?curid=54913701.
Figure 235. ***Rhamnus ilicifolia.*** Source: Charlie Hohn, https://www.inaturalist.org/photos/7262866.
Figure 236. ***Rubus ursinus.*** Source: Gaia Leo, https://commons.wikimedia.org/w/index.php?curid=68610213.
Figure 237. ***Thalictrum fendleri var. polycarpum.*** Source: Flowersinmyyard, https://commons.wikimedia.org/w/index.php?curid=68320295.
Figure 238. ***Elymus condensatus.*** Source: Peggy A. Lopipero-Langmo, https://www.flickr.com/photos/98699202@N03/10355498513.


Platanus racemosa


Fraxinus velutina var. coriacea


Populus fremontii


Amorpha fruticosa


Baccharis salicifolia


Rhamnus ilicifolia


Rubus ursinus


Thalictrum fendleri var. polycarpum


Elymus condensatus

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES							
Acer negundo	Box elder	5-9	E, F, G	+ ^ ~ o	FS / PS	6	
Alnus rhombifolia	White alder	1-9	G	+ ^ ~ o	All	6	
Fraxinus velutina var. coriacea	Velvet ash	1-9	B, E, F, G	+ ^ ! o	FS / PS	6	
Juglans californica var. californica	California walnut	3-9	B, E, F	+ ^ !	FS / PS	6	
Platanus racemosa	California sycamore	1-9	E,F	+ ^ ~ o	FS	6	
Populus fremontii ssp. fremontii	Fremont cottonwood	1-9	F, G	+ ^ ~ o	FS	8	
Populus trichocarpa	Black cottonwood	1-9	F, G	+ ^ ~ o	FS	8	
Quercus agrifolia var. agrifolia	Coast live oak	1-9	A, B, C	+ ^	FS	8	
Salix gooddingii	Black willow	1-9	F, G	+ ^ ~ o	FS	6	
Sambucus nigra ssp. caerulea	Mexican elderberry	1-9	C, E, F	+ ^ ~ o	FS	6	
Umbellularia californica	California bay laurel	1-9	B, E, F	+ ^ !	FS / PS	6	
SHRUBS							
Amorpha fruticosa	indigobush	1-9	B, F, G	+ ~ o	FS / PS	3	
Baccharis pilularis var. consanguinea	Coyote brush	1-5	A, C, D	* !	FS / PS	4	
Baccharis salicifolia	Mulefat	1-9	F, G	+ ~ o	All	3	
Berberis pinnata	California barberry	5-9	B, E, F	+ !	FS / PS	4	
Frangula californica ssp. californica	California coffeeberry	1-9	A, B, C, D	* !	All	6	
Heteromeles arbutifolia	Toyon	1-9	A, B, C, E, F	+ ^ !	FS / PS	6	
Keckiella cordifolia	Heart-leaved penstemon	1-9	A, B, C, E		All	3	
Malosma laurina	Laurel sumac	1-9	A, C	+ !	FS	6	
Mimulus aurantiacus	Bush monkey flower	1-9	A, B, C		FS / PS	2	
Pluchea sericea	Arrow weed	1-9	F, G	o	FS	3	
Prunus ilicifolia ssp. ilicifolia	Hollyleaf cherry	5-9	A, B, C	+ !	FS / PS	4	
Rhamnus ilicifolia	Hollyleaf redberry	5-9	A, B, C	+ !	All	5	
Rhus aromatica	Fragrant sumac	1-9	A, B, C, E, F	+	FS / PS	4	
Rhus integrifolia	Lemonadeberry	1-9	A, B, C	+ !	FS / PS	6	
Ribes aureum var. gracillimum	Golden currant	3-9	A, B, C, E, F		FS / PS	3	
Ribes californicum var. hesperium	Hillside gooseberry	3-9	B, F, G	+	PS	4	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
T-D	M	30-60	40				Occasional	X	Birds, Butterflies	Yellow/Cream	X	X		
T-D	H	20-30	20-30	X			Occasional	X	Birds, Butterflies	Green / Cream			X	X
T-D	M	20-30	20-30		X		Frequent - Occasional	X	Birds, Butterflies	Yellow		X		
T-D	L	15-25	20	X	X		Frequent	X	Birds	Yellow		X		
T-D	M	40	40	X	X		Dominant	X	Birds, Butterflies	Yellow/Cream	X	X		
T-D	M	30	35				Occasional	X	Birds, Butterflies	Cream	X	X		
T-D	M	30	30+				Frequent - Occasional	X	Birds, Butterflies	Yellow	X	X		
T	VL / L	40	40	X	X		Occasional	X	Birds, Butterflies	Yellow		X		
T-D	H	25	25				Frequent	X	Birds, Butterflies, Bees	Green	X	X		
T-D	L	15	20	X	X		Subdominant	X	Birds, Butterflies, Bees	Yellow/Cream		X	X	
T	L	30	30				Frequent - Occasional	X	Birds	Yellow/Cream		X		
S-D	M	3-8	3-8				Frequent - Occasional	X	Birds, Butterflies	Purple/Yellow	X	X		
S	L	4-6	6-8	X	X		Frequent	X	Bees, Butterflies	Yellow/Cream	X	X	X	X
S	H	4-8	6-10	X	X		Frequent	X	Bees, Butterflies	White/Pink/White	X	X	X	X
S	L	4-6	4+				Occasional	X	Birds, Butterflies, Bees	Yellow	X	X		
S	VL	8	12	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Cream		X	X	
S/T	VL	8-15	15	X			Occasional	X	Birds, Bees	White			X	
P/V-D	VL	4	4				Occasional	X	Birds	Red		X	X	
S	VL	10	20	X	X		Frequent	X	Birds	Cream	X	X		
S	VL	2	2	X		X	Frequent	X	Birds, Butterflies, Bees	Orange/Yellow	X	X	X	
S	M	6-8	6+	X			Occasional	X		Pink		X	X	
S	VL	6-12	6-12	X			Occasional	X	Birds, Butterflies, Bees	Cream	X	X		
S	VL	6	6	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream	X	X		
S-D	L	3-5	4-8		X		Frequent - Occasional		Birds	Yellow/Cream		X		
S	VL	8-10	15	X	X		Occasional	X	Birds	Pink	X	X		
S-D	VL	6-8	6-8	X	X	X	Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream	X	X		
S-D	L	5	5-8	X	X		Occasional	X	Birds, Butterflies, Bees	Purple/Yellow	X	X		

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
SHRUBS (continued)							
Ribes speciosum	Fuchsia-flowered gooseberry	3-9	B, F	+	PS / FS	4	
Rosa californica	California wild rose	1-9	E, F, G		All	3	
Salix exigua	Sandbar willow	2-9	F, G	+ ~ o	FS	6	
Salix lasiolepis	Arroyo willow	1-9	G	+ ^ ~ o	FS / PS	5	
Venegasia carpesioides	Canyon sunflower	1-9	B, E, F	+ !	All	3	
PERENNIALS							
Artemisia douglasiana	Mugwort	1-9	A, B, C, E	! ~ o	All	3	
Eriophyllum confertiflorum	Golden yarrow	1-9	A, B, C	+	FS / PS	1	
Eschscholzia californica	California poppy	1-9	C, D		FS / PS	1	
Juncus patens	California grey rush	1-9	E, F, G	~ o	FS / PS	2	
Juncus textilis	Basket rush	1-9	E, F, G	+ ~ o	FS	2	
Juncus torreyi	Rush	1-9	E, F, G	~ o	FS / PS	1-2	
Lotus scoparius (Acmispon glaber)	Deerweed	1-6, 9	A, C	+ *	FS	2	
Lupinus latifolius var. parishii	Broad-leaf canyon lupine	6-9	B, E, F	+ o	FS / PS	2	
Thalictrum fendleri var. polycarpum	Meadow rue	6-9	B, F, G	o	PS / FS	2	
Typha domingensis	Southern cattail	1-9	E, F, G	~ o	FS	2	
GRASSES							
Agrostis exarata	Bent grass	1-9	A, B, C, E, F, G		FS / PS	1-2	
Bromus carinatus var. carinatus	California brome	1-9	A, B, C, E, F, G	* !	FS / PS	1	
Carex barbarae	Valley sedge	1-9	F, G	~ o	FS / PS	1-2	
Carex spissa	San Diego sedge	1-9	F, G	~ o	FS	1	
Elymus condensatus	Giant wild rye	1-9	A, B, C, E		All	2	
Muhlenbergia rigens	Deergrass	1-9	A, B, C, E, F		FS / PS	3	
Schoenoplectus acutus var. occidentalis	Tule	5-9	E, F, G	~ o	FS	2	
VINES							
Clematis ligusticifolia	Virgin's bower	3-9	B, E, F, G	o	FS / PS	2	
Vitis girdiana	Desert grape	3-9	G	o	All	2	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
S-D	VL	5-8	6-8	X	X		Occasional	X	Birds, Butterflies, Bees	Red/Pink	X	X		
S	L	4-6	4+	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Pink		X	X	
S-D	H	10-25	10-12	X	X		Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow	X	X		
S/T-D	H	15	15	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Cream	X	X		
S	L	4	4				Occasional	X	Birds, Bees	Yellow	X	X		
P	M	3-5	3+	X	X		Frequent	X	Birds, Butterflies	Yellow/Cream		X	X	X
P	VL	2	1-3			X	Frequent - Occasional	X	Bees, Butterflies	Yellow		X	X	X
A/P-D	VL	1	1-2		X		Occasional	X	Birds, Butterflies, Bees	Orange / Yellow		X		
P/GC	L	2.5	3+	X			Occasional	X	Butterflies					
P	M	3-7	1				Occasional	X						
P	M	2-3	3+				Occasional			Red/Brown			X	
P	VL	3	3		X		Occasional	X	Bees, Butterflies	Yellow	X	X	X	
P	L	4	4				Occasional	X	Bees, Butterflies	Blue/Purple		X		
P	M	2	2				Occasional	X		Yellow		X	X	
P	(Not Listed)	12	3+				Occasional	X	Butterflies					
G/P/GC	(Not Listed)	2-4	2				Frequent		Butterflies					
G/P/GC	(Not Listed)	1.5-3	1+				Frequent	X	Butterflies	Yellow		X		
G/P/GC	(Not Listed)	1-3	3				Frequent	X	Butterflies	Cream/Purple/Red			X	
G/P/GC	M	2-4	2-4				Occasional	X	Butterflies	Brown/Green/Yellow		X		
G/P/GC	L	4-5	3+	X			Occasional	X	Butterflies					
G/P/GC	L	3	4	X			Occasional	X	Birds					
G/P/GC	(Not Listed)	3-10	3+				Frequent - Occasional		Butterflies					
V-D	L	climbs		X			Occasional	X		Cream			X	
V/S-D	L	climbs		X			Occasional	X	Birds	Green		X		

SOUTHERN SYCAMORE RIPARIAN WOODLAND

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
GROUNDCOVERS							
Carex praegracilis	Slender sedge	1-9	D, E, F, G	o	FS / PS	1	
Euthamia occidentalis	Western goldenrod	3-9	E, F, G	o	FS / PS	1	
Elymus triticoides	Creeping wild rye	1-9	B, E, F, G	!	All	2	
Salvia spathacea	Hummingbird sage	1-9	B, C, E		PS / FS	2	
Solidago californica	California goldenrod	3-9	A, B, F, G	o	FS / PS	1	
Solidago confinis	Southern goldenrod	3-9	E, F, G	o	FS / PS	1	
Stachys bullata	Pink hedgenettle	1-9	E, F, G	+ ~ o	PS / FS	2	
Symphoricarpos mollis	Creeping snowberry	3-9	B, E	!	PS / FS	2	

DESCRIPTIVE FEATURES

	PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
												W	SP	SU	F
	P/GC	M	.5-1	2+	X			Occasional	X						
	P/GC	L	2-4	2+	X			Frequent - Occasional	X		Yellow / Green			X	X
	G/P/GC	L	2	2+	X			Occasional	X	Butterflies					
	P/GC	L	1	3+	X			Occasional	X	Birds, Butterflies, Bees	Red/Pink	X	X	X	
	P/GC	M	1	2+	X			Frequent - Occasional	X	Bees, Butterflies	Yellow			X	X
	P/GC	M	1	2+	X			Frequent - Occasional		Bees	Yellow		X	X	X
	P/GC	L	1-2	2+	X	X		Frequent - Occasional	X	Birds, Butterflies, Bees	Lavender/Purple		X	X	X
	S-D/GC	L	2	2+	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Pink		X	X	

VALLEY OAK WOODLAND

Valley oak woodland (VOW) (Valley Oak Association):
This community is typified by its majestic signature tree (Quercus lobata), limited shrub layer, and generally grassy understory. VOW occurs in deep, well-drained alluvial soils that may be intermittently or seasonally flooded. This community is found on floodplains, valley bottoms, gentle slopes, and summit valleys.

- Understory is adapted to partial or full shade.
- Requires well draining soils that may be seasonally flooded.
- Typically found in stream beds, floodplain, or gentle slopes.

Figure 239. ***Quercus lobata.*** Source: King of Hearts, https://commons.wikimedia.org/w/index.php?curid=75700289.
Figure 240. ***Platanus racemosa.*** Source: Raffi Kojian, http://www.gardenology.org, https://commons.wikimedia.org/w/index.php?curid=9705655.
Figure 241. ***Frangula californica ssp. californica.*** Source: Krzysztof Ziarnek, Kenraiz, https://commons.wikimedia.org/w/index.php?curid=54696941.
Figure 242. ***Eriophyllum confertiflorum.*** Source: Björn S..., https://www.flickr.com/photos/40948266@N04/43163438812.
Figure 243. ***Sisyrinchium bellum.*** Source: Franco Folini, https://www.flickr.com/photos/livenature/4350730696.
Figure 244. ***Eschscholzia californica.*** Source: docentjoyce, https://commons.wikimedia.org/w/index.php?curid=8495738.
Figure 245. ***Vitis girdiana*** Source: Stickpen, https://commons.wikimedia.org/wiki/File:Vitisgirdiana1.JPG.
Figure 246. ***Stipa cernua.*** Source: Kyle Nessen, https://www.inaturalist.org/photos/38751036.
Figure 247. ***Stipa pulchra.*** Source: Matt Lavin. https://www.flickr.com/photos/plant_diversity/35034340452.

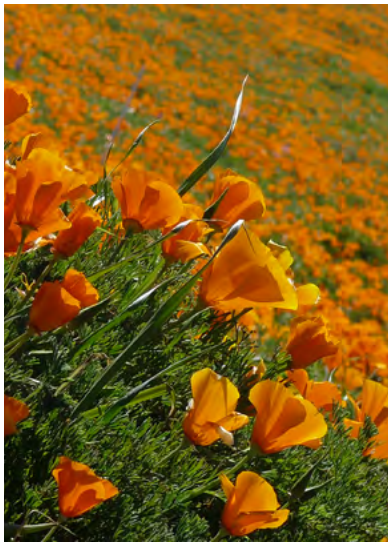
Quercus lobata

Platanus racemosa

Frangula californica ssp. californica

Eriophyllum confertiflorum

Sisyrinchium bellum



Eschscholzia californica

Vitis girdiana

Stipa cernua

Stipa pulchra

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES							
Fraxinus velutina var. coriacea	Velvet ash	1-9	B, E, F, G	+ ^ ! o	FS / PS	6	
Platanus racemosa	California sycamore	1-9	E,F	+ ^ ~ o	FS	6	
Quercus agrifolia var. agrifolia	Coast live oak	1-9	A, B, C	+ ^	FS	8	
Quercus lobata	Valley oak	3-6	A, C, E	+ ^ *	FS	8	
SHRUBS							
Frangula californica ssp. californica	California coffeeberry	1-9	A, B, C, D	* !	All	6	
PERENNIALS							
Corethrogyne filaginifolia var. filaginifolia	California aster	1-9	A, B		FS	2	
Eriophyllum confertiflorum	Golden yarrow	1-9	A, B, C	+	FS / PS	1	
Eschscholzia californica	California poppy	1-9	C, D		FS / PS	1	
Sisyrinchium bellum	Blue-eyed grass	1-9	E, F, G	o	FS / PS	1	
GRASSES							
Bromus carinatus var. carinatus	California brome	1-9	A, B, C, E, F, G	* !	FS / PS	1	
Elymus condensatus	Giant wild rye	1-9	A, B, C, E		All	2	
Muhlenbergia rigens	Deergrass	1-9	A, B, C, E, F		FS / PS	3	
Stipa cernua	Nodding needlegrass	1-9	A, B, C, E		FS / PS	1	
Stipa pulchra	Purple needlegrass	1-9	A, B, C, E	* !	FS / PS	1	
VINES							
Clematis ligusticifolia	Virgin's bower	3-9	B, E, F, G	o	FS / PS	2	
Lathyrus vestitus	Pacific sweet pea	6-9	B		FS / PS	2	
Vitis girdiana	Desert grape	3-9	G	o	All	2	
GROUNDCOVERS							
Achillea millefolium var. californicum	Yarrow	1-9	A, B, C, D, E, F	!	FS / PS	1	
Carex praegracilis	Slender sedge	1-9	D, E, F, G	o	FS / PS	1	
Elymus triticoides	Creeping wild rye	1-9	B, E, F, G	!	All	2	
Euthamia occidentalis	Western goldenrod	3-9	E, F, G	o	FS / PS	1	
Solidago californica	California goldenrod	3-9	A, B, F, G	o	FS / PS	1	
Solidago confinis	Southern goldenrod	3-9	E, F, G	o	FS / PS	1	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
T-D	M	20-30	20-30		X		Occasional	X	Birds, Butterflies	Yellow		X		
T-D	M	40	40	X	X		Subdominant	X	Birds, Butterflies	Yellow/Cream	X	X		
T	VL / L	40	40	X	X		Occasional	X	Birds, Butterflies	Yellow		X		
T-D	M	35	35	X	X		Dominant	X	Birds, Butterflies	Green / Cream	X	X		
S	VL	8	12	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Cream		X	X	
P	L	1-3	1-3	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Purple/Pink/White	X			
P	VL	2	1-3			X	Frequent - Occasional	X	Bees, Butterflies	Yellow		X	X	X
A/P-D	VL	1	1-2		X		Occasional	X	Birds, Butterflies, Bees	Orange / Yellow		X		
P-D	L	1	1				Frequent	X	Butterflies	Purple	X	X		
G/P/GC	(Not Listed)	1.5-3	1+				Frequent	X	Butterflies	Yellow		X		
G/P/GC	L	4-5	3+	X			Occasional	X	Butterflies					
G/P/GC	L	3	4	X			Frequent	X	Birds					
G/P/GC	VL	2	2				Frequent	X						
G/P/GC	VL	2	2		X		Frequent	X	Butterflies	Cream		X		
V-D	L	climbs		X			Occasional	X		Cream			X	
V/P	(Not Listed)	climbs			X		Occasional	X		Pink/White	X	X		
V/S-D	L	climbs		X			Occasional	X	Birds	Green		X		
P/GC	L	.5-2	3	X	X		Occasional	X	Birds, Butterflies, Bees	White		X	X	
P/GC	M	.5-1	2+	X			Occasional	X						
G/P/GC	L	2	2+	X			Occasional	X	Butterflies					
P/GC	L	2-4	2+	X			Frequent - Occasional	X		Yellow / Green			X	X
P/GC	M	1	2+	X			Frequent - Occasional	X	Bees, Butterflies	Yellow			X	X
P/GC	M	1	2+	X			Frequent - Occasional		Bees	Yellow		X	X	X

CALIFORNIA WALNUT WOODLAND

California walnut woodland (WW) (Walnut Woodland Association):
Walnut woodlands are found where soils are intermittently flooded and saturated, such as riparian corridors, floodplains, incised canyons, low-flow river and stream margins, seeps, stream and river banks, and terraces. WW also favor rarely flooded north-facing slopes, terraces, and flats. Its soils are generally fine-textured, shale-derived, and deep.

- Very rare in LA River watershed due to urbanization.
- Requires well draining soils that may be seasonally flooded.
- Typically found in stream beds, moist areas, or north-facing slopes.

Figure 248. ***Juglans californica.*** Source: Consultaplantas, https://commons.wikimedia.org/w/index.php?curid=44978241.
Figure 249. ***Sambucus nigra ssp. caerulea.*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=1953423.
Figure 250. ***Heteromeles arbutifolia.*** Source: Miguel Vieira, https://commons.wikimedia.org/w/index.php?curid=19525268.
Figure 251. ***Salvia leucophylla.*** Source: John Rusk, https://www.flickr.com/photos/john_d_rusk/9309081263.
Figure 252. ***Malacothamnus fasciculatus.*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=1113761.
Figure 253. ***Asclepias fascicularis.*** Source: Jim Morefield, https://www.flickr.com/photos/127605180@N04/15966683860.
Figure 254. ***Achillea millefolium var. californicum.*** Source: Dcrjsr, https://commons.wikimedia.org/w/index.php?curid=16059528.
Figure 255. ***Calystegia macrostegia ssp. arida.*** Source: OLIN, 2017.
Figure 256. ***Solidago californica.*** Source: Stickpen, https://commons.wikimedia.org/w/index.php?curid=8092464.


Juglans californica


Sambucus nigra ssp. caerulea


Heteromeles arbutifolia


Salvia leucophylla


Malacothamnus fasciculatus


Asclepias fascicularis


Achillea millefolium var. californicum


Calystegia macrostegia ssp. arida


Solidago californica

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES							
Juglans californica var. californica	California walnut	3-9	B, E, F	+ ^ !	FS / PS	6	
Quercus agrifolia var. agrifolia	Coast live oak	1-9	A, B, C	+ ^	FS	8	
Sambucus nigra ssp. caerulea	Mexican elderberry	1-9	C, E, F	+ ^ ~ o	FS	6	
SHRUBS							
Heteromeles arbutifolia	Toyon	1-9	A, B, C, E, F	+ ^ !	FS / PS	6	
Lonicera subspicata var. denudata	Chaparral honeysuckle	1-9	A, B		FS	2	
Malacothamnus fasciculatus	Chaparral bush mallow	1-9	A	+ !	FS	4	
Mimulus aurantiacus	Bush monkey flower	1-9	A, B, C		FS / PS	2	
Prunus ilicifolia ssp. ilicifolia	Hollyleaf cherry	5-9	A, B, C	+ !	FS / PS	4	
Rhamnus ilicifolia	Hollyleaf redberry	5-9	A, B, C	+ !	All	5	
Rhus ovata	Sugar bush	1-9	A, C	+ * !	FS / PS	6	
Ribes aureum var. gracillimum	Golden currant	3-9	A, B, C, E, F		FS / PS	3	
Salvia leucophylla	Purple sage	1-9	A, C, D	+ * !	FS	5	
Salvia mellifera	Black sage	1-9	A, C, D	+ !	FS	4	
PERENNIALS							
Asclepias fascicularis	Narrow-leaved milkweed	1-9	C, E, F, G	+	FS / PS	3	
Corethrogyne filaginifolia var. filaginifolia	California aster	1-9	A, B		FS	2	
Dryopteris arguta	Coastal wood fern	1-9	E, F, G	o	PS / FS	1	
Eriophyllum confertiflorum	Golden yarrow	1-9	A, B, C	+	FS / PS	1	
Eschscholzia californica	California poppy	1-9	C, D		FS / PS	1	
Malacothrix saxatilis	Cliff aster	1-9	A, B, C, D	+	FS	1	
Sisyrinchium bellum	Blue-eyed grass	1-9	E, F, G	o	FS / PS	1	
Thalictrum fendleri var. polycarpum	Meadow rue	6-9	B, F, G	o	PS / FS	2	
GRASSES							
Bromus carinatus var. carinatus	California brome	1-9	A, B, C, E, F, G	* !	FS / PS	1	
Elymus condensatus	Giant wild rye	1-9	A, B, C, E		All	2	
Elymus glaucus ssp. glaucus	Blue wild rye	1-9	A, B, C, E, F, G	+	All	3	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
T-D	L	15-25	20	X	X		Dominant	X	Birds	Yellow		X		
T	VL / L	40	40	X	X		Subdominant	X	Birds, Butterflies	Yellow		X		
T-D	L	15	20	X	X		Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream		X	X	
S/T	VL	8-15	15	X			Subdominant	X	Birds, Bees	White			X	
V/S	L	climbs					Occasional	X	Birds	Yellow/Cream		X	X	
S	VL	6	6+		X		Frequent - Occasional	X	Birds, Butterflies	White + Pink		X	X	
S	VL	2	2	X		X	Frequent	X	Birds, Butterflies, Bees	Orange/Yellow	X	X	X	
S	VL	6-12	6-12	X			Frequent	X	Birds, Butterflies, Bees	Cream	X	X		
S	VL	6	6	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream	X	X		
S	VL	8-10	15	X	X		Frequent - Occasional	X	Birds	Pink/White	X	X		
S-D	VL	6-8	6-8	X	X	X	Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream	X	X		
S	VL	5	6-8	X	X		Occasional	X	Birds, Butterflies, Bees	Lavender/Purple		X	X	
S	VL	4	6	X	X	X	Occasional	X	Birds, Butterflies, Bees	Lavender/White	X	X	X	
P-D	VL	3	2+		X		Occasional	X	Birds, Butterflies	White, Lavender			X	X
P	L	1-3	1-3	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Purple/Pink/White	X			
P	L	1-2	2+		X		Occasional							
P	VL	2	1-3			X	Frequent - Occasional	X	Bees, Butterflies	Yellow		X	X	X
A/P-D	VL	1	1-2		X		Occasional	X	Birds, Butterflies, Bees	Orange / Yellow		X		
P	M	1-2	1-2				Occasional		Bees, Butterflies	White	X		X	X
P-D	L	1	1				Frequent	X	Butterflies	Purple	X	X		
P	M	2	2				Occasional	X		Yellow		X	X	
G/P/GC	(Not Listed)	1.5-3	1+				Occasional	X	Butterflies	Yellow		X		
G/P/GC	L	4-5	3+	X			Occasional	X	Butterflies					
G/P/GC	L	1.5-3	1+				Frequent - Occasional	X	Butterflies					

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
GRASSES (continued)							
Stipa lepida	Foothill needlegrass	1-9	A, B, C, D		FS / PS	1	
Stipa pulchra	Purple needlegrass	1-9	A, B, C, E	*!	FS / PS	1	
SUCCULENTS							
Opuntia littoralis	Coastal prickly pear	1-9	A		FS	3	
VINES							
Calystegia macrostegia ssp. arida	Southern California morning glory	3-9	B		FS / PS	1	
Calystegia macrostegia ssp. intermedia	Island morning glory	1-5	A, B		FS / PS	1	
Clematis ligusticifolia	Virgin's bower	3-9	B, E, F, G	o	FS / PS	2	
GROUNDCOVERS							
Achillea millefolium var. californicum	Yarrow	1-9	A, B, C, D, E, F	!	FS / PS	1	
Carex praegracilis	Slender sedge	1-9	D, E, F, G	o	FS / PS	1	
Elymus triticoides	Creeping wild rye	1-9	B, E, F, G	!	All	2	
Euthamia occidentalis	Western goldenrod	3-9	E, F, G	o	FS / PS	1	
Solidago californica	California goldenrod	3-9	A, B, F, G	o	FS / PS	1	
Solidago confinis	Southern goldenrod	3-9	E, F, G	o	FS / PS	1	
Symphoricarpos mollis	Creeping snowberry	3-9	B, E	!	PS / FS	2	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
G/P/GC	VL	2	2		X		Occasional	X						
G/P/GC	VL	2	2		X		Occasional	X	Butterflies	Cream		X		
SC	VL	3	3+		X		Frequent - Occasional	X	Birds	Orange / Yellow		X		
V/P	L	climbs		X			Frequent - Occasional		Bees	White	X	X	X	
V/P	L	climbs		X	X		Frequent - Occasional	X	Bees	Pink/White	X	X	X	
V-D	L	climbs		X			Occasional	X		Cream			X	
P/GC	L	.5-2	3	X	X		Occasional	X	Birds, Butterflies, Bees	White		X	X	
P/GC	M	.5-1	2+	X			Occasional	X						
G/P/GC	L	2	2+	X			Occasional	X	Butterflies					
P/GC	L	2-4	2+	X			Frequent - Occasional	X		Yellow / Green			X	X
P/GC	M	1	2+	X			Frequent - Occasional	X	Bees, Butterflies	Yellow			X	X
P/GC	M	1	2+	X			Frequent - Occasional		Bees	Yellow		X	X	X
S-D/GC	L	2	2+	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Pink		X	X	

PERENNIAL FRESHWATER EMERGENT WETLAND

Perennial freshwater emergent wetland (PFEW):
This community thrives in lowland areas distinguished by year-round saturated soils and shallow standing water. Historically, such areas appeared along the path of former channels within the floodplain, but 90% of this habitat type in California has since been destroyed. Herbaceous plants such as grasses, reeds, sedges, rushes, cattails, and bulrush predominate. Many of these are rhizomatous, reproducing asexually underground rather than by seed. The herbaceous vegetation tends to appear in dense clumps, with trees and shrubs accounting for less than 10% of plant cover. Soils are deep, built up from sediment deposition by slow-moving waters, and can be peaty.

- Requires saturated soils or shallow standing water.
- Typically found along the margins of lakes and reservoirs.
- Restoration efforts are needed.

Figure 257. ***Salix exigua.*** Source: Thayne Tuason, https://commons.wikimedia.org/wiki/File:Salix_exigua_var._exigua_4.jpg
Figure 258. ***Baccharis salicifolia.*** Source: Krzysztof Ziarnek, Kenraiz, https://commons.wikimedia.org/w/index.php?curid=54913701.
Figure 259. ***Cyperus eragrostis*** Source: Krzysztof Ziarnek, Kenraiz, https://commons.wikimedia.org/wiki/Category:Cyperus_eragrostis#/media/File:Cyperus_eragrostis_kz03.jpg.
Figure 260. ***Typha latifolia.*** Source: R. A, Nonenmacher, https://commons.wikimedia.org/wiki/File:Typha_latifolia_7642.jpg
Figure 261. ***Bolboschoenus maritimus.*** Source: Stefan Lefnaer, https://commons.wikimedia.org/wiki/File:Bolboschoenus_maritimus_s._str._sl5.jpg.
Figure 262. ***Schoenoplectus californicus.*** Source: Forest and Kim Starr, https://upload.wikimedia.org/wikipedia/commons/2/2a/Burr_Marigold_Bidens_Laevis_%28237189541%29.jpeg
Figure 263. ***Bidens laevis.*** Source: Suzanne Antonia, https://commons.wikimedia.org/wiki/File:Burr_Marigold_Bidens_Laevis_(237189541).jpeg.
Figure 264. ***Sparganium eurycarpum.*** Source: Tom Koerner, https://commons.wikimedia.org/wiki/File:Bur-reed_(Sparganium_eurycarpum)_Sand_Lake_Wetland_Management_District_01_(14385334072).jpg#filelinks.
Figure 265. ***Artemisia douglasiana.*** Source: Römert, https://commons.wikimedia.org/w/index.php?curid=19802958.


Salix exigua

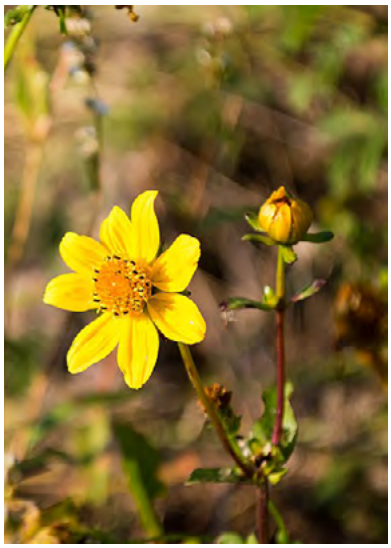

Baccharis salicifolia


Cyperus eragrostis


Typha latifolia


Bolboschoenus maritimus


Schoenoplectus californicus


Bidens laevis


Sparganium eurycarpum


Artemisia douglasiana

PERENNIAL FRESHWATER EMERGENT WETLAND

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES							
Alnus rhombifolia	White alder	2-9	G	+ ^ ~ o	All	6	
Populus fremontii ssp. fremontii	Fremont cottonwood	1-9	F, G	+ ^ ~ o	FS	8	
Populus trichocarpa	Black cottonwood	1-9	F, G	+ ^ ~ o	FS	8	
Salix gooddingii	Black willow	1-9	F, G	+ ^ ~ o	FS	6	
Salix laevigata	Red willow	1-9	F, G	+ ^ ~ o	FS / PS	6	
Sambucus nigra ssp. caerulea	Mexican elderberry	1-9	C, E, F	+ ^ ~ o	FS	6	
SHRUBS							
Baccharis salicifolia	Mulefat	2-9	F, G	^ ~ o	All	3	
Salix exigua	Sandbar willow	2-9	F, G	^ ~ o	FS	6	
Salix lasiandra	Shining willow	1-9	F, G	+ ^ ~ o	FS / PS	5	
Salix lasiolepis	Arroyo willow	1-9	G	+ ^ ~ o	FS / PS	5	
PERENNIALS							
Alisma triviale	Water plantain	2-9	G	~ o	FS / PS	1	
Artemisia douglasiana	Mugwort	1-9	A, B, C, E, F	! ~ o	All	3	
Bidens laevis	Bur marigold	2-9	F, G	+ ~ o	FS	1	
Equisetum hymale	Scouring rush	1-9	F,G	~ o	PS	2	
Sparganium eurycarpum	Broadfruit bur-reed	2-9	G	~ o	FS / PS	3	
Typha latifolia	Broadleaf cattail	2-9	G	! ~ o	FS	1	
GRASSES							
Bolboschoenus maritimus	Alkali bulrush	2-9	G	~ o	FS	1	
Carex fracta	Fragile-sheathed sedge	5-9	F, G	~ o	FS / PS	2	
Carex senta	Swamp carex	5-9	F, G	~ o	PS	2	
Carex spissa	San Diego sedge	1-9	F, G	~ o	FS	2	
Cyperus eragrostis	Tall flatsedge	2-9	G	o	FS	1	
Eleocharis macrostachya	Common spikerush	1-9	F,G	~ o	FS	2	
Elymus glaucus ssp. glaucus	Blue wild rye	1-9	A, B, C, E, F, G	+	All	3	
Juncus balticus	Wire rush	2-9	G	~ o	PS	1	
Juncus macrophyllus	Long-leaved rush	5-9	F, G	~ o	PS	2	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
T	H	20-30	20-30				Occasional	X	Birds, Butterflies	Green / Cream			X	X
T-D	M	30	35				Occasional	X	Birds, Butterflies	Cream	X	X		
T-D	M	30	30+				Frequent - Occasional	X	Birds, Butterflies	Yellow	X	X		
T-D	H	25	25				Frequent	X	Birds, Butterflies, Bees	Green	X	X		
T-D	H	15-20	15-20				Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow	X	X		
T-D	L	15	20	X	X		Frequent - Occasional	X	Birds, Butterflies, Bees	Yellow/Cream		X	X	
S	H	4-8	6-10	X	X		Occasional	X	Bees, Butterflies	White/Pink/White	X	X	X	X
S-D	H	10-25	10-12	X	X		Subdominant	X	Birds, Butterflies, Bees	Yellow	X	X		
S/T-D	H	15	15				Dominant	X	Birds, Butterflies, Bees	Yellow		X		
S/T-D	H	15	15	X			Frequent - Occasional	X	Birds, Butterflies, Bees	Cream	X	X		
P	(Not Listed)	2-3	1.5-2				Occasional		Butterflies	White			X	
P	M	3-5	3+	X	X		Frequent	X	Birds, Butterflies	Yellow / Cream		X	X	X
P	M	2-3	1-2				Occasional							
P	H	3	3+				Frequent	X	Birds					
P	(Not Listed)	4-6	2-3				Occasional		Butterflies	Green			X	
P	(Not Listed)	4-6	4-6		X		Dominant							
G/P/GC	(Not Listed)	3	2+				Dominant	X	Butterflies					
G/P/GC	(Not Listed)	1.5-3	1.5-3				Occasional		Butterflies					
G/P/GC	(Not Listed)	1.5-3	1.5-3				Occasional		Butterflies	Green		X		
G/P/GC	M	2-4	2-4				Occasional	X	Butterflies	Brown/Green/Yellow		X		
G/P/GC	H	2	30				Frequent	X		Green / Yellow		X	X	X
G/P/GC	H	1.5-3	2+				Frequent	X	Birds, Butterflies					
G/P/GC	L	1.5-3	1+				Frequent - Occasional	X	Butterflies					
G/P/GC	(Not Listed)	3	0.5-1		X		Frequent							
G/P/GC	(Not Listed)	3	2+				Occasional							

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
GRASSES (continued)							
Juncus xiphioides	Iris-leaf rush	2-9	G	~	PS	1	
Schoenoplectus californicus	California bulrush	2-9	G	! ~ o	FS	6	
GROUNDCOVERS							
Anemopsis californica	Yerba mansa	2-3, 5-9	F, G	* o	FS / PS	1	
Carex praegracilis	Slender sedge	1-9	D, E, F, G	o	FS / PS	1	
Nasturtium officinale	Watercress	2-9	G	~	FS	1	

DESCRIPTIVE FEATURES

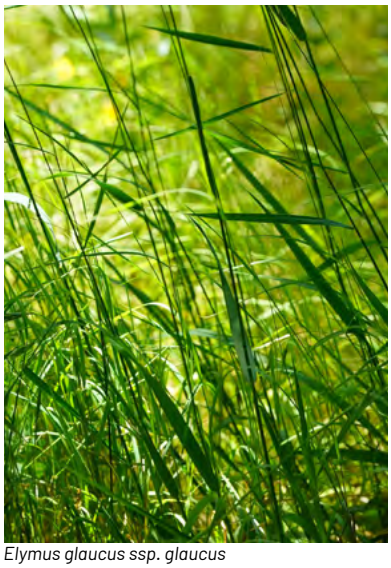
	PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	SHORTLIST PLANT	USACE NATIVE PLANT LIST	SEED LA TARGET LIST	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
												W	SP	SU	F
	G/P/GC	(Not Listed)	1-3	1-2		X		Frequent	X	Butterflies					
	G/P/GC	(Not Listed)	6-12	3+				Dominant	X	Butterflies	Brown		X		
	P	M	0.5-1	1+				Frequent	X		White / Cream / Red	X	X		
	P/GC	M	.5-1	2+	X			Occasional	X						
	P	(Not Listed)	0.5-2	3+				Frequent			White / Green		X	X	X

DRY MEADOW

Dry Meadow (DM):
The dry meadow is a community characterized by an open example of perennial bungrasses and annual and perennial wildflowers. Its extents have been greatly diminished in the LA River Watershed due to encroachment by agriculture, grazing, urbanization, and the invasion of exotic species. This community requires well-draining soils. This plant list includes examples of annual specials that would typically be found in dry meadows. Project-specific species lists and seed mixes can be developed with a qualified botanist or ecologist. Maintenance for yearly seed sowing and other measures specific to the dry meadow community must be planned before implementation. For example, weed management is crucial during the early development stages of this community.

- Requires well-drained soils.
- Seed sowing and additional maintenance specific to meadows is required.

Figure 266. ***Elymus glaucus ssp. glaucus.*** Source: Wild Bryde, https://www.inaturalist.org/photos/38822555.
Figure 267. ***Lotus scoparius (Acmispon glaber).*** Source: glmory, https://commons.wikimedia.org/w/index.php?curid=32092287.
Figure 268. ***Isocoma menziesii ssp. vernonioides.*** Source: Miguel Vieira, https://commons.wikimedia.org/w/index.php?curid=9389145.
Figure 269. ***Bromus carinatus.*** Source: Matt Lavin. https://www.flickr.com/photos/plant_diversity/3861052158.
Figure 270. ***Deinandra fasciculata.*** Source: Björn S. https://commons.wikimedia.org/wiki/File:Clustered_Tarweed_-_Deinandra_fasciculata_(41948547430).jpg.
Figure 271. ***Stipa cernua.*** Source: Kyle Nessen, https://www.inaturalist.org/photos/38751036.
Figure 272. ***Stipa lepida.*** Source: John Rusk, https://commons.wikimedia.org/w/index.php?curid=59287600.
Figure 273. ***Muhlenbergia rigens.*** Source: Krzysztof Ziarnek, Kenraiz, https://commons.wikimedia.org/w/index.php?curid=54450777.
Figure 274. ***Koeleria macrantha.*** Source: Matt Lavin. https://commons.wikimedia.org/wiki/File:Koeleria_macrantha_(3879657197).jpg.



Elymus glaucus ssp. glaucus

Lotus scoparius (Acmispon glaber)

Isocoma menziesii ssp. vernonioides

Bromus carinatus

Deinandra fasciculata

Stipa cernua

Stipa lepida

Muhlenbergia rigens

Koeleria macrantha

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
SHRUBS							
Atriplex lentiformis ssp. lentiformis	Saltbush	1-5	C, D, E	* !	FS	5	
Baccharis pilularis var. consanguinea	Coyote brush	1-5	A, C, D	* !	FS / PS	4	
Isocoma menziesii ssp. vernonioides	Goldenbush	1-9	A, C		FS / PS	2	
PERENNIALS							
Ambrosia psilostachya	Western ragweed	1-9	A, B, C	+ !	FS	1	
Bloomeria crocea	Common goldenstar	1-9	A, B, C	+	FS / PS	0.5	
Epilobium canum ssp. canum	Hoary California fuchsia	1-9	A, B	+	FS / PS	2	
Eschscholzia californica	California poppy	1-9	C, D		FS / PS	1	
Grindelia camporum	Great valley gumweed	1-9	A, B, C	+ !	FS	2	
Lotus scoparius (Acmispon glaber)	Deerweed	1-6, 9	A, C	+ *	FS	2	
Lupinus bicolor	Miniature lupine	1-9	A, B, C	+ !	FS	1	
Penstemon heterophyllus var. australis	Foothill penstemon	1-3; 6-9	A, B, C		FS / PS	1	
Pseudognaphalium canescens	Wright's cudweed	1-9	A, B, C	+	FS	0.5	
Sidalcea malviflora	Checker bloom	5-9	A, B, C, D		FS / PS	1	
Sisyrinchium bellum	Blue-eyed grass	1-9	E, F, G	o	FS / PS	1	
GRASSES							
Agrostis pallens	Seashore bent grass	1-9	A, B, C, E, F, G	!	FS / PS	1	
Bromus carinatus var. carinatus	California brome	1-9	A, B, C, E, F, G	* !	FS / PS	1	
Elymus glaucus ssp. glaucus	Blue wild rye	1-9	A, B, C, E, F, G	+	All	3	
Elymus trachycaulus	Slender wheatgrass	1-9	A, B, C, D		FS / PS	4	
Festuca californica	California fescue	1-9	A, B, C, D, E	!	FS / PS	3	
Hordeum brachyantherum ssp. californicum	California meadow barley	1-9	A, B, C, E, F, G		FS / PS	2	
Koeleria macrantha	Junegrass	1-9	A, B, C, D	+ *	FS / PS	1	
Melica californica	California melicgrass	5-9	A, B, C, D		FS / PS	1	
Muhlenbergia rigens	Deergrass	1-9	A, B, C, E, F		FS / PS	3	
Sporobolus airoides	Alkali sacaton	1-5	A, C, D	*	FS	2	
Stipa cernua	Nodding needlegrass	1-9	A, B, C, E		FS / PS	1	

DESCRIPTIVE FEATURES

	PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
									W	SP	SU	F
	S	VL	6-8	5-10	Occasional	X	Birds, Butterflies	Yellow/Brown			X	
	S	L	4-6	6-8	Occasional	X	Bees, Butterflies	Yellow/Cream	X	X	X	X
	S	VL	1-3	3	Occasional	X	Bees, Butterflies	Yellow		X	X	X
	P	(Not Listed)	3-7	1	Occasional	X	Butterflies, Bees	Green			X	X
	P	VL	1	0.5	Occasional	X		Yellow		X		
	P	VL	1-3	2-4	Occasional		Birds, Butterflies	Red			X	X
	A/P-D	VL	1	1-2	Occasional	X	Birds, Butterflies, Bees	Orange / Yellow		X		
	P	VL	2-6	3	Frequent - Occasional	X	Butterflies	Yellow		X	X	X
	P	VL	3	3	Frequent - Occasional	X	Bees, Butterflies	Yellow	X	X	X	
	P	(Not Listed)	0.25-1	1	Frequent - Occasional	X	Birds, Butterflies, Bees	Blue/Lavender/White		X		
	P	L	1	1	Occasional	X	Birds, Butterflies, Bees	Purple/Blue		X	X	
	P	(Not Listed)	3	0.5	Occasional		Butterflies, Bees	Cream/Yellow/Brown			X	X
	P	L	0.3-1.5	0.5	Occasional	X	Birds, Butterflies	Pink		X	X	
	P-D	L	1	1	Frequent - Occasional	X	Butterflies	Purple		X		
	G/P/GC	(Not Listed)	0.33-2.3	2	Frequent	X	Butterflies	Green		X		
	G/P/GC	(Not Listed)	1.5-3	1+	Frequent	X	Butterflies	Yellow		X		
	G/P/GC	L	1.5-3	1+	Occasional	X	Butterflies					
	G/P/GC	(Not Listed)	3-5	3+	Occasional	X	Butterflies	Yellow		X		
	G/P/GC	L	1.3-4	3	Frequent	X	Butterflies	Yellow	X	X		
	G/P/GC	L	1.5-4	1+	Frequent	X	Butterflies	Yellow		X		
	G/P/GC	L	1-2	1	Frequent	X	Butterflies					
	G/P/GC	L	1-4.3	1	Frequent	X	Butterflies	Yellow/Purple			X	
	G/P/GC	L	1-2	4	Occasional	X	Birds					
	G/P	L	3-4	2	Occasional	X	Butterflies					
	G/P/GC	VL	2	2	Occasional	X						

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
GRASSES (continued)							
Stipa coronatum	Giant stipa	1-9	A, E, F		FS / PS	2	
Stipa lepida	Foothill needlegrass	1-9	A, B, C, D		FS / PS	1	
Stipa pulchra	Purple needlegrass	1-9	A, B, C, E	*!	FS / PS	1	
GROUNDCOVERS							
Achillea millefolium var. californicum	Yarrow	1-9	A, B, C, D, E, F	!	FS / PS	1	
Salvia spathacea	Hummingbird sage	1-9	B, C, E		PS / FS	2	
ANNUALS							
Achyrachaena mollis	Blow wives	1-9	A, B, C	~ o	FS	0.5	
Ambrosia acanthicarpa	Annual bursage	1-9	A, B, C	o	FS / PS	1	
Apiastrum angustifolium	Mock parsley	1-9	A, B, C	~ o	FS	0.5	
Camissoniopsis bistorta	California sun cup	1-9	A, B, C	~	FS	0.5	
Chaenactis glabriuscula	Yellow pincushion	1-9	A, B, C	! ~ o	FS	1	
Cryptantha intermedia	Common cryptantha	1-9	A, B, C	* o	FS	0.5	
Deinandra fasciculata	Clustered tarweed	1-9	A, B, C	~	FS	1.5	
Lasthenia californica	California goldfields	1-9	A, B, C		FS / PS	0.5	
Layia platyglossa	Coastal tidy tips	1-9	A, B, C		FS	2	
Lepidium nitidum	Peppergrass	1-9	A, B, C		FS	0.5	
Phacelia stellaris	Brand's star phacelia	1-6	A, B, C		FS	0.5	

DESCRIPTIVE FEATURES

	PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
									W	SP	SU	F
	G/P/GC	(Not Listed)	2-4	1-2	Occasional	X						
	G/P/GC	VL	1-1	2	Occasional	X						
	G/P/GC	VL	1-1	2	Occasional	X	Butterflies	Cream		X		
	P/GC	L	0.5-2	3	Occasional	X	Birds, Butterflies, Bees	White		X	X	
	P/GC	L	1	3+	Occasional	X	Birds, Butterflies, Bees	Red/Pink	X	X	X	
	A	(Not Listed)	1-1.5	0.5	Occasional	X		White		X		
	A	(Not Listed)	3-5	1	Occasional	X	Butterflies, Bees	Cream			X	X
	A	(Not Listed)	1.5	0.25	Occasional			White		X		
	A	(Not Listed)	1-2	1-2	Occasional	X	Butterflies	Yellow		X		
	A	(Not Listed)	1.5	0.5	Occasional		Bees	Yellow	X	X	X	
	A	(Not Listed)	0.25-1.5	0.25	Occasional		Butterflies, Bees	White/Yellow		X		
	A	(Not Listed)	3	2	Frequent	X	Butterflies, Bees	Yellow		X	X	X
	A	(Not Listed)	0.5-1.5	0.5	Occasional	X	Butterflies, Bees	Yellow	X	X		
	A	(Not Listed)	0.5-2	0.5-2	Frequent	X	Butterflies	Yellow	X	X		
	A	(Not Listed)	1	0.5	Occasional		Butterflies	White		X		
	A	(Not Listed)	0.25-1	0.25	Occasional		Butterflies, Bees	Lavender		X		

DESERT SCRUB

Desert Creosote Bush Scrub (DS):
The Desert Creosote Bush Scrub is not a community currently native to the LA River watershed, but is native to the low-lying deserts in southeastern California (below 3500 ft). With increased temperatures and more frequent weather extremes, including drought, the plants from this list may perform well in the urban conditions of the LA River corridor. However, this list is not intended to replace the use of California natives currently adapted to Los Angeles but rather lists examples of species that will tolerate increasing temperatures.

- Requires well-drained soils, can tolerate alkaline soils and salt.
- Tolerant of a wide range of temperatures, including intense heat.

Figure 275. ***Parkinsonia florida.*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=344153.
Figure 276. ***Quercus wislizeni.*** Source: Krzysztof Ziarnek, Kenraiz, https://commons.wikimedia.org/wiki/File:Quercus_wislizeni_kz3.jpg.
Figure 277. ***Atriplex canescens.*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=4269398.
Figure 278. ***Calliandra eriophylla.*** Source: Chris English, https://commons.wikimedia.org/w/index.php?curid=56261079.
Figure 279. ***Fallugia paradoxa.*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=3929255.
Figure 280. ***Larrea tridentata.*** Source: Andrey Zharkikh, https://commons.wikimedia.org/w/index.php?curid=60781561.
Figure 281. ***Encelia farinosa.*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=204952.
Figure 282. ***Sphaeralcea ambigua.*** Source: Stan Shebs, https://commons.wikimedia.org/w/index.php?curid=8563714.
Figure 283. ***Abutilon palmeri.*** Source: Ken-ichi Ueda, https://www.inaturalist.org/photos/27181425?size=large.

Parkinsonia florida

Quercus wislizeni

Atriplex canescens

Calliandra eriophylla

Fallugia paradoxa

Larrea tridentata

Encelia farinosa

Sphaeralcea ambigua

Abutilon palmeri

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES							
Celtis laevigata var. reticulata	Western hackberry	1-9	C, D, E	^ *	FS / PS	6	
Chilopsis linearis	Desert willow	3-9	C, D, E	+ ^ *	FS	6	
Parkinsonia florida	Blue palo verde	3-9	C, D, E	^ *	FS	6	
Quercus wislizeni	Interior live oak	3-9	C, D, E	^ *	FS	10	
SHRUBS							
Atriplex canescens	Four-wing saltbush	1-9	C, D, E	+ *	FS	4	
Baccharis sarothroides	Broom baccharis	1-9	A, C, D, E	* !	FS	4	
Calliandra eriophylla	Fairy duster	3-9	C, D, E, F	+ *	FS	2	
Encelia actoni	Acton brittlebush	1-9	A, C, D	*	FS	3	
Encelia farinosa	Brittlebush	3-9	A, C, D, E	+ * !	FS	2	
Ephedra viridis	Mountain ephedra	3-9	A, C, D, E	*	FS / PS	3	
Ericameria nauseosa	Rabbitbrush	3-9	A, C, D, E	+ *	FS	4	
Eriogonum fasciculatum var. foliolosum	Leafy California buckwheat	1-9	A, C	+ !	FS / PS	3	
Eriogonum fasciculatum var. polifolium	Interior California buckwheat	3-9	A, C	+ * !	FS / PS	3	
Fallugia paradoxa	Apache plume	3-9	A, C, D	* !	FS / PS	3	
Frangula californica ssp. californica	California coffeeberry	1-9	A, B, C, D	* !	All	6	
Hyptis emoryi	Desert lavender	3-9	C, D, E	*	FS	6	
Isomeris arborea	Bladder pod	1-9	A, C, D, E	+ * !	FS	3	
Justicia californica	Chuparosa	3-9	C, D, E	* !	FS	2	
Larrea tridentata	Creosote bush	3-9	C, D, E	*	FS	4	
Lupinus excubitus	Grape soda lupine	1-9	C, D, E	+ *	FS	4	
Lycium andersonii	Water jacket	1-9	A, C, D, E	*	FS	4	
Peritoma arborea	Bladderpod	1-9	A, B, C	+ !	FS / PS	4	
Prosopis glandulosa	Honey mesquite	3-9	C, D, E, F	+ ^ *	FS	6	
Salvia apiana	White sage	3-9	A, C, D	+ !	FS	3	
Scutellaria mexicana	Mexican bladdersage	3-9	C, D, E	*	FS / PS	1	

DESCRIPTIVE FEATURES

	PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	LA LEVEL III ECOREGION	ADJACENT LEVEL III ECOREGION	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
											W	SP	SU	F
	T-D	L	20-40	20-40	Occasional	X		X		Cream		X		
	T-D	VL	25	25	Occasional	X		X	Birds, Butterflies, Bees	White + Pink		X	X	
	T	VL	25	20	Occasional	X		X	Birds, Bees	Yellow		X		
	T-D/S	VL	15-50	10-50	Occasional	X	X		Birds, Butterflies	Cream/Green	X	X		
	S	VL	1-10	3-7	Frequent - Occasional	X	X	X	Birds, Butterflies	Yellow/Green		X	X	
	S	VL	1-12	6	Occasional	X	X	X	Birds, Butterflies, Bees	Cream			X	
	S	VL	1-3	3	Occasional	X		X	Birds, Butterflies, Bees	Pink/Purple	X	X		
	S	VL	5	5	Frequent - Occasional	X	X	X	Bees	Yellow		X	X	X
	S	VL	1-5	4	Occasional	X	X	X	Bees	Yellow	X	X		
	S	VL	3-5	3-5	Frequent - Occasional	X	X			Yellow		X		
	S	(Not Listed)	3-9	3-9	Occasional	X		X	Bees, Butterflies	Yellow			X	X
	S	VL	3-5	2-6	Occasional	X	X	X	Birds, Butterflies, Bees	Red/Cream			X	
	S	VL	3-5	2-6	Occasional	X	X	X	Birds, Butterflies, Bees	Pink/Cream			X	
	S	VL	3-6	6	Frequent - Occasional	X		X		Lavender/Pink/White/ Green		X		
	S	VL	8	12	Occasional	X	X		Birds, Butterflies, Bees	Cream		X	X	
	S	VL	6-12	8	Occasional	X		X		Lavender/Blue	X	X		
	S	VL	1-6	6	Occasional	X	X	X	Birds, Butterflies, Bees	Yellow	X	X		
	S	VL	2-4	4	Occasional			X	Birds, Butterflies, Bees	Red/Yellow		X		
	S	VL	3-12	6-12	Dominant	X		X	Bees	Yellow		X		
	S	L	7	7	Occasional	X	X	X	Birds, Butterflies, Bees	Purple/White		X	X	
	S	VL	6	6	Occasional	X		X	Birds	Cream		X		
	S	VL	3-5	5	Occasional	X	X	X	Birds, Butterflies, Bees	Yellow/Green	X	X		
	T-D/S	L	20-30	30	Occasional	X		X	Butterflies	Yellow		X	X	
	S	VL	3	3-5	Occasional	X	X		Birds, Butterflies, Bees	White	X	X	X	
	S	(Not Listed)	1-3	1-3	Occasional			X	Bees	Purple		X	X	

SPECIES		SITING + PERFORMANCE					
BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
SHRUBS (continued)							
Simmondsia chinensis	Jojoba	1-9	A, C, D, E	+ * !	FS	4	
Sphaeralcea ambigua	Apricot mallow	1-9	A, C, D, E	*	FS	1	
Tecoma stans	Yellow bells	1-9	A, C, D, E	* !	FS	6	
PERENNIALS							
Abutilon palmeri	Palmer's Indian mallow	1-9	A, C, D	*	FS	2	
Asclepias erosa	Desert milkweed	3-9	A, C, D	+ *	FS	1	
Romneya coulteri	Coulter's Matilija poppy	1-9	A, C, D, E	*	FS	3	
GRASSES							
Aristida purpurea	Purple three awn	1-9	A, C, D, E	*	FS	1	
Bouteloua gracilis	Blue Grama	3-9	A, C, D, E	*	FS / PS	1	
Sporobolus airoides	Alkali sacaton	1-5	A, C, D	*	FS	2	
Stipa hymenoides	Indian ricegrass	3-9	A, C, D	*	FS	1	
Stipa speciosa	Desert needlegrass	3-9	A, C, D, E	*	FS	1	
SUCCULENTS							
Agave deserti	Desert agave	3-9	A, C, D	*	FS	3	
Fouquieria splendens	Ocotillo	3-9	A, C, D, E	*	FS	3	
Opuntia basilaris	Beaver tail	3-5, 9	A, C	*	FS	2	
Yucca schidigera	Mojave yucca	1-9	A, C, D	*	FS	3	
VINES							
Vitis girdiana	Desert grape	3-9	G	o	All	2	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	OCCURRENCE IN COMMUNITY	OFTEN AVAILABLE IN CA	LA LEVEL III ECOREGION	ADJACENT LEVEL III ECOREGION	POLLINATOR HABITAT	BLOOM COLOR	BLOOM SEASON			
										W	SP	SU	F
S	VL	3-7	4-7	Occasional	X		X	Birds	Cream		X		
S	L	3-5	2-4	Frequent - Occasional	X	X	X	Bees, Butterflies	Red/Orange	X	X		
S	L	15-20	15-20	Occasional	X			Birds, Bees	Yellow			X	X
P	L	3-8	3-5	Occasional	X	X	X	Butterflies	Yellow/Orange		X		
P	VL	3	1	Occasional		X	X	Birds, Butterflies	Cream		X	X	X
P	VL	6-8	6-8	Frequent	X	X		Bees, Butterflies	White/Yellow		X	X	
G/P/GC	VL	1-3	2	Frequent - Occasional	X	X	X						
G/P/GC	L	.5-2	2	Occasional	X	X	X	Butterflies	Yellow/Tan			X	
G/P	L	3-4	2	Occasional	X	X	X	Butterflies					
G/P	VL	1.2-2.3	1.5	Occasional	X	X	X	Butterflies	Yellow		X		
G/P/GC	(Not Listed)	1-2	1	Frequent		X	X						
SC	(Not Listed)	1-20	3	Occasional	X		X	Butterflies	Yellow		X	X	
S/SC	VL	10-20	15	Occasional	X		X	Birds	Red		X	X	
SC	VL	1-2	2	Occasional		X	X		Pink		X		
SC	VL	1-16	5	Occasional	X	X	X	Birds, Butterflies	Cream		X		
V/S-D	L	climbs		Occasional	X	X	X	Birds	Green		X		

CLIMATE-ADAPTED TREES

Climate Adapted Trees (CT):
The following list provides options for both California native and non-native, non-invasive tree species when more species diversity is desired. However, planting the native trees from the prior lists in this chapter is encouraged wherever possible. These trees have also been selected for their ability to survive in often harsh urban conditions and are often tolerant of both smog and heat. If a project is an urban-wildland interface area, the use of non-native species is not encouraged.

- Useful at gateways for visual impact or additional shade.
- Can tolerate the harsh urban environment.
- Additional species can be considered on a per-project basis.

Figure 284. ***Cercis occidentalis.*** Source: Stan Shebs, https://commons.wikimedia.org/wiki/File:Cercis_occidentalis_1.jpg.
Figure 285. ***Chilopsis linearis.*** Source: Krzysztof Ziarnek, Kenraiz, https://commons.wikimedia.org/w/index.php?curid=54448559.
Figure 286. ***Chitalpa tashkentensis.*** Source: Frau Siebenschläfer, https://commons.wikimedia.org/w/index.php?curid=15746538.
Figure 287. ***Hesperocyparis forbesii.*** Source: Consultaplantas, https://commons.wikimedia.org/wiki/File:Cupressus_forbesii_1c.JPG.
Figure 288. ***Lyonothamnus floribundus ssp. asplenifolius.*** Source: J Brew, https://commons.wikimedia.org/w/index.php?curid=15394974.
Figure 289. ***Pinus torreyana.*** Source: Richard O. Barry, https://en.m.wikipedia.org/wiki/File:Pinus_torreyana_at_State_Reserve.jpg
Figure 290. ***Quillaja saponaria.*** Source: Daderot, https://commons.wikimedia.org/w/index.php?curid=37387713.
Figure 291. ***Quercus douglasii.*** Source: Yath, https://commons.wikimedia.org/wiki/File:Large_Blue_Oak.jpg.
Figure 292. ***Tipuana tipu.*** Source: Daniel Ventura, https://commons.wikimedia.org/w/index.php?curid=2246165.

Cercis occidentalis

Chilopsis linearis

Chitalpa tashkentensis

Hesperocyparis forbesii

Lyonothamnus floribundus ssp. asplenifolius

Pinus torreyana

Quillaja saponaria

Quercus douglasii

Tipuana tipu

SPECIES

SITING + PERFORMANCE

BOTANICAL NAME	COMMON NAME	FRAMES FOR BEST PERFORMANCE	CONSTRUCTED CONTEXTS	APPLICATIONS	SUN EXPOSURE	SETBACK FROM PAVEMENT (FEET)	
TREES							
Arbutus 'Marina'	Marina madrone	1-9	C, D, E	+ *	FS	15	
Calocedrus decurrens	Incense Cedar	3-9	A, B, C, D	+	FS / PS	15	
Cercis occidentalis	Western redbud	3-9	B, C, E	+ ^	FS / PS	5	
Chilopsis linearis	Desert willow	3-9	C, D, E	+ ^ *	FS	4-6	
Chitalpa tashkentensis	Chitalpa	1-9	C, D, E	^ *	FS / PS	6-8	
Cordia boissieri	Texas Wild Olive	1-9	A, C, D, E	^ *	FS	6-8	
Cupressus arizonica	Arizona cypress	3-9	A, C, D	*	FS / PS	10	
Dalbergia sissoo	Indian rosewood	3-9	A, C, D, E	* !	FS / PS	10	
Forestiera neomexicana	Desert olive	1-9	A, B, C, D, E	+ ^ *	FS	6-8	
Hesperocyparis forbesii	Tecate cypress	3-9	C, D	+ * !	FS	10	
Laurus nobilis	Sweet Bay	1-9	A, C, D, E	^ *	FS / PS	6-8	
Lophostemon confertus	Brisbane Box	1-5	C, E, F	^	FS / PS	6-8	
Lyonothamnus floribundus ssp. asplenifolius	Ironwood	1-5	B, C, E	^	FS / PS	6-8	
Olneya tesota	Desert ironwood	3-9	C, D, E	+ *	FS	6-8	
Pinus canariensis	Canary Island pine	1-9	A, B, C, D	*	FS / PS	5	
Pinus coulteri	Coulter pine	3-9	A, B, C	+	FS / PS	6-8	
Pinus eldarica	Eldarica pine	1-9	C, D, E	^ *	FS	6-8	
Pinus halepensis	Aleppo pine	1-9	A, B, C, D, E	*	FS	6-8	
Pinus muricata	Bishop pine	1-9	A, B, C, D, E	*	FS / PS	10	
Pinus pinea	Stone pine	1-9	A, B, C, D, E	^ *	FS	15	
Pinus torreyana	Torrey pine	1-9	A, B, C	+	FS / PS	10	
Quercus chrysolepis	Canyon live oak	1-9	A, B, C, D, E	+ ^	FS / PS	15	
Quercus douglasii	Blue Oak	3-9	A, B, C, D, E	+ ^	FS / PS	10	
Quillaja saponaria	Soapbark tree	1-9	C, D, E	^ *	FS / PS	10	
Searsia lancea	African sumac	1-9	C, D, E	^ * !	FS	10	
Tipuana tipu	Tipu tree	1-9	C, D, E	^ *	FS / PS	15	
Vitex agnus-castus	Chaste tree	1-9	A, B, C, D, E	^ *	FS	5	

DESCRIPTIVE FEATURES

PLANT FORM	WATER USE (WUCOLS IV)	MATURE HEIGHT (FEET)	MATURE WIDTH (FEET)	LA LEVEL III ECOREGION	ADJACENT LEVEL III ECOREGION	BLOOM COLOR	BLOOM SEASON			
							W	SP	SU	F
T	M	25-40	50			Pink			X	
T	M	12-150	50	X	X					
T-D	L	6-25	10-18	X		Pink		X		
T-D	VL	25	25	X	X	White + Pink		X	X	
T-D	L	20-35	20-30			Pink		X	X	X
T	L	15-25	15-25							
T	VL	30-80	30	X	X					
T-D	L	45-60	30-40			Yellow/Cream		X	X	
T/S	L	10-18	10	X	X					
T	VL	33	25	X						
T/S	L	40	30			Yellow		X		
T	M	30-60	20-40			White			X	
T	L	30-60	20-40	X		White/Brown		X	X	
T	(Not Listed)	20-30	20		X	Purple		X		
T	L	50-80	20-35							
T	L	30-60	25-40	X						
T	L	30-55	11-24							
T	L	30-60	20-40							
T	L	40-90	30	X						
T	L	40-50	40-50							
T	L	40-70	20-45	X						
T	L	30-90	30-60	X		Yellow/Cream	X	X		
T-D	VL	15-80	30	X		Yellow/Cream	X	X		
T	L	25-60	10-35			Yellow/Cream		X	X	
T	L	20-25	20-35			Yellow/Green			X	
T-D	L	50	50+			Yellow			X	
T/S-D	L	8-10	5-8			Purple			X	

ECOLOGY, HABITAT, AND PLANTING CHECKLIST

Reference the LACFCD and Public Works Permitting checklist in Chapter 2 for an overview of project permitting and applicable codes.

Detailed Drawing and Specification Technical Requirements Checklist for Ecology, Habitat, and Planting

Planting Along Levees and Floodwalls

- □ Follow the most recent USACE Guidelines.
- □ Follow the 17 foot Limited Landscape Management Zone requirements.
- □ Indicate in site plan a 3 - 6 foot clear line of sight at access points and trail intersections.
- □ Deploy BMPs to capture stormwater where possible.

Maintenance Buffers and Clearances

- □ All maintenance vehicles must have ingress and egress clearance at all times.
- □ Any alteration or design of service roads must meet with county approval.
- □ A minimum 4 foot trees and tall shrub setback from the sidewalk adjacent to vehicular ingress/egress from arterial streets.
- □ Vehicular access gates are to be setback 20 feet from the arterial street curb when available and feasible.
- □ Consult with appropriate utility company if working in a utility easement or right-of-way

Soils

- □ Test soils. If soils are contaminated, create a remediation plan.
- □ Peat shall not be specified as a soil mix component.
- □ Test samples of salvaged on-site topsoil, all plant mix materials, and organic material components which are intended to be used for planting soil mixes and final mixes by an independent Soil and Plant Testing Laboratory acceptable to the landscape architect and in accordance with the current standards of the Soil Science Society of America. All reports shall be sent to the landscape architect for approval.

Irrigation

- □ Irrigation supply and system components shall comply with LA County Low Impact Development Manual, LA County water sources, conservation standards, and current California Green Building Standards Code.
- □ Use recycled or reclaimed water for irrigation where possible; ensure planting is compatible with salinity levels of irrigation water.
- □ Provide a soil and water source analysis prior to design of the irrigation system and develop a watering, nutrition, and amendment schedule in response to the analysis.
- □ Analyze total dissolved salts from water sources to confirm plant types are compatible with saline soils. Provide soil amendments or on-going organic water treatment to reduce high salt or TDS levels.
- □ All drip irrigation systems shall be installed in a manner that can provide multiple emitters to each container plant.
- □ Irrigation details shall provide for appropriate use of in-line filters, pressure regulators, pressure compensating emission devices, and end-flush valves.

Wildfire management

- □ For larger projects or those that interface with a wildlife area, indicate wildfire breaks on the site plan.

ECOLOGY, HABITAT, AND PLANTING CHECKLIST

Reference the LACFCD and Public Works Permitting checklist in Chapter 2 for an overview of project permitting and applicable codes.

Tree and Shrub Planting

- ☐ Do not plant species listed as invasive by the California Invasive Plant Council (Cal-IPC).
- ☐ Planting in the LA River channel should only occur where excess hydraulic capacity is confirmed.
- ☐ Planting plans should show frequency and placement of plant species with graphic hatches and annotations. Hatches can be further detailed with a graphic matrix showing typical plant placement. Sizes and quantity should be indicated on the corresponding plant schedule.
- ☐ Identify areas on plan that are habitat focused and those that are program focused.
- ☐ In habitat-focused areas, show the that the following criteria is met in the planting schedule:
  - 95% minimum of the total number of plants of the same pot size to be LA River Watershed native species (refer to the native plant community lists in this chapter).
  - 5% maximum of the total number of plants of the same pot size to be native to Los Angeles' Level III ecoregion (Southern California/Northern Baja Coast; Southern California Mountains).
  - 10% minimum of the total number of LA River Watershed native plants of the same pot size to be locally sourced in the LA River Watershed. Higher percentages should be achieved as local supply capacity increases.
- ☐ In program-focused areas, show the that the following criteria is met in the planting schedule:
  - 85% minimum of the total number of plants of the same pot size to be native to the LA River Watershed (refer to the native plant community lists in this chapter) or the Level III ecoregions of Los Angeles and just east of Los Angeles, as appropriate per planting context and climate regimes (Southern California/Northern Baja Coast; Southern California Mountains; Mojave Basin and Range; Sonoran Basin and Range).
  - 15% maximum of the total number of plants of the same pot size to be climate-adapted, non-native non-invasive species.

- ☐ Install native planting in the late fall through winter (between November 1 and March 15 or as specified in the schedule prepared by the project landscape architect).
- ☐ Eradicate all existing invasive plant species on site. Existing, non-native, non-invasive species may be retained until senescence then replaced with appropriate native plants.
- ☐ Procure plant material from a nursery that holds an appropriate nursery license with the California Department of Food and Agriculture (CDFA) to sell the requested plant material. Contractor shall submit proof of license that all plant material was obtained by a pest free nursery in good standing with CDFA.
- ☐ Plant material quantities and handling standards must comply with the latest version of the American Standard for Nursery Stock (ANSI Z60.1) published by the American Horticulture Industry Association.
- ☐ Procure plants that are not rootbound.
- ☐ Avoid purchasing plants affected by pathogens and use nurseries that incorporate best practices for pathogen avoidance, such as member nurseries of the Southern California Nursery Best Management Practices (BMP) Group.
- ☐ The contractor shall acquire all seed material of the required type, sizes, and quantities through sources approved by the project landscape architect. Weed seed shall not exceed 1% by weight of the total mixture. Wet, moldy, or otherwise damaged seed shall be rejected.
- ☐ Do not use seeds treated with mercury.
- ☐ Include proper drainage of planting in drawings and installation.
- ☐ Conduct percolation tests to determine positive drainage of all plant pits. Note percolation performance requirements may be designated by the landscape architect or as required in the LA County Public Works Low Impact Development Manual.
- ☐ All plants are to be thoroughly watered upon installation to compact soil and settle plants to natural soil depth. Excessive watering shall be minimized to prevent erosion.
- ☐ Planting areas that are not seeded are to be covered with 3-6" of organic mulch.

ECOLOGY, HABITAT, AND PLANTING CHECKLIST

Reference the LACFCD and Public Works Permitting checklist in Chapter 2 for an overview of project permitting and applicable codes.

Detailed Maintenance Program Checklist for Ecology, Habitat, and Planting

All projects along the LA River are required to develop a three year monitoring and maintenance program prior to start of construction. This program begins on completion of the last day of the planting operation and emphasizes proper application of supplemental water, replacement planting, and weed management to achieve an increased rate of vegetation establishment and growth. Regular inspections and decisions regarding weed management, supplemental irrigation, and additional planting actions should also be in the plan.

3 Year Monitoring and Maintenance Program

Program Management

- ☐ All management actions shall be implemented by experienced crews with knowledge and familiarity of native plants and adaptive management. Education, training, and/or certification in the care of CA native species and habitat planting is required for these maintenance crews.
- ☐ All maintenance actions are to be managed by the landscape architect, botanist, ecologist, or land care professional who is responsible to conduct regular inspections, maintain written records, and to make decisions that will further improve the establishment of the vegetation. Twice monthly visits are to be scheduled in the first sixteen weeks of planting establishment to observe landscape performance. A brief summary report shall be prepared for each visit by approved professionals (the landscape architect, botanist, ecologist, or land care professional).
- ☐ All programs, schedules of maintenance action, and summary reports shall be submitted to the county/contracting officer.

Tree and Shrub Planting

- ☐ Include budget for replacement planting. Long-term management actions and replacement plantings are to emphasize native species and non-invasive species for future climate regimes.
- ☐ Restoration of damage to landscape plantings by acts of vandalism, storms, heavy equipment, or other causes shall be repaired or replaced in a manner that is consistent with the original planting program unless otherwise directed by the landscape architect.(Adjustments to the types of replacement plants may be decided if a particular species is showing inadequate suitability to the conditions of the site.)
- ☐ Plants shall be checked for settlement and shall be reset at proper grade as necessary.
- ☐ Germination and growth of plants is to be inspected on a weekly basis for the first three months following planting to monitor progress and observe problems as they arise.
- ☐ Monitoring should include noting any signs of insect or disease outbreaks, with treatment taken as needed.

- ☐ If staking trees is specified they shall be inspected monthly and be maintained to support and protect trees until they are able to stand alone.
- ☐ By the end of summer, the project landscape architect, botanist, ecologist, or land care professional is to prepare a detailed program and schedule of supplemental planting actions that must be implemented by fall or early winter to work with the best climate and planting season for native species.
- ☐ All supplemental planting actions are to be done with care and in a manner that minimizes disturbance to the adjacent soils and vegetation.

Irrigation

- ☐ For native planting, use irrigation systems only for establishment and drought period. Limit summer water after establishment.
- ☐ For all plant material irrigation systems, a baseline irrigation watering schedule will be provided to meet the following requirements:
- ☐ **Permanently Irrigated Landscape**
    - Establishment watering schedule is to meet the requirements and recommendations of the plant material provider.
    - Staged watering schedule should be designed to deepen plant root zone growth and ability to thrive on reduced supplemental watering schedule.
    - The proposed watering schedule should provide for future plant root zone growth and established requirements to promote healthy plant establishment and maturation.
- ☐ **Establishment Irrigated Native Landscape**
    - Establishment watering schedule to meet the requirements and recommendations of the native seed and/or plant material provider.
    - Staged watering schedule designed to 'harden off' plant materials over a three-year growth period to encourage deep, stable root growth and the ability to thrive on natural precipitation.
    - The proposed watering schedule will provide for future plant root zone growth and established requirements to promote healthy plant establishment and maturation.

ECOLOGY, HABITAT, AND PLANTING CHECKLIST

Reference the LACFCD and Public Works Permitting checklist in Chapter 2 for an overview of project permitting and applicable codes.

- ☐ All irrigation systems shall be inspected throughout the year. See seasonal maintenance recommendations below.
- ☐ **Spring (seasonal system start-up as applicable)**
  - Prior to heavy summer irrigation system use, complete full system operational check to verify the following:
  - Confirm upcoming watering schedule accords with average weather conditions and upcoming plant establishment requirements.
  - Control system operation, connection to local weather station, rain sensor, master valve, and flow sensor.
  - Test the backflow prevention device for proper operation and protection of upstream water supply.
  - Integrity of mainline and lateral piping, repair leaks, and related failures.
  - Remote control valve operation.
  - Clean drip zone filter kits and test operation.
  - Review operation of each irrigation zone and adjust or repair each emission device for proper operation.
- ☐ **Summer**
  - Once monthly, operate each irrigation zone and repair or adjust as necessary to eliminate leaks, overspray onto hardscape areas, and other system casualties.
- ☐ **Fall (seasonal system shut down as applicable)**
  - Winterize the irrigation system in accordance with local regulation and manufacturer recommendations.

Pruning and Weeding

- □ Invasive species growth shall be continuously monitored during the planting process. Perform weeding and supplemental mulching as necessary to prevent the spread of invasive species. The specific methods, products, and areas where weeding is proposed shall be approved by the project landscape architect. Refer to Los Angeles County Weed Management Area Best Management Practices manual.[42]

- □ All trees and shrubs shall be allowed to grow to their natural genetic form and size. Do not excessively prune plants. Limb tree branches to required height for USACE or LA County Flood Control District maintenance areas only once the trees have reached maturity.

- □ Include provisions for wildfire management and prevention:

    - Properly prune shrubs to reduce fuel load.

    - Reduce and remove invasive grasses and other invasive annuals which can increase fire risk.

- □ All pruning and weeding actions are to be done with care and in a manner that minimizes disturbance to the adjacent soils and vegetation.

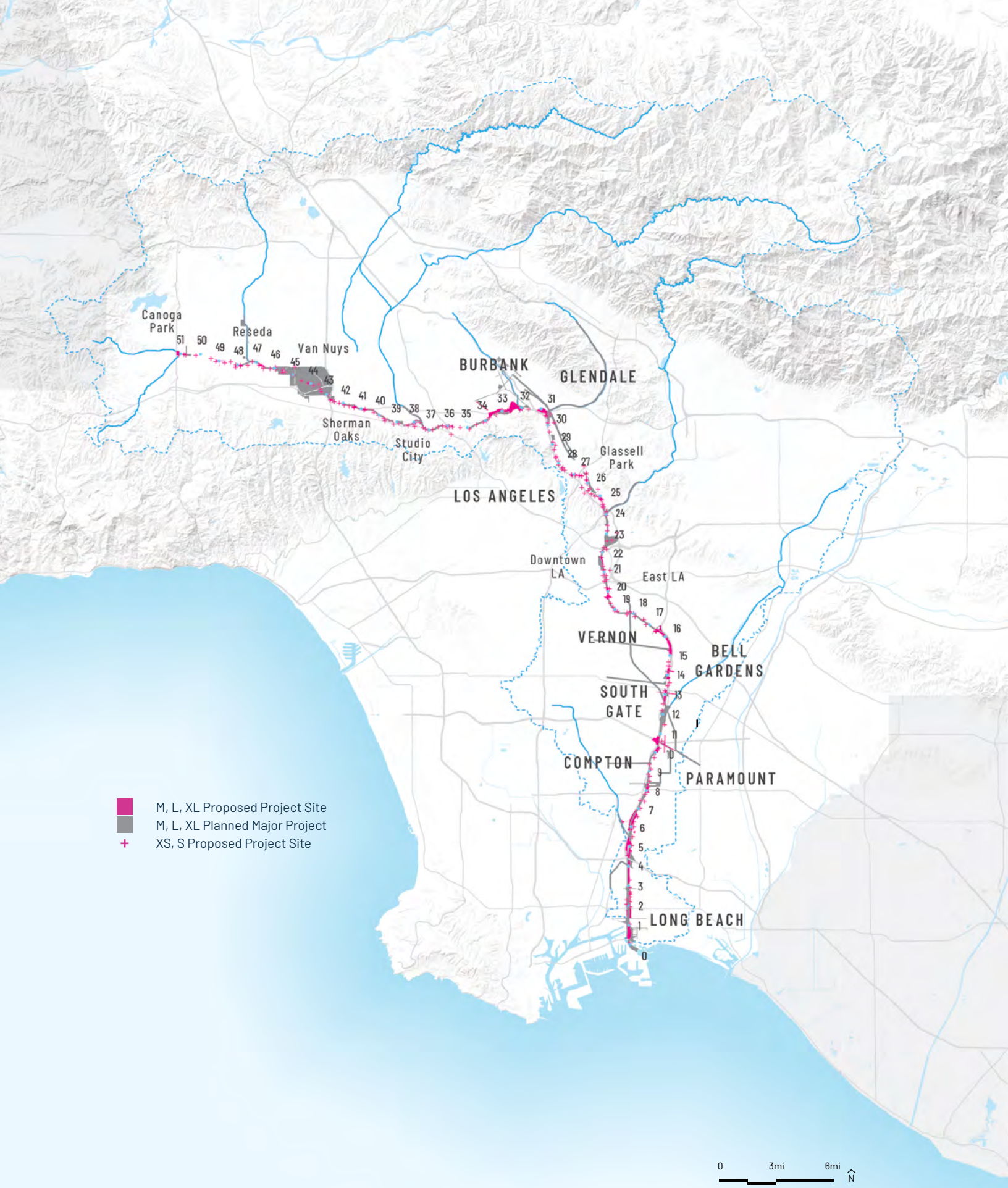


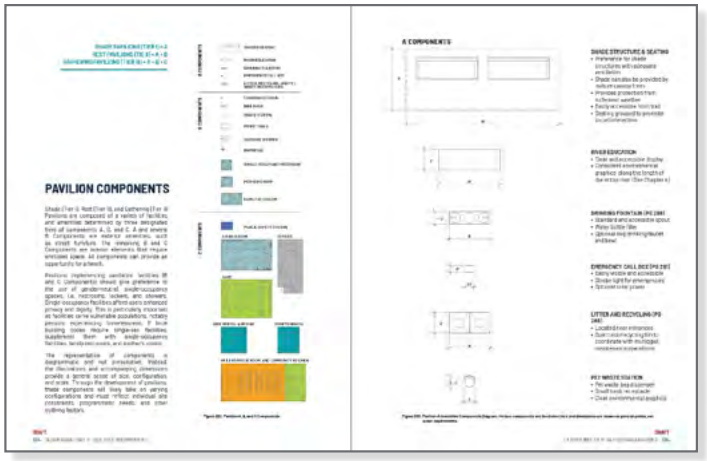
Figure 293. Projects Along the LA River. A consistent cadence of XS, S, M, L, and XL projects occurs along the 51 miles of the LA River.

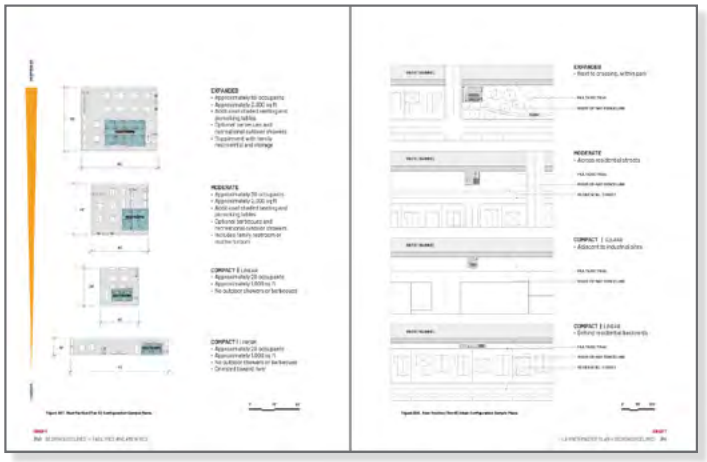
6.
FACILITIES AND AMENITIES

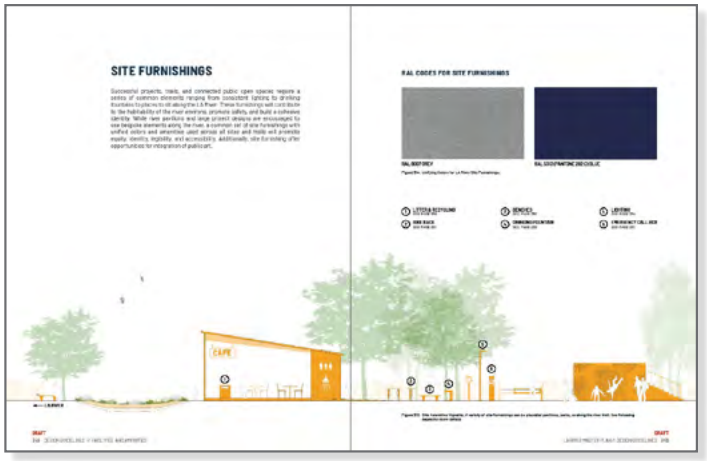
Facilities and amenities along the LA River promote a sense of place and belonging along the river corridor. They are not only what draw people to the river, but also encourage them to stay for longer periods of time to enjoy the river with comfort and safety. These amenities, ranging from large pavilions to a single bench, are meant to be used by all people, including commuters, recreational users, nearby residents, and persons experiencing homelessness. Though the River Pavilions are a significant community resource and house a cluster of various amenities, a single drinking fountain along the multiuse river trail is just as vital to the experience of a person along the river. Most importantly, these facilities and amenities should strive for design excellence. Great design of these elements will elevate the experience of users along the river and offer opportunities for artwork. Additionally, they must be maintained, be visible, and occur at a consistent cadence so that people know what to expect along the river corridor. This consistency encourages community members to keep coming back and exploring the LA River.

WHAT'S IN THE CHAPTER

The following pages contain the information regarding the size, occupancy, program, and configuration of the different types of pavilions along the LA River. This chapter will also provide information regarding the types of site furnishings that are deemed acceptable to be used along the river. Consult the checklist at the end of the chapter to ensure the correct guideline items are followed.







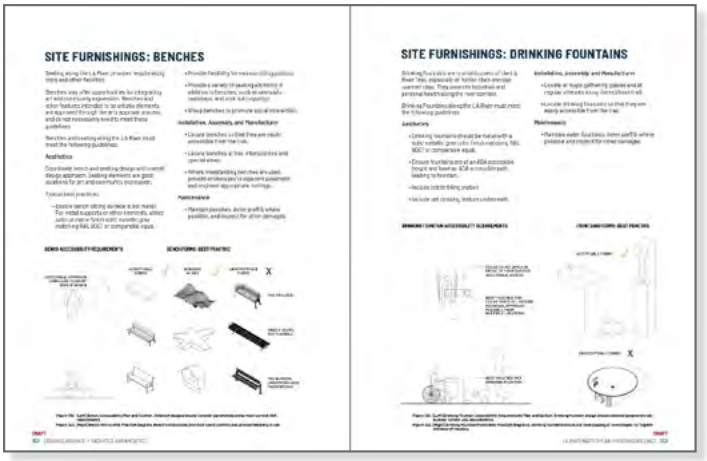


Figure 294. Chapter 6 of this document covers items related to facilities and amenities along the LA River.

THE LA RIVER'S SHADE (TIER I), REST (TIER II), AND GATHERING (TIER III) PAVILIONS FORM A VARIED NETWORK OF COMMUNITY ASSETS THAT ACCESSIBLE TO ALL

RIVER PAVILIONS

Pavilions situated along the LA River will house numerous facilities and amenities and will form a network of programs and activities to support a continuous and unified experience along the river trail. Pavilions serve as an asset for river users and river-adjacent communities. They should complement existing neighborhood assets, such as parks, schools, community facilities, public transit, and cultural organizations to form enriched nodes of interest. Furthermore, pavilions provide multiple opportunities for artwork. Other master plans and urban designs have already identified several sites for facilities and amenities, but additional pavilions are necessary to establish a regular and equitable cadence for all river users.

The architecture of the River Pavilions should meet the highest standard of design excellence. All pavilions should have a finish floor elevation above the 1% storm event level. If elevation at the 1% storm event level is not feasible, first consider other locations. If no other location is possible, consider making the facility floodable. Further, the maintenance planning for the pavilions is critical, as to best alleviate future operations and maintenance costs.

Figure 295. Lewis MacAdams Riverfront Park is one example of an existing pavilion along the LA River at river mile 26. Source:LA Public Works, 2018.

River Pavilions have been organized into three tiers based on the number and type of amenities provided. Pavilions with baseline amenities will occur more frequently in the cadence along the river, while pavilions with added amenities occur more intermittently at an appropriate cadence. Shade Pavilions (Tier I), the baseline, include seating, shade structures, drinking fountains, waste disposal, and an emergency call box. Rest Pavilions (Tier II) include the baseline amenities Shade Pavilion (Tier I) and restrooms, bike racks, picnic tables, charging stations, and vending machines, with optional barbecues and outdoor showers.

Gathering Pavilions (Tier III), include all Shade (Tier I) and Rest (Tier II) Pavilion amenities in addition to a cafe, indoor showers, lockers, public safety station, and bike rental and repair. Sports equipment rental, multipurpose rooms, and community kitchens can further enhance Gathering Pavilions (Tier III). Larger pavilions, in particular, operate as destinations in themselves attracting visitors to the river. More information on potential use of different pavilions can be found later in this chapter. Within each tier, pavilions can adjust in scale, configuration, and specific program to react to local site conditions and amenities that may already exist.

CONSISTENTLY DISTRIBUTE PAVILIONS ALONG THE 51 MILES OF THE LA RIVER TO PROVIDE ESSENTIAL FACILITIES AND AMENITIES WITHIN REACH OF ALL OF THE RIVER'S USERS AND NEIGHBORING COMMUNITIES

PAVILION CADENCE

A network of pavilions along the LA River should adhere to a cadence that optimizes an equitable distribution of facilities and amenities for river users and river-adjacent communities.

Ideally, Shade (Tier I) and Rest (Tier II) Pavilions alternate every 1/2 mile along both sides of the river where feasible, with the exception of gaps in the river trail. Shade (Tier I) and Rest (Tier II) Pavilions should have a spacing tolerance of 1/10th of a mile to provide adequate flexibility in selecting appropriate and favorable sites. The 1/2 mile spacing affords river users shaded seating within an approximate five-minute walk in either direction. The one-mile spacing between Rest Pavilions (Tier II) in particular provides river users a restroom facility within an estimated ten-minute walk in either direction.

Located every 2-3 miles on either side of the river, Gathering Pavilions (Tier III) should be located in conjunction with river gateway access points, enhancing their accessibility to river-adjacent communities. The spacing of the pavilions is intended to create a consistent cadence of amenities without creating redundancy. The spacing tolerance of 1/10th of a mile helps equalize the distribution of facilities and amenities. For example, if a Gathering Pavilion (Tier III) falls within 1/2 mile of a Shade (Tier I) or Rest (Tier II) Pavilion, the smaller pavilion should move 1/10th of a mile away from the larger one.

Upon full implementation of the LA River Master Plan, pavilions will regularly stand on both banks of the river along its continuous 51 miles of connected open space. The spacing of pavilions on opposite riverbanks does not need to align with one another. Instead, it is more important that pavilions situate appropriately in their context, instead of adhering to a rigid plan at the expense of more logical and strategic placement. Further, additional pavilions can supplement the baseline cadence to respond to community needs and increased visitation.

Urban context should further inform site selection and the orientation of pavilions. Optimized placement of pavilions enhances the river's relationship to the river itself, along with proximate streets, crossings, parks, community facilities, and public transportation. River users should have a plethora of facilities and amenities within every frame, along both banks of the river.

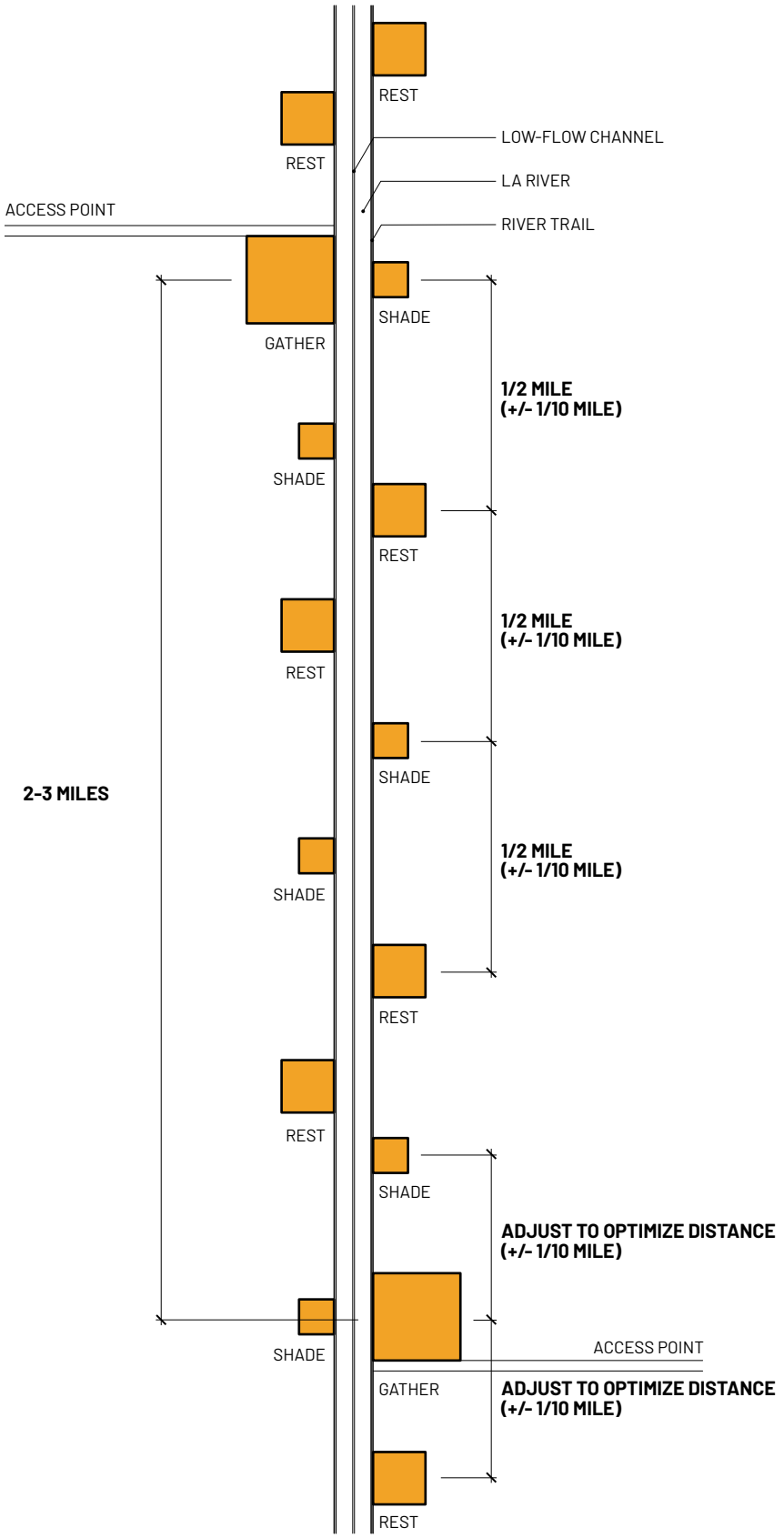


Figure 296. Shade, Rest, and Gathering Pavilions all occur at a consistent cadence along the river. A base level of amenities are to be installed at a minimum of every half mile along each bank of the river.

SHADE PAVILIONS (TIER I) = A
REST PAVILIONS (TIER II) = A + B
GATHERING PAVILIONS (TIER III) = A + B + C

PAVILION COMPONENTS

Shade (Tier I), Rest (Tier II), and Gathering (Tier II) Pavilions are composed of a variety of facilities and amenities determined by three designated tiers of components A, B, and C. A and several B Components are exterior amenities, such as street furniture. The remaining B and C Components are interior elements that require enclosed space. All components can provide an opportunity for artwork.

Pavilions implementing sanitation facilities (B and C Components) should give preference to the use of gender-neutral, single-occupancy spaces, i.e. restrooms, lockers, and showers. Single-occupancy facilities afford users enhanced privacy and dignity. This is particularly important as facilities serve vulnerable populations, notably persons experiencing homelessness. If local building codes require single-sex facilities, supplement them with single-occupancy facilities, family restrooms, and mother's rooms.

The representation of components is diagrammatic and not prescriptive. Instead, the illustrations and accompanying dimensions provide a general sense of size, configuration, and scale. Through the development of pavilions, these components will likely take on varying configurations and must reflect individual site constraints, programmatic needs, and other outlying factors.

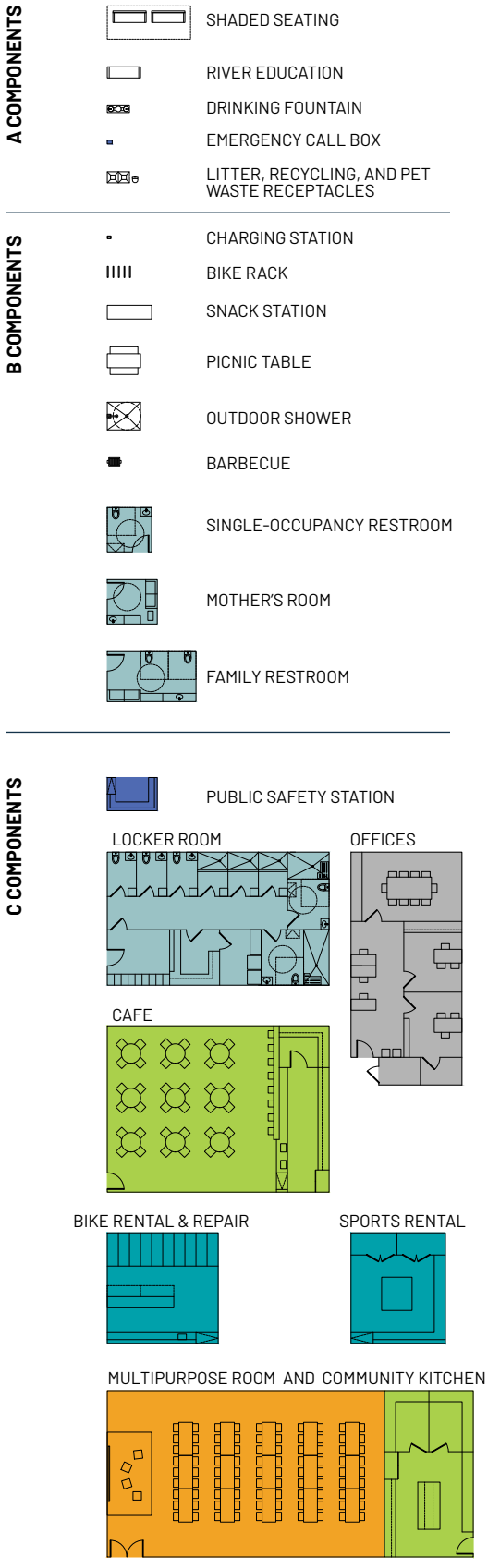
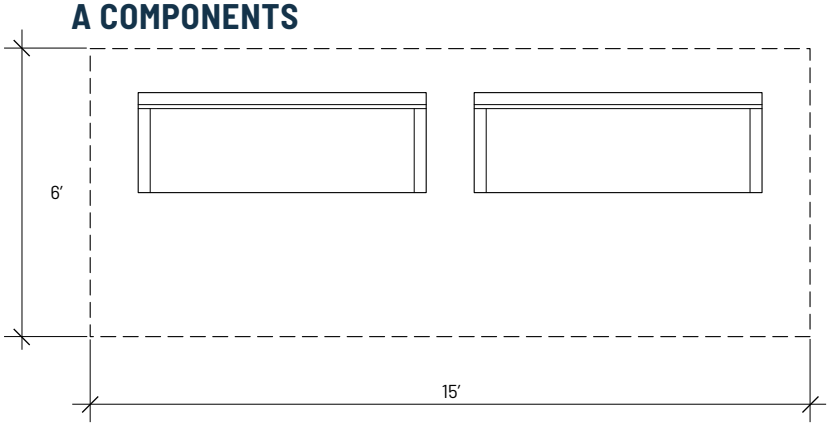


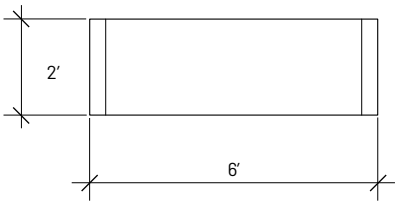
Figure 297. Pavilion A, B, and C components range in size and programming from shade and drinking fountains to restrooms and community kitchens.

A COMPONENTS



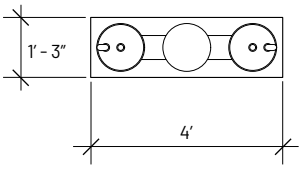
SHADE STRUCTURE & SEATING

- Preference for shade structures with adequate ventilation
- Shade can also be provided by mature canopy trees
- Provides protection from inclement weather
- Easily accessible from trail
- Seating grouped to promote social interaction



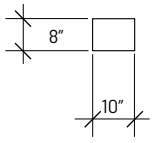
RIVER EDUCATION

- Clear and accessible display
- Consistent environmental graphics along the length of the entire river (See Chapter 4)



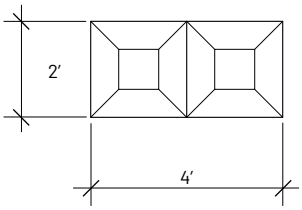
DRINKING FOUNTAIN (PG 289)

- Standard and accessible spout
- Water bottle filler
- Optional dog drinking faucet and bowl



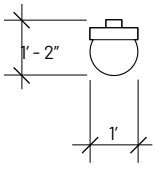
EMERGENCY CALL BOX (PG 291)

- Easily visible and accessible
- Strobe light for emergencies
- Optional solar power



LITTER AND RECYCLING (PG 288)

- Located near entrances
- Dual trash/recycling bin to coordinate with municipal maintenance operations

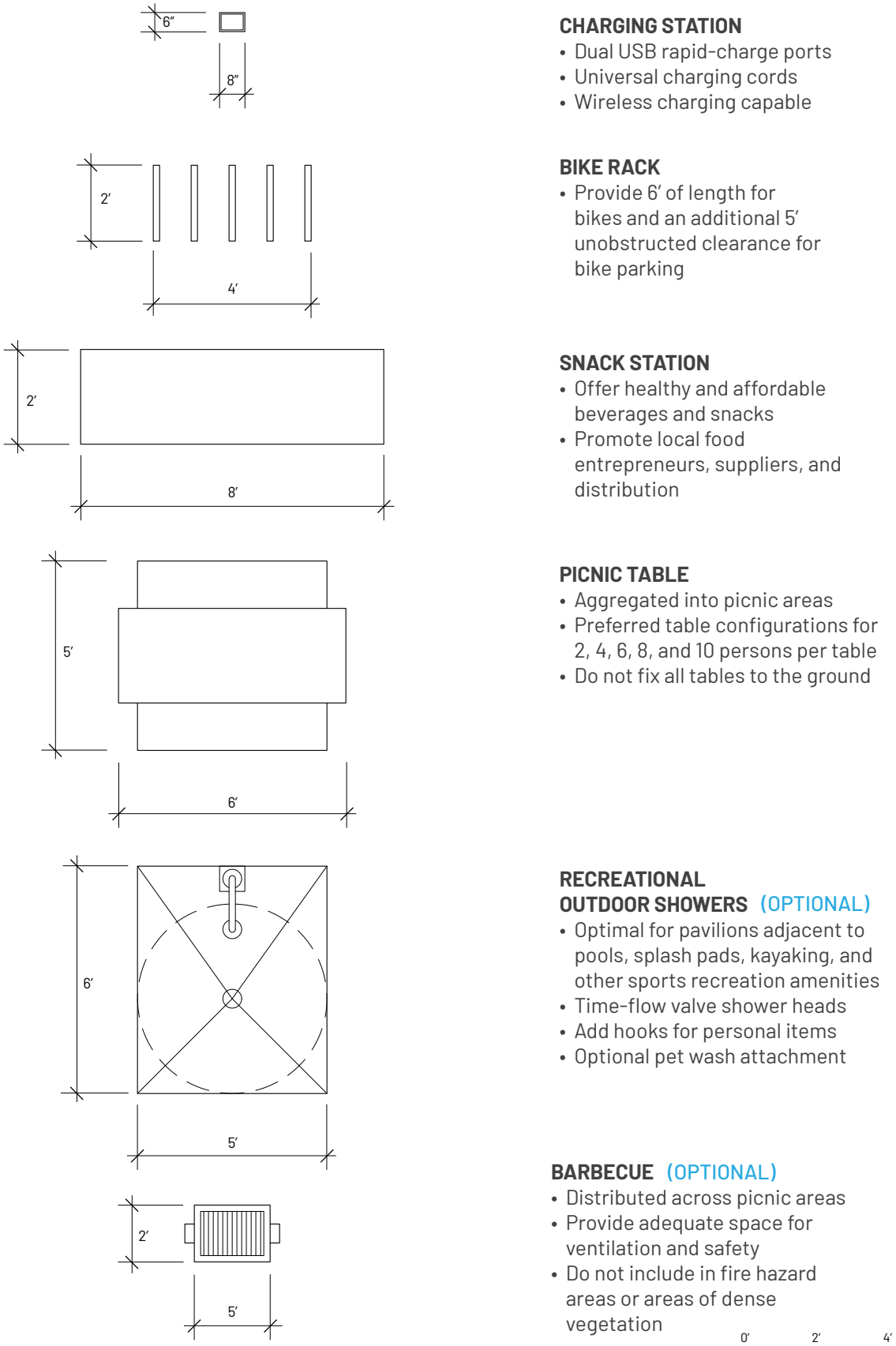


PET WASTE STATION

- Pet waste bag dispenser
- Small trash receptacle
- Clear environmental graphics

Figure 298. The basic components of a Shade Pavilion include shade, seating, and drinking fountains. Various components are illustrated here and dimensions are shown as general guides, not exact requirements.

B COMPONENTS



CHARGING STATION
- Dual USB rapid-charge ports
- Universal charging cords
- Wireless charging capable

BIKE RACK
- Provide 6′ of length for bikes and an additional 5′ unobstructed clearance for bike parking

SNACK STATION
- Offer healthy and affordable beverages and snacks
- Promote local food entrepreneurs, suppliers, and distribution

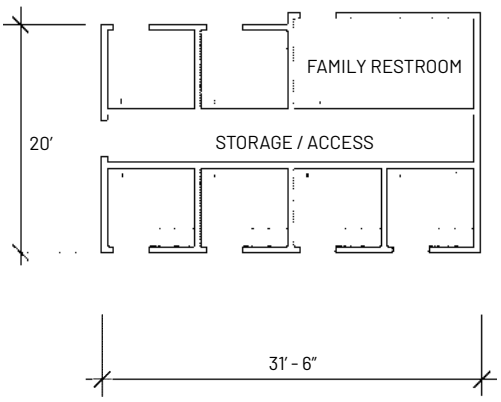
PICNIC TABLE
- Aggregated into picnic areas
- Preferred table configurations for 2, 4, 6, 8, and 10 persons per table
- Do not fix all tables to the ground

RECREATIONAL OUTDOOR SHOWERS (OPTIONAL)
- Optimal for pavilions adjacent to pools, splash pads, kayaking, and other sports recreation amenities
- Time-flow valve shower heads
- Add hooks for personal items
- Optional pet wash attachment

BARBECUE (OPTIONAL)
- Distributed across picnic areas
- Provide adequate space for ventilation and safety
- Do not include in fire hazard areas or areas of dense vegetation

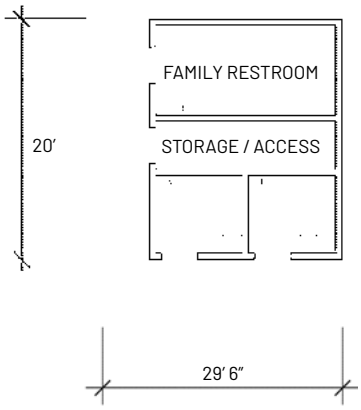
Figure 299. The basic components of a Rest Pavilion include restrooms, bike racks, and a snack station. Dimensions are general guides and not exact requirements.

TIER II - BASIC SANITATION FACILITIES



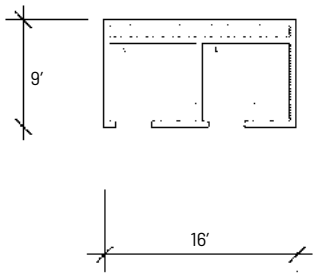
SINGLE OCCUPANCY | LARGE

- Modular and standardized
- 6 restrooms
- 1 family restroom
- Changing station
- Storage and access room
- Modular and standardized



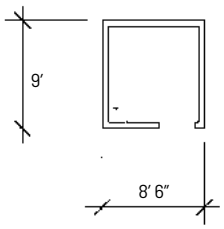
SINGLE OCCUPANCY | MEDIUM

- Modular and standardized
- 2 restrooms
- 1 family restroom
- Changing station
- Storage and access room
- Modular and standardized



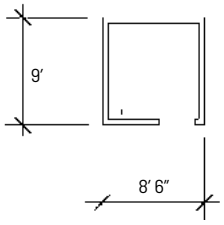
SINGLE OCCUPANCY | SMALL

- 2 restrooms
- Changing station
- Access shaft for plumbing
- Modular and standardized



MOTHER'S ROOM (OPTIONAL)

- Changing station
- Seating and space for nursing
- Bottle warmer
- Modular and standardized



STORAGE ROOM (PREFERRED)

- Storage and cleaning supplies
- Utility sink and counter space
- Space for bathroom attendant

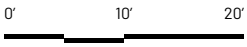
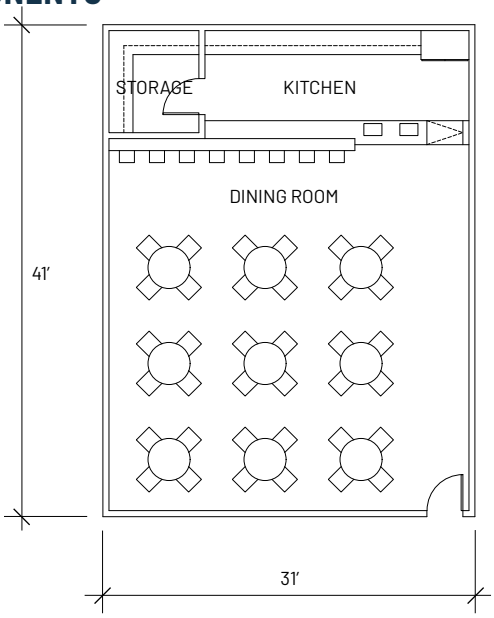
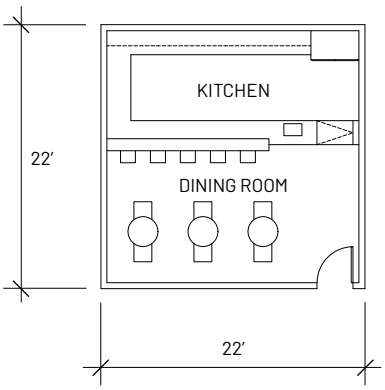


Figure 300. Restrooms should consist of single occupancy stalls, preferably including both a storage room and a mother's room. Various components are illustrated here and dimensions are shown as general guides, not exact requirements.

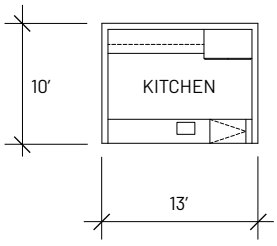
C COMPONENTS



CAFE | LARGE
- Appropriate for large pavilion with other significant program
- Table seating and counter service
- Full service kitchen capable of on-site preparation
- Take-out / ready-made counter
- Separate food storage



CAFE | MEDIUM
- Appropriate for small and medium pavilions
- Limited table seating and counter service
- Kitchen capable of basic on-site preparation
- Take-out / ready-made counter

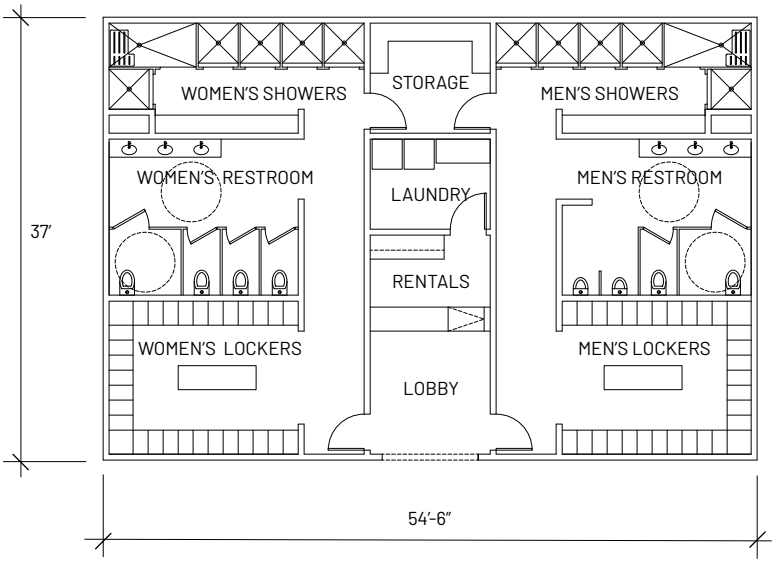


CAFE | SMALL
- Appropriate for small pavilions and outdoor picnic areas
- No indoor seating
- Limited on-site preparation
- Take-out / ready-made counter

0' 10' 20'

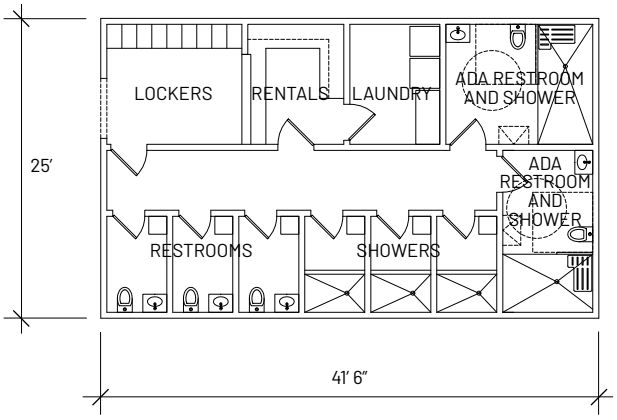
Figure 301. The basic components of a Gather Pavilion include a programed element such as a cafe or community center. Cafes can vary in size depending on the project site. Dimensions are general guides and not exact requirements.

TIER III - ENHANCED SANITATION FACILITIES



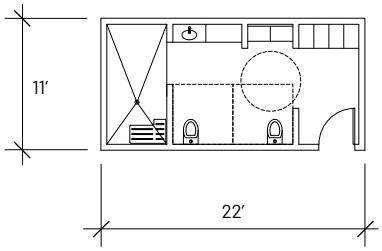
SINGLE-SEX LOCKER ROOM

- Utilize single-sex locker room configurations only when required by local building code
- Provides an efficient and centralized use of space
- Does not afford users the same level of privacy as single occupancy showers, restrooms, or changing areas
- On-site attendant required
- Customized to pavilion



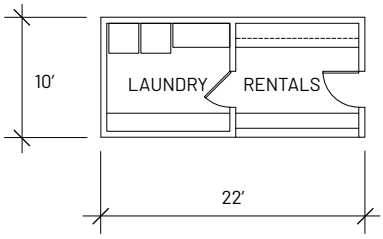
UNISEX LOCKER ROOM

- Preferred configuration to increase sense of privacy
- Should separate restrooms from showers as they have varied time of visitorship
- On-site attendant required
- Customized to pavilion



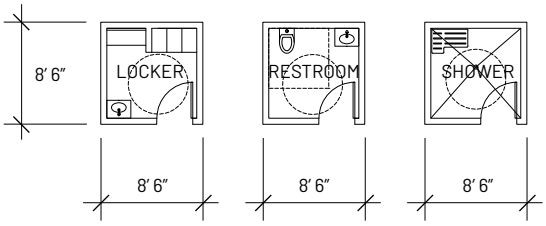
FAMILY LOCKER ROOM

- Lockers and showers
- Adult and child's height toilets
- Seating and space for nursing
- Changing table
- Customized to pavilion



RENTAL & SERVICE STATION

- Station to rent towels and purchase toiletry items
- Laundry and storage for maintenance
- Customized to pavilion

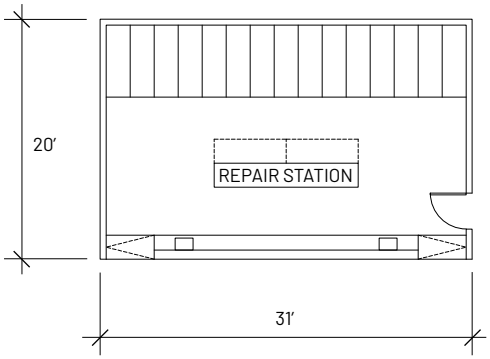


SINGLE OCCUPANCY FACILITIES

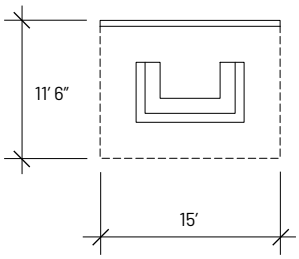
- Increased sense of privacy
- Separate facilities for lockers, restroom, and shower
- Customized to pavilion

0' 10' 20'

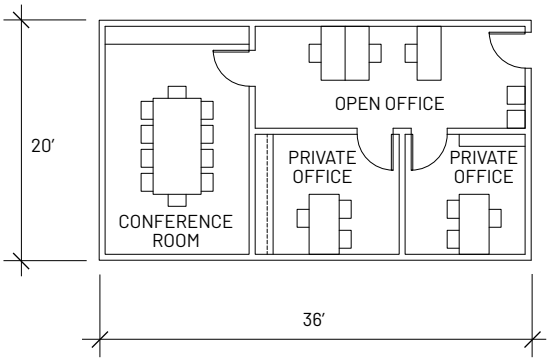
Figure 302. Locker rooms in Gather Pavilions may not be able to provide single use occupancy restrooms or locker stalls, although they are preferred if possible. Various components are illustrated here and dimensions are shown as general guides, not exact requirements.



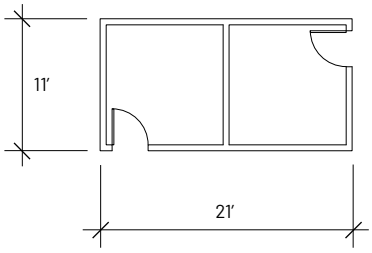
BIKE RENTAL & REPAIR
- Can be either indoor or outdoor
- Station for river users to rent bike and inflate tires
- Provide adequate space, floor and counter, for bike repairs



PUBLIC SAFETY STATION
- Visible station for public safety or police officer
- Can also serve as a LA River concierge with information on events and activities along the river



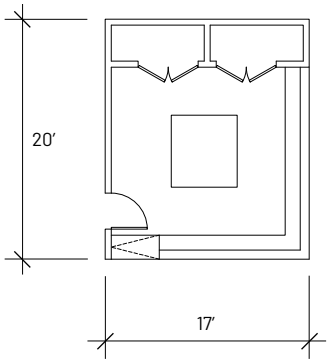
MANAGEMENT OFFICES (OPTIONAL)
- Provide offices and conference room for pavilion management operations and staff
- Located away from public function
- Connect to storage room as necessary



FACILITIES STORAGE (OPTIONAL)
- Configuration dependent on pavilion size and storage needs
- Provide storage for general facility needs and management offices

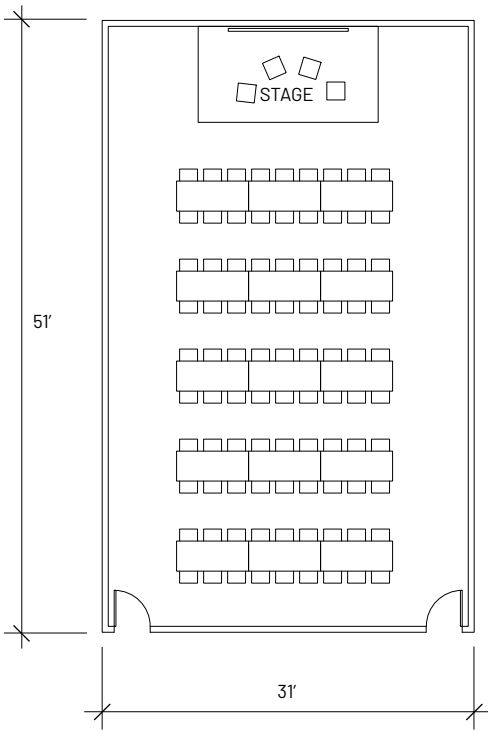
0′ 10′ 20′

Figure 303. Gather Pavilions may include a bike repair and rental shop or a public safety station. Supporting facilities such as management offices or additional storage can also be included. Dimensions are general guides and not exact requirements.



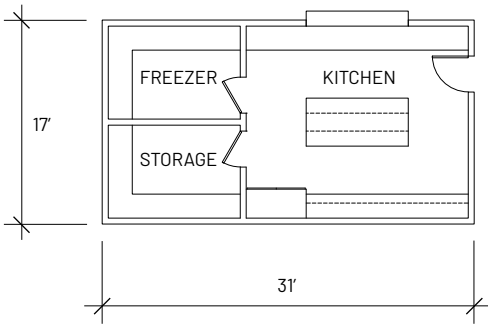
SPORTS EQUIPMENT RENTAL (OPTIONAL)

- Short-term rentals of sports equipment adjacent to major recreational areas
- Incorporate horizontal and vertical storage



MULTIPURPOSE ROOM (OPTIONAL)

- Flexible space for events such as parties, lectures, meetings, community engagement, and performances
- Can be combined with a community kitchen to support events and dining activities
- Optional room dividers for concurrent events



COMMUNITY KITCHEN (OPTIONAL)

- Flexible kitchen space for food preparation for events and culinary education
- Servery to multipurpose room
- Commercial grade appliances

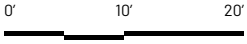


Figure 304. Gather Pavilions may include rooms that can be of general use to the community, such as a community kitchen or multipurpose room. Various components are illustrated here and dimensions are shown as general guides, not exact requirements.

ALL PAVILIONS SHOULD RESPOND TO THEIR SITE CONSTRAINTS WHILE PROVIDING ADEQUATE FACILITIES AND AMENITIES TO THE ADJACENT RIVER TRAIL, EXISTING PUBLIC RESOURCES, AND CONTEXT

PAVILION CONFIGURATIONS

There are numerous ways to configure A, B, and C Components into the varying Shade (Tier I), Rest (Tier II), and Gathering (Tier III) Pavilions. Sample configurations demonstrate different planar organizations appropriate for discrete site constraints and desired results: Compact-Linear, Compact-Square, Moderate, and Expanded.

Compact-Linear and Compact-Square configured pavilions represent the baseline facilities and amenities required per tier. Compact-Linear pavilions are most appropriate in constricted sites, such as those within an existing, narrow right-of-way or a future cantilever constructed above the river channel. Compact-Linear configurations optimize pavilions' river frontage. Compact-Square pavilions are more appropriate for larger, less-constrained sites.

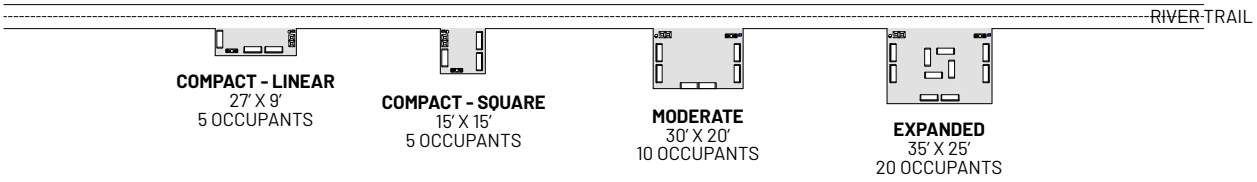
Moderate configurations incorporate additional amenities and larger facilities into more spacious pavilions, which include multiple shade structures for seating and larger picnic areas. Similarly, expanded configurations further integrate enlarged facilities and increased amenities, but also include optional programs from the pavilion components, such as outdoor showers and barbecues in Rest Pavilions (Tier II) and the multipurpose room and community kitchen of Gathering Pavilions (Tier III). Expanded configurations require significant land area and have a higher development cost, but become enhanced resources to river users and river-adjacent communities.

River Pavilions occupancy vary by program and square footage, in which there is an approximate range of 5 to 500 occupants. An occupant load factor is used to determine a maximum occupation of different programmed spaces. Occupant load factors should reflect the prevailing International Building Code or the local building code of the site's jurisdiction, adhering to whichever is more restrictive. Shade Pavilions (Tier I) are single-use structures and therefore utilize a single occupant load factor. However, Rest (Tier II) and Gathering (Tier III) Pavilions are multiuse, necessitating multiple occupancy calculations as determined by each significant program, i.e., restrooms, locker rooms, rental stations, offices, cafe, multipurpose room, and kitchen.

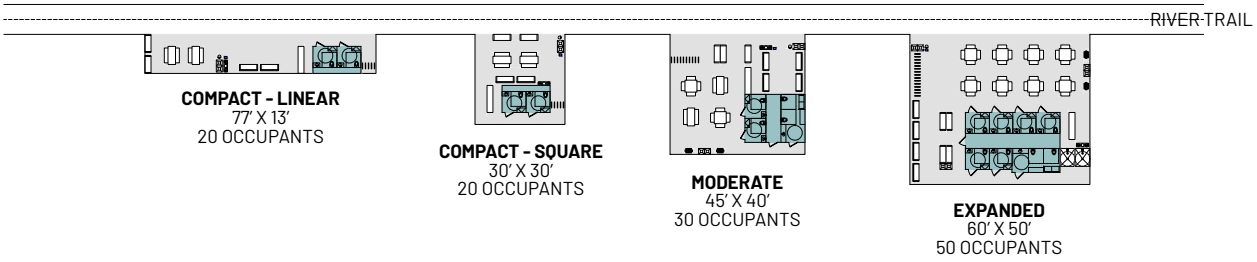
Use discretion when assigning occupant load factors to the varying programs. For example, a kiosk cafe without patron seating will have a significantly lower occupant load factor and thus occupancy than an enclosed cafe with a service counter, tables, and chairs. Further, flexible programs can have varied configurations and thus differing occupant load factors. For example, a multipurpose room can be configured loosely for events with tables and chairs, moderately with unfixed seating, and tightly with standing room only. Utilize the occupant load factor for spaces in the most confined configuration anticipated.

Shade (Tier I), Rest (Tier II), and Gathering (Tier III) Pavilions must adhere to the following prevailing standards: Federal, state and county requirements, such as California's Title 24 Part 6 Building Energy Efficiency Standards, and local building codes, zoning regulations, and parking requirements. Moreover, the development of pavilions should reflect a commitment to serve the entirety of river users and make necessary accommodations for universal access.

SHADE PAVILIONS (TIER I)



REST PAVILIONS (TIER II)



GATHERING PAVILIONS (TIER III)

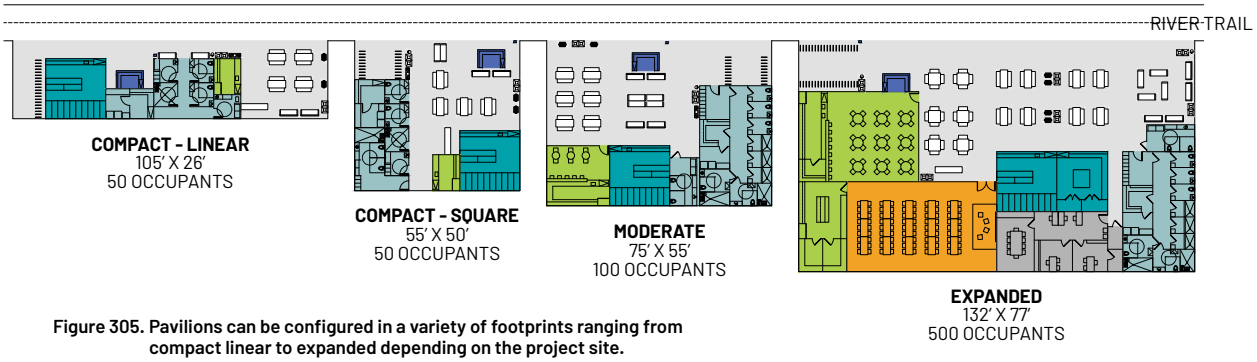


Figure 305. Pavilions can be configured in a variety of footprints ranging from compact linear to expanded depending on the project site.

Shade Pavilions (Tier I)

- Compact | Linear (27' x 9') : 5 occupants
- Compact | Square (15' x 15'): 5 occupants
- Moderate (30' x 20'): 10 occupants
- Expanded (35' x 25'): 20 occupants

Rest Pavilions (Tier II)

- Compact | Linear (77' x 13'): 20 occupants
- Compact | Square (30' x 30'): 20 occupants
- Moderate (45' x 40'): 30 occupants
- Expanded (60' x 50'): 50 occupants

Gathering Pavilions (Tier III)

- Compact | Linear (105' x 26'): 50 occupants
- Compact | Square (55' x 50'): 50 occupants
- Moderate (75' x 55'): 100 occupants
- Expanded (132' x 77'): 500 occupants

Figure 306. A Shade Pavilion (Tier I) at river mile 14.7 is an example of how trail users can be welcomed with environmental graphics, an accessible ramp entrance, and amenities such as bike racks and drinking fountains.

SHADE PAVILIONS (TIER I)

Shade Pavilions (Tier I) are the smallest of the River Pavilions. They provide shade and seating options along the length of the river, in addition to river education, drinking water, emergency call boxes, trash and recycling bins, and pet waste disposal. Shade Pavilions (Tier I) do not hold a robust program, but instead serve river users as a site of refuge, appropriate for moments of shade respite, shelter during passing inclement weather, and comfort. Shade can be provided both by structures and by mature canopy trees. They may take on a number of different configurations, dependent on their site constraints, urban context, and desired orientation. Shade Pavilions (Tier I) are small, but are essential in creating a consistent identity and robust implementation of LA River facilities and amenities.

SHADE PAVILIONS (TIER I) PROVIDE SHELTER AND REFUGE TO VISITORS OF THE LA RIVER AND ALSO PROVIDE OPPORTUNITIES FOR RIVER EDUCATION

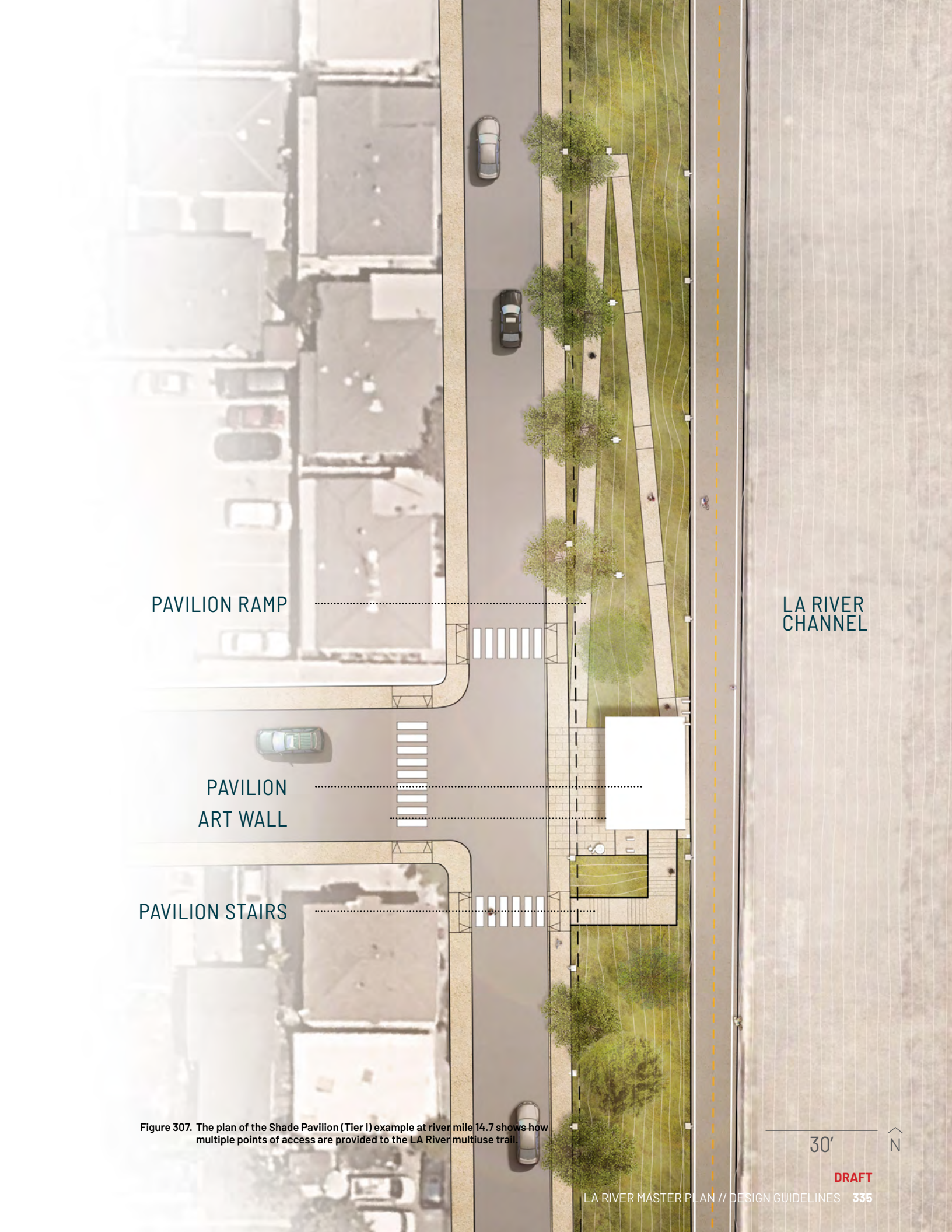
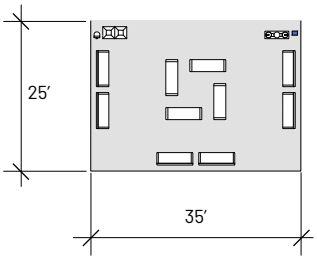
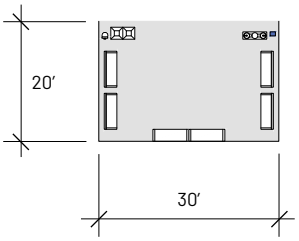


Figure 307. The plan of the Shade Pavilion (Tier I) example at river mile 14.7 shows how multiple points of access are provided to the LA River multiuse trail.

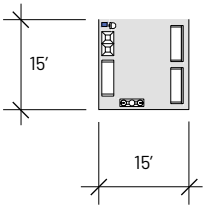
PREFERRED



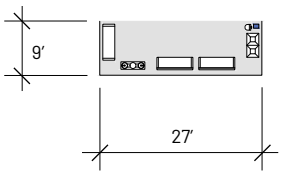
EXPANDED
- Approximately 20 occupants
- Approximately 900 sq ft
- Arranges covered seating for to encourage socialization
- Enhanced river education area
- Seating orientated facing and away from river and parallel and perpendicular to trail



MODERATE
- Approximately 10 occupants
- Approximately 600 sq ft
- Arranges covered seating for to encourage socialization
- Seating orientated away from river and perpendicular to trail



COMPACT | SQUARE
- Approximately 5 occupants
- Approximately 250 sq ft
- Seating orientated away from river and perpendicular to trail



COMPACT | LINEAR
- Approximately 5 occupants
- Approximately 250 sq ft
- Seating oriented toward river and parallel to trail

MINIMUM

0′ 20′ 40′

Figure 308. The Shade Pavilion (Tier I) can be configured in a variety of footprints from compact to expanded, depending on the project site and other constraints.

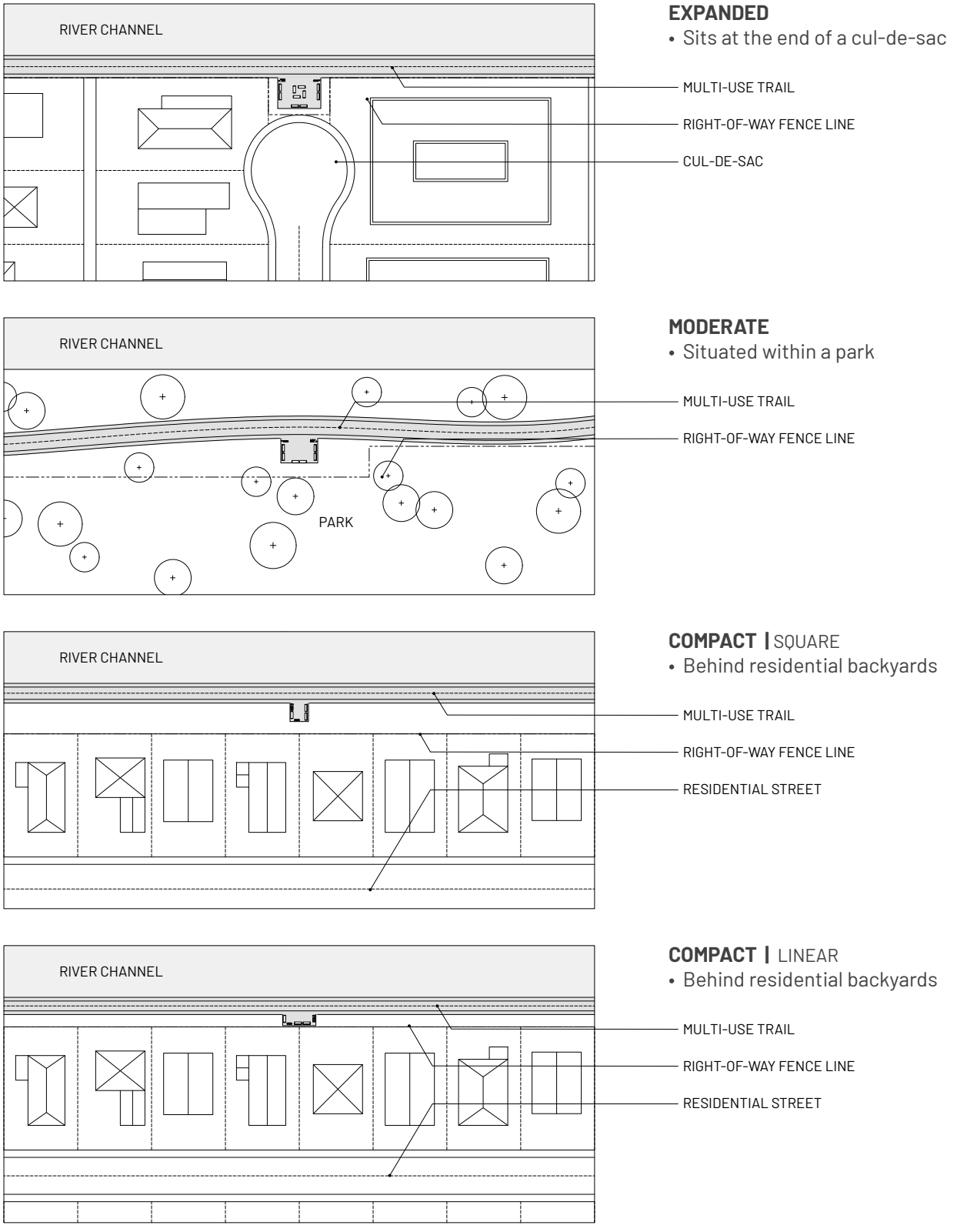


Figure 309. These example plans show how the Shade Pavilion (Tier I) can be implemented in a variety of urban contexts along the LA River.

Figure 310. The example of a Rest Pavilion (Tier II) at river mile 50.9 welcomes users through pavement markings, a picnic area, and a local food vendor. Public restrooms are an important feature of Rest Pavilions.

REST PAVILIONS (TIER II)

Rest Pavilions (Tier II) offer enhanced facilities and amenities beyond the baseline Shade Pavilions (Tier I), but fewer than Gathering Pavilions (Tier III). The most notable addition is restrooms. There should be a preference for single-occupancy restrooms and family restrooms, to provide greater privacy and dignity to all users. To increase efficiency and recognizability, Rest Pavilions (Tier II) should implement modular restrooms configurations that can be fabricated off-site, customized to incorporate graphic standards established along the LA River, and have an extensive presence across its 51 miles on both river banks. The modularity of the restrooms enhances the river's unification, pavilion familiarity, and equity for all river users.

Rest Pavilions (Tier II) also incorporate picnic areas, vending machines for healthy and affordable snacks and beverages, universal charging stations, and bike racks. Depending on their size and context, they may also include barbecues and recreational outdoor showers, which are particularly beneficial if the pavilion is adjacent to pools, other water features, or sports facilities. These pavilions serve as accessory facilities and amenities for river users, enabling relief, rest, and sustenance.

Regular maintenance is essential to preserve the upkeep of these facilities. In their implementation across the river, it is essential to consider materials that are durable, easily cleaned, and vandal-resistant, lessening long-term maintenance costs. Further, it is important to regularly operate and survey them to deter people from misappropriating their use. In facilitating welcoming, comfortable, and familiar structures, Rest Pavilions (Tier II) can establish a cadence of refuge along both banks of the LA River. They can create an accessible environment, in which river user and river-adjacent community needs are met.

REST PAVILIONS (TIER II), SPACED ON AVERAGE ONE MILE APART FROM OTHER TIER II PAVILIONS, FORM A RELIABLE NETWORK OF RESTROOM FACILITIES, PROVIDING RIVER USERS GREATER COMFORT AND IMPROVING SANITATION ALONG THE LA RIVER

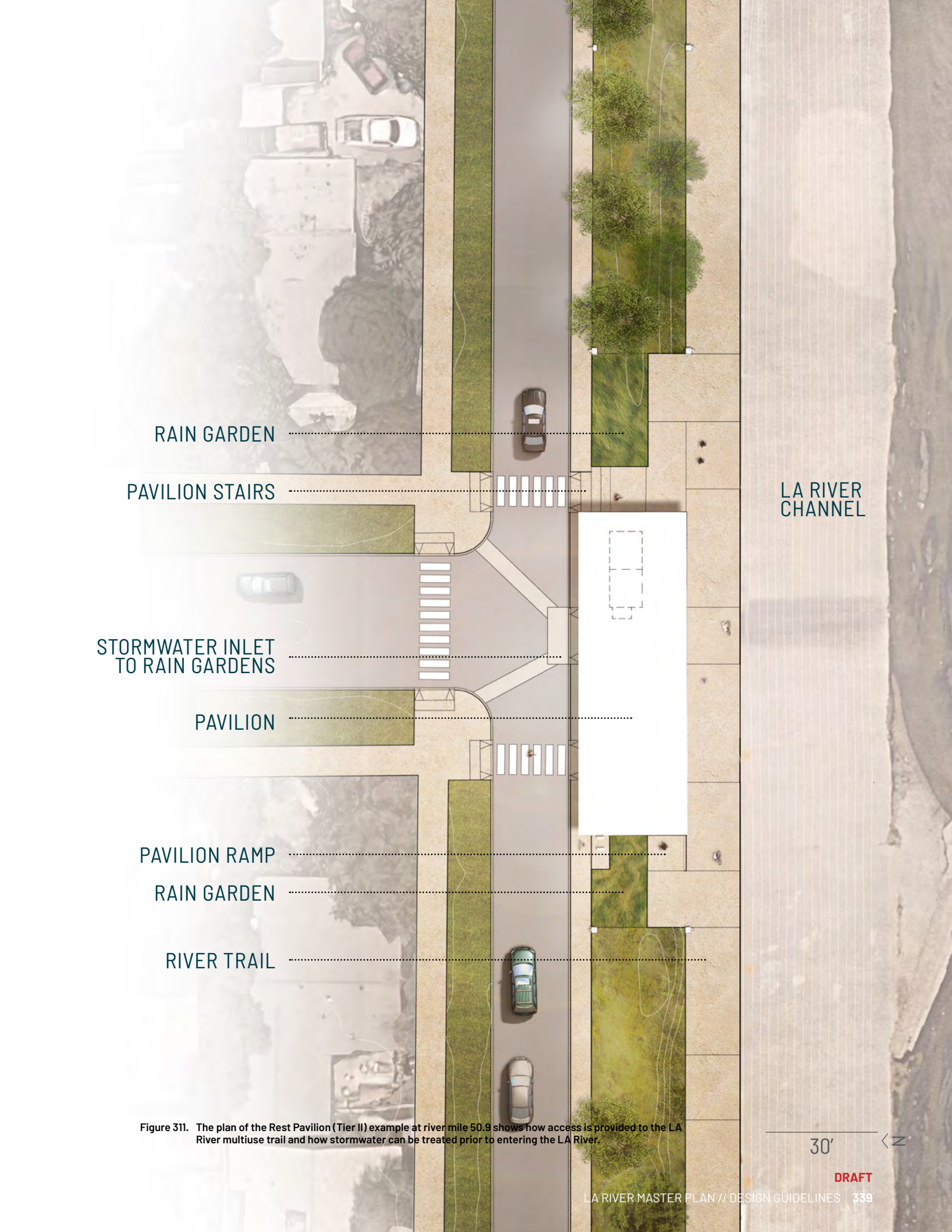
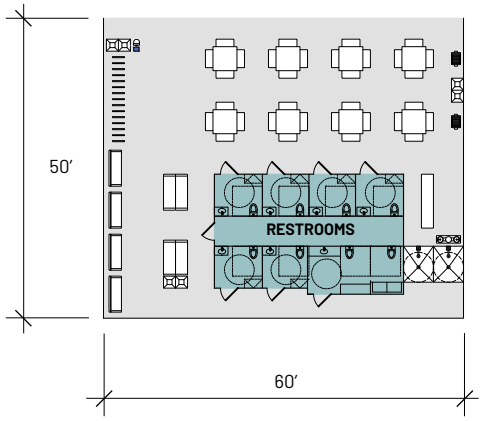
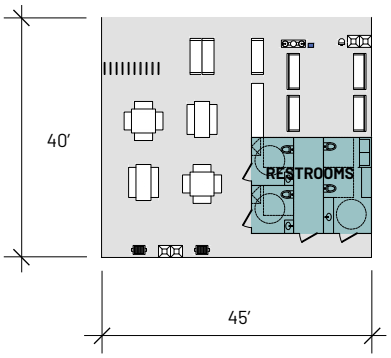


Figure 311. The plan of the Rest Pavilion (Tier II) example at river mile 50.9 shows how access is provided to the LA River multiuse trail and how stormwater can be treated prior to entering the LA River.

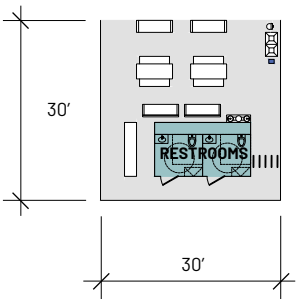
PREFERRED



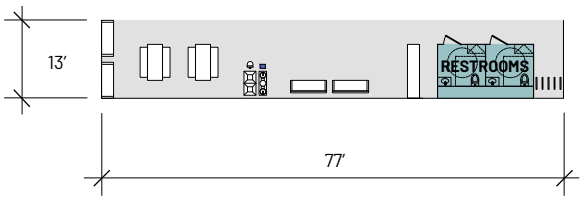
EXPANDED
- Approximately 50 occupants
- Approximately 3,000 sq ft
- Additional shaded seating and picnicking tables
- Optional barbecues and recreational outdoor showers
- Supplement with family restroom(s) and storage



MODERATE
- Approximately 30 occupants
- Approximately 2,000 sq ft
- Additional shaded seating and picnicking tables
- Optional barbecues and recreational outdoor showers
- Includes family restroom or mother's room



COMPACT | LINEAR
- Approximately 20 occupants
- Approximately 1,000 sq ft
- No outdoor showers or barbecues



COMPACT | LINEAR
- Approximately 20 occupants
- Approximately 1,000 sq ft
- No outdoor showers or barbecues
- Oriented toward river

MINIMUM

0′ 20′ 40′

Figure 312. The Rest Pavilion (Tier II) can be configured in a variety of footprints from compact to expanded, depending on the project site and other constraints.

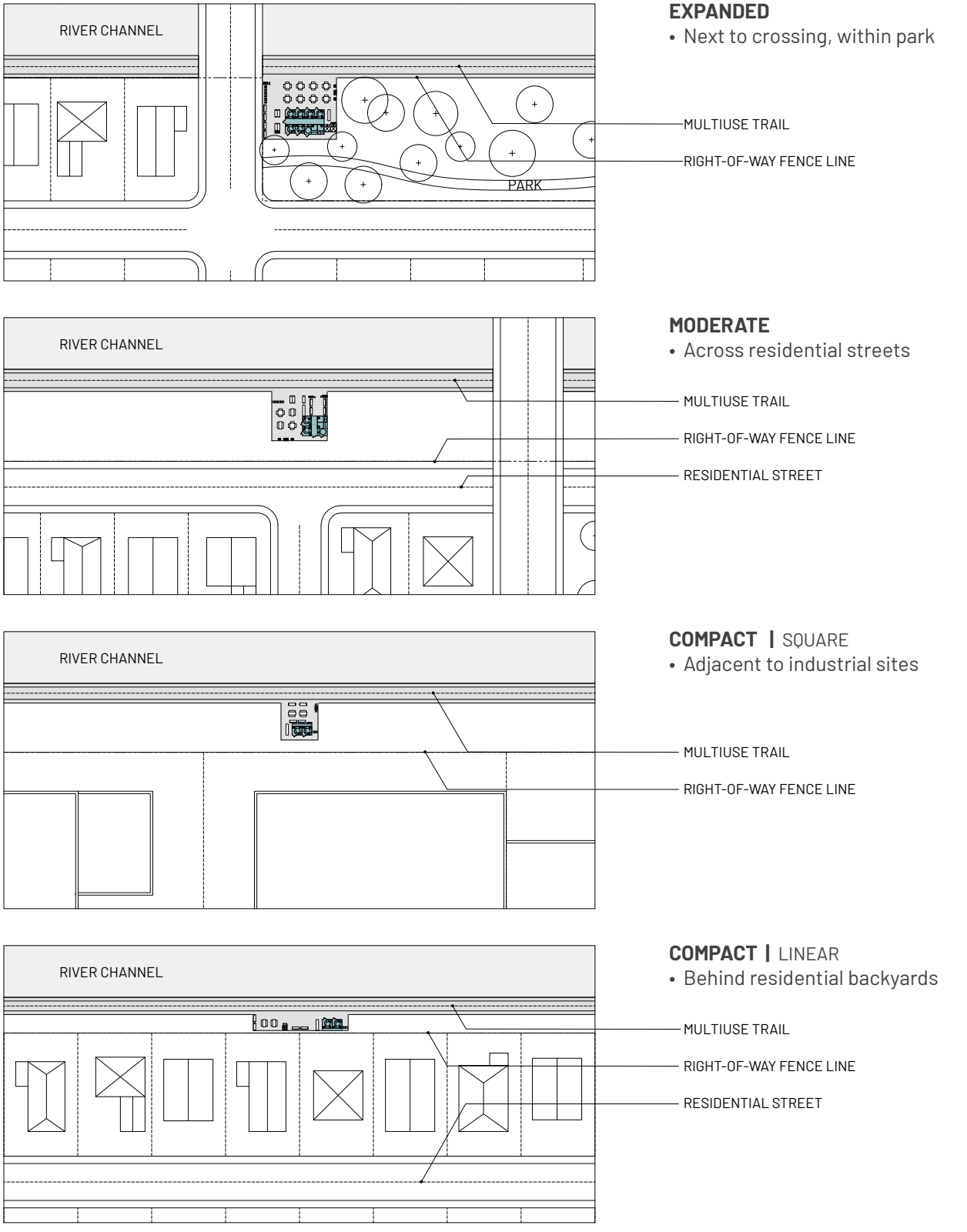


Figure 313. These example plans show how the Rest Pavilion (Tier II) can be implemented in a variety of urban contexts along the LA River.

Figure 314. This example of a Gathering Pavilion (Tier III) at river mile 28.4 includes a cafe overlooking the LA River. Gather Pavilions often include community programming that requires expanded facilities.

GATHERING PAVILIONS (TIER III)

Gathering Pavilions (Tier III) are the largest of the River Pavilions and can serve as significant hubs for programming and activity. Ideally situated every 2-3 miles at the access points to the LA River, these pavilions are accessible to both river users and adjacent community members. Expanded Gathering Pavilions in particular can support river-adjacent neighborhoods as community centers with robust facilities, amenities, and opportunities for events, education, and engagement.

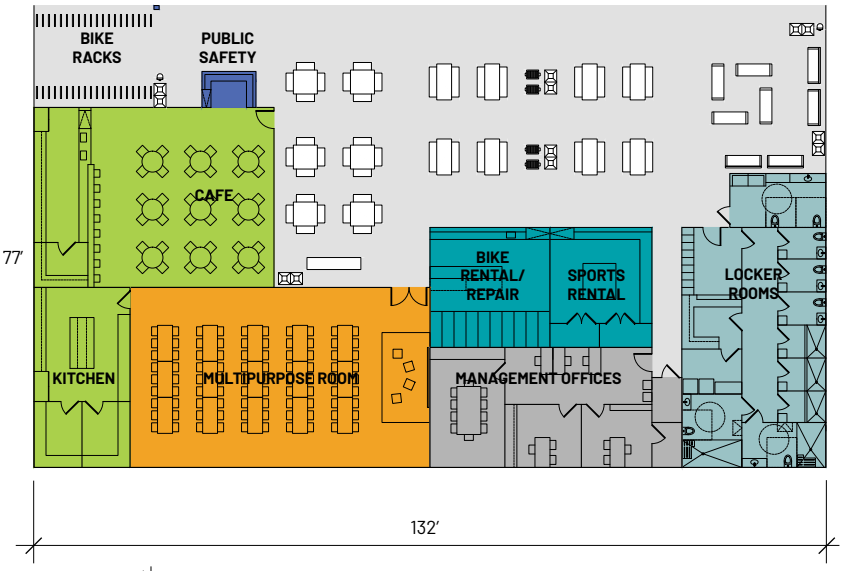
Gathering Pavilions (Tier III) also offer enhanced sanitation facilities including restrooms, showers, lockers, and changing facilities. Locker rooms, paired with attendant stations, should have regular on-site maintenance to preserve their upkeep and deter misuse. Further, they have rental kiosks to provide river users towels for rent, in addition to soap, shampoo, conditioner, and other toiletries for purchase. Unlike Rest Pavilions (Tier II), sanitation facilities in Gathering Pavilions (Tier III) should be customized to best relate to the specific organization of other spaces within the pavilion.

These sanitation facilities provide multiple benefits and can help alleviate the sanitation needs of persons experiencing homelessness. Currently, many of these individuals have limited access to sanitation facilities and as the county and river-adjacent cities make further investments to construct affordable housing and permanent supportive housing for persons experiencing homelessness, Gathering Pavilions (Tier III) can serve in the interim as spaces to support this vulnerable population's sanitation needs. However, upon their development and long-term, locker rooms can serve the needs of everyone along the length of the river, especially those engaging in athletic activity. Gathering Pavilions (Tier III) will supplement the active needs of river users outside of the building itself, such as soccer, dance and theater arts, sporting events, yoga classes, and jogging along the trail.

Gathering Pavilions (Tier III) are centralized hubs for the LA River. Their optional multipurpose rooms can be utilized for community events, ceremonies, and other large gatherings. They should also have enough hardscaped floor area to similarly host outside events and ceremonies. Unlike smaller pavilions, they can support on-site management staff to establish daily programming and robust community offerings. The pavilions must be flexible for different needs, programs, and activities to optimize the development of the river at large.

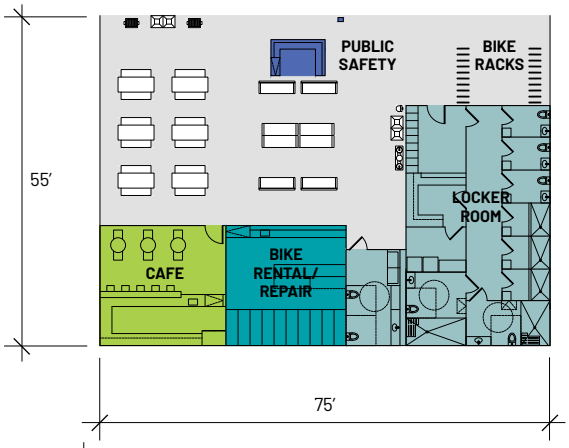
Figure 315. The plan of the Gathering Pavilion (Tier III) example at river mile 28.4 shows how multiple facilities can be incorporated onto a project site.

PREFERRED



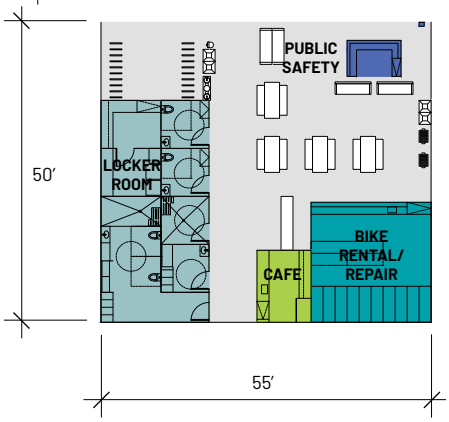
EXPANDED

- Approximately 500 occupants
- Approximately 10,500 sq ft
- Enlarged cafe and locker room
- Multipurpose room and community kitchen provides large, flexible event space
- Includes sports equipment rental to supplement adjacent sports fields and courts
- If using single-sex locker rooms, supplement with family locker room



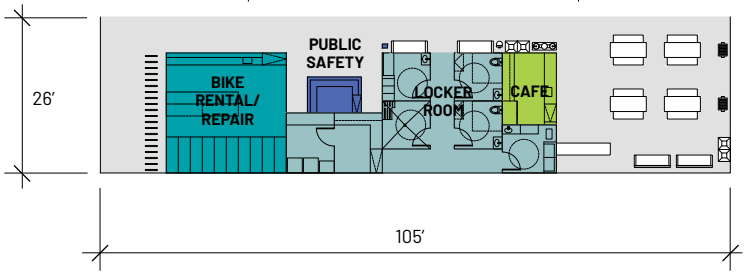
MODERATE

- Approximately 100 occupants
- Approximately 4,500 sq ft
- Enlarged cafe and locker room
- No multipurpose room, community kitchen, or sports equipment rental



COMPACT | SQUARE

- Approximately 50 occupants
- Approximately 3,000 sq ft
- No multipurpose room, community kitchen, or sports equipment rental



COMPACT | LINEAR

- Approximately 50 occupants
- Approximately 3,000 sq ft
- No multipurpose room, community kitchen, or sports equipment rental

MINIMUM

0′ 20′ 40′

Figure 316. The Gather Pavilion (Tier III) can be configured in a variety of footprints from compact to expanded, depending on the project site and other constraints.

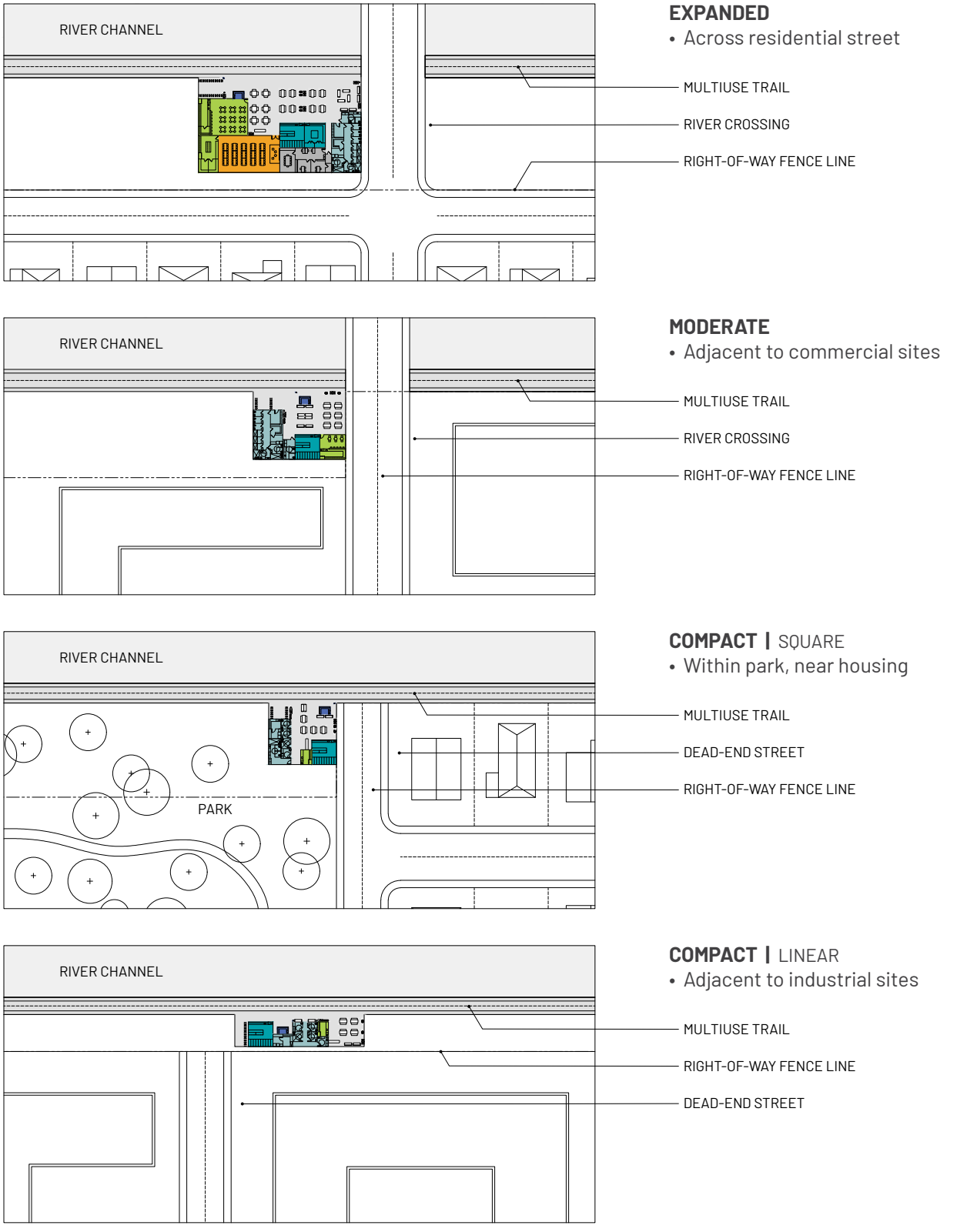


Figure 317. These example plans show how the Gathering Pavilion (Tier III) can be implemented in a variety of urban contexts along the LA River.

PAVILIONS SITUATED ALONG THE LA RIVER SHOULD IMPLEMENT VARYING BEST PRACTICES TO EMBODY THE SAME ENVIRONMENTAL, PUBLIC HEALTH, AND SOCIAL VISION OF THE LA RIVER MASTER PLAN OVERALL

PAVILION BEST PRACTICES

The development of River Pavilions should incorporate water, environmental, construction, and social best practices, among many others. When developing River Pavilions, there are numerous prevailing standards for best practices to reference, including but not limited to California's Title 24 Part 6 Building Energy Efficient Standards, United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED), United States Department of Energy Better Buildings Initiative, Energy Star, Dark Sky, Cradle-to-Cradle, and Green Globes, among many others. Pavilions should also reference future standards and best practices for upcoming development.

All pavilions should promote the health, safety, and welfare of river users. First, all pavilions should optimize lighting at night, to enhance visibility, deter criminal behaviors, and lessen concerns of safety. However, lighting should not be too bright as to cause significant light pollution or create oppressive environments. Emergency call boxes should sit near the entry of all pavilions and create a recognizable and regular network of public safety mechanisms. Rest (Tier I) and Gathering (Tier II) Pavilions in particular should provide first-aid kits and automatic defibrillators for emergencies great and small. Self-administered first-aid kits in particular require regular inspection, maintenance, and replenishment with single-use medications. Lastly, Gathering Pavilions (Tier III) incorporate public safety stations that can have on-site staff, river staff, and/or police officers to serve and support river users. The presence of public safety and police officers will further help to strengthen notions of safety along the river and serve visitors during moments of need. However, it is critical to not oversurveil river users, as to make them feel uncomfortable in their occupation of the river and its facilities and amenities.

River Pavilions offer refuge to river users and river-adjacent communities and should reflect the same aspiration of enhancing visitors' experience of the river as the LA River Master Plan at large. Pavilions should not result in demanding energy and water usage, cause environmental nuisances, engage unsustainable building practices, nor create inaccessible facilities and amenities. Pavilions should serve as an example of varying best practices and help propel the LA River into a future of access, equity, and resiliency.

WATER
- Follow LA County LID Standards
- On-site water retention, detention, and filtration
- Capture 100% of on-site rainfall for the 85% rain event
- Greywater and rainwater reuse
- Low-flow water fixtures

ENERGY AND ENVIRONMENT
- Utilize renewable energy sources (solar, wind, and water)
- Optimize building orientation for solar exposure, diffused daylight, and passive ventilation
- High thermal performance
- Energy efficient appliances
- Pollution reduction

MATERIALITY
- Locally sourced, recycled, and recyclable materials with low embodied energy
- High-albedo roof and paving materials to mitigate heat gain
- Green roof and pervious paving

CONSTRUCTION / O&M
- Recycle construction waste
- Reduce dust and mitigate other nuisances during construction
- Green cleaning and integrated building management
- Regularly monitor building systems and optimize usage

SOCIAL
- Provide universal access to all communities and users
- Avoid physical deterrents
- Provide spaces for socialization
- Promote public engagement with areas for large gatherings

SITE FURNISHINGS

Successful projects, trails, and connected public open spaces require a series of common elements ranging from consistent lighting to drinking fountains to places to sit along the LA River. These furnishings will contribute to the habitability of the river environs, promote safety, and build a cohesive identity. While river pavilions and large project designs are encouraged to use bespoke elements along the river, a common set of site furnishings with unified colors and amenities used across all sites and trails will promote equity, identity, legibility, and accessibility. Additionally, site furnishing offer opportunities for integration of public art.

RAL CODES FOR SITE FURNISHINGS

RAL 9007 GREY

RAL 5013 (PANTONE 282 C) BLUE

Figure 319. LA River Site Furnishings should use RAL 9007 for silver metallic finishes and an RAL 5013 to match the environmental graphics and for overall consistency along the LA River.

1. **LITTER & RECYCLING** SEE PAGE 350
2. **BIKE RACK** SEE PAGE 351
3. **BENCHES** SEE PAGE 352
4. **DRINKING FOUNTAIN** SEE PAGE 353
5. **LIGHTING** SEE PAGE 354
6. **EMERGENCY CALL BOX** SEE PAGE 357

Figure 318. A variety of site furnishings can be placed at pavilions, parks, or along the river trail. See the following pages for more details on each element.

SITE FURNISHINGS: LITTER AND RECYCLING RECEPTACLES

Litter and recycling receptacles are necessary to maintain the health, safety, and the general aesthetic of the LA River.

Litter Receptacles along the LA River must meet the following guidelines:

Aesthetics

- Select receptacles without ornament or protrusions.
- Receptacles should be metal with a solid metallic gray color finish matching RAL 9007 or comparable equal.
- Receptacles should have rain guards or a side opening that prevents rainwater from collecting in the receptacle.

Assembly, Installation, and Manufacturer

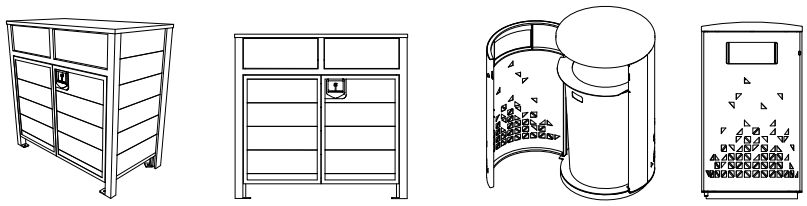
- Locate receptacles so that they are easily accessible from the trail or other user area.
- Locate receptacles at entrances, rest stops, major access points, and near benches.
- Co-locate recycling receptacles adjacent to all trash receptacles.

Maintenance

- Install receptacles that are easy to empty and do not not require heavy lifting by maintenance staff. For example, seek receptacles with side panels that open to empty.
- Coordinate maintenance program to ensure receptacles will be emptied regularly.
- Ensure receptacle does not leach or contaminate adjacent areas.

RECEPTACLE FORMS: BEST PRACTICE

ACCEPTABLE FORMS ✓



UNACCEPTABLE FORMS X

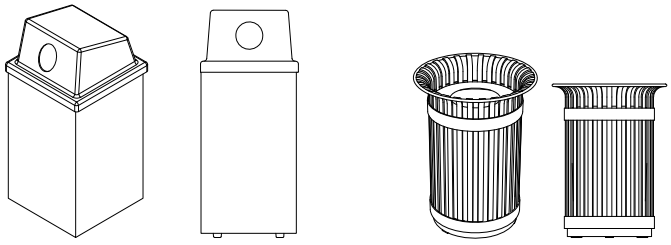


Figure 320. Litter receptacles should have simple forms with flat tops and an opening protected from rain.

SITE FURNISHINGS: BIKE RACKS

Frequent bicycle racks encourage the use of bicycle trails and multi-modal transit along the LA River and throughout LA County.

Bicycle racks along the LA River must meet the following guidelines:

Aesthetics

- Select racks without ornament or protrusions.
- Racks should be metal with a solid metallic gray color finish matching RAL 9007 or comparable equal.
- Provide racks with individual loops, not continuous rows.

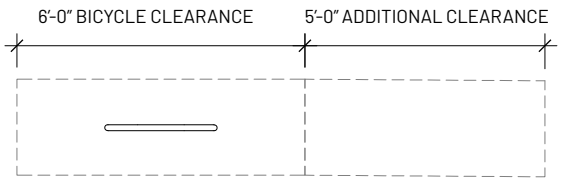
Installation, Assembly, and Manufacturer

- Provide 6' of length for bikes and an additional 5' unobstructed clearance for bike parking.
- Locate racks at entrances to the river, pavilions, and access points.

Maintenance

- Use a durable material that will withstand weathering.
- Maintain bicycle racks, deter graffiti where possible and inspect for other damages.

BICYCLE RACK PLAN



BICYCLE RACK FORMS: BEST PRACTICE

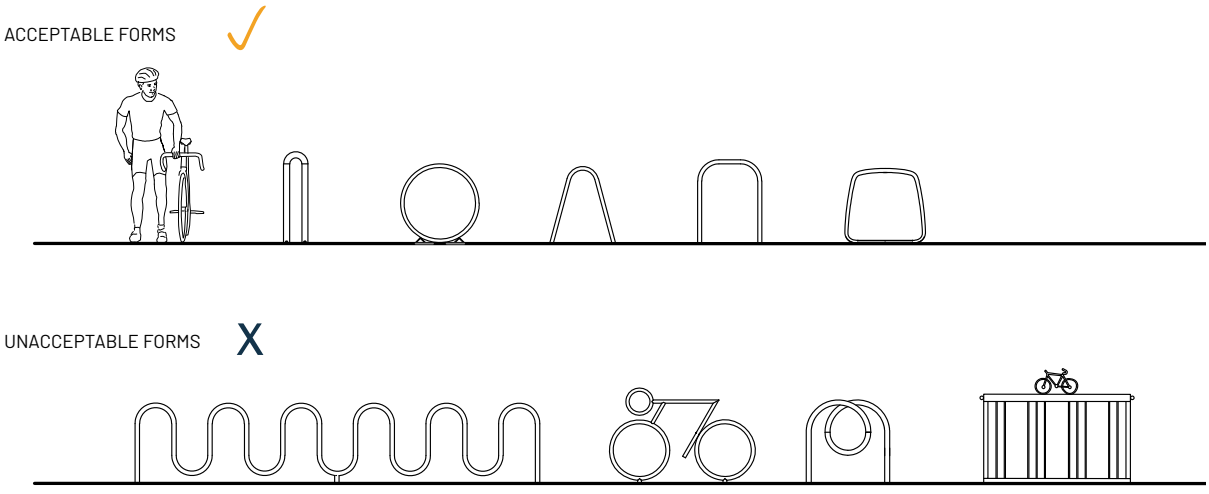


Figure 321. (Top) Bicycle racks should be placed to allow room for parking and maneuvering.
Figure 322. (Bottom) Bicycle racks should be individual loops and simple forms without ornamentation.

SITE FURNISHINGS: BENCHES

Seating along the LA River provides respite along trails and other facilities.

Benches may offer opportunities for integrating art and community expression. Benches and other features intended to be artistic elements are approved through the arts approval process and do not necessarily need to meet these guidelines.

Benches and seating along the LA River must meet the following guidelines:

Aesthetics

Coordinate bench and seating design with overall design approach. Seating elements are good locations for art and community expression.

Typical best practices:

- Ensure bench sitting surface is not metal. For metal supports or other elements, utilize satin or matte finish solid metallic gray matching RAL 9007 or comparable equal.
- Provide flexibility for various sitting options.
- Provide a variety of seating elements in addition to benches, such as seatwalls, seatsteps, and rock outcroppings.
- Group benches to promote social interaction.

Installation, Assembly, and Manufacturer

- Locate benches so that they are easily accessible from the trail.
- Locate benches at trail intersections and special views.
- Where freestanding benches are used, provide anchorages to adjacent pavement and engineer appropriate footings.

Maintenance

- Maintain benches, deter graffiti where possible, and inspect for other damages.

BENCH FORMS: BEST PRACTICE

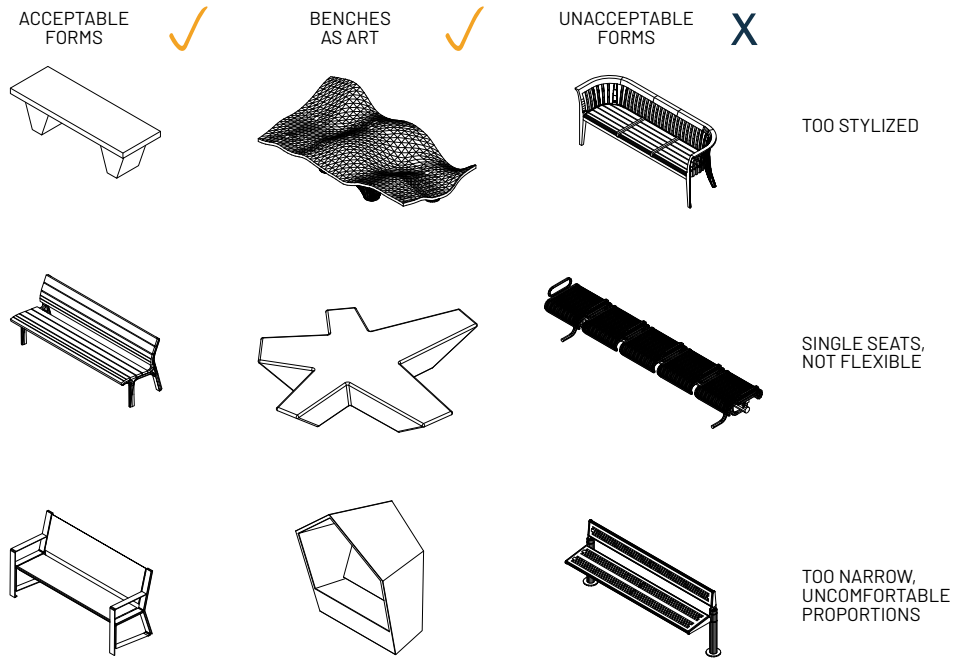


Figure 323. Bench forms should prioritize users' comfort and provide flexibility in use.

SITE FURNISHINGS: DRINKING FOUNTAINS

Drinking fountains are crucial to users of the LA River Trail, especially on hotter-than-average summer days. They promote hydration and personal health along the river corridor.

Drinking Fountains along the LA River must meet the following guidelines:

Aesthetics

- Drinking fountains should be metal with a solid metallic gray color finish matching RAL 9007 or comparable equal.
- Include bottle filling station
- Include pet drinking feature underneath.

Installation, Assembly, and Manufacturer

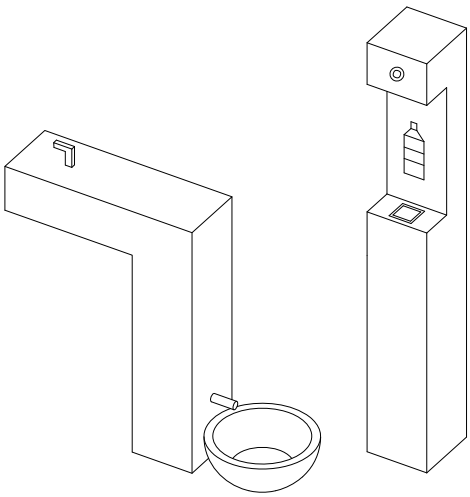
- Locate at major gathering spaces and at regular intervals along the multiuse trail.
- Locate drinking fountains so that they are easily accessible from the trail.

Maintenance

- Maintain water fountains, deter graffiti where possible and inspect for other damages.

FOUNTAINS FORMS: BEST PRACTICE

ACCEPTABLE FORMS ✓



UNACCEPTABLE FORMS X

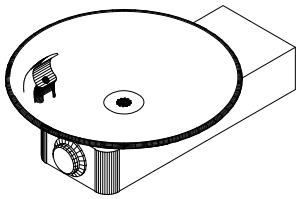


Figure 324. Drinking fountains should not have cupping or bowl shapes for hygiene and ease of cleaning.

SITE FURNISHINGS: LIGHTING

Lighting provides visibility for cyclists and pedestrians and highlights special areas such as major access points, emergency call boxes, and information kiosks. Trail underpasses, future overpasses, and street ends are all areas that need special attention to lighting with regards to safety and visibility. All lighting should minimize light pollution to the greatest extent possible and be sensitive to ecological needs. Special care needs to be taken around wildlife habitat areas. Project lighting should be designed by qualified lighting design professionals. Technology and research with regards to lighting is constantly evolving, and the most efficient fixtures should be allowed for use in projects along the LA River.

Lighting elements along the LA River vary per specific application. Overall, all lighting must meet the following:

Aesthetics

- Select fixtures that have a modern, urban aesthetic free of extraneous decorative elements.
- Acorn light fixtures and light masts are prohibited.
- Integrate lighting into architecture where possible rather than having standalone fixtures.
- Finish for luminaries and pole must be available in a neutral solid metallic gray color matching RAL 9007 or comparable equal.

Light Quality and Locations

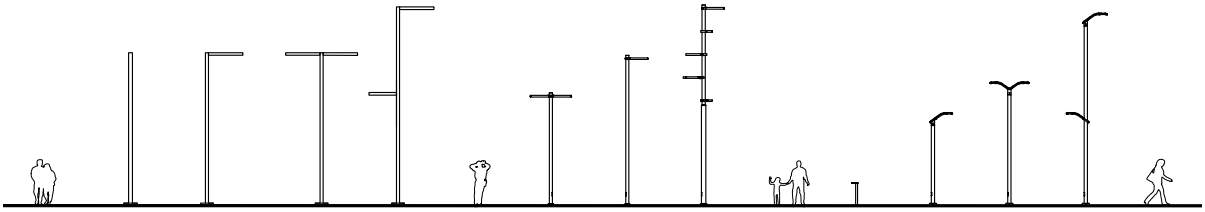
- Complete lighting study to determine appropriate light levels, fixture types, and fixture heights.
- Install lighting at over/underpasses, intersections, and trailheads for safety.
- Use LED or more efficient light source.
- Use Dark Sky compliant and BUG rated (backlight, updlight, glare) fixtures. These ratings should be as efficient as possible and eliminate spillover lighting. Fixtures should meet these requirements without adding additional shielding.
- Provide fixtures that have IES (Illuminating Engineering Society) files for illumination measured in lumens (bulb strength depending on pole height) and footcandles (light falling on a surface determined by lighting designer).
- Engineer poles and footings to withstand all project loads, including but not limited to, wind loads.
- Luminaire housing to be IP66 suitable for damp locations.

Installation, Assembly, and Manufacturer

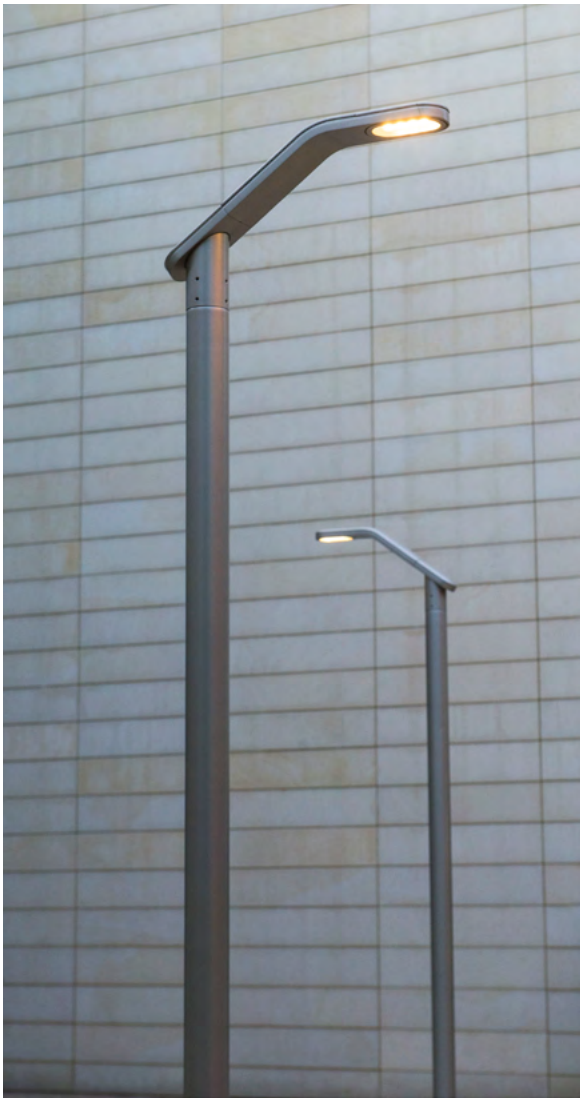
- Require UL listed products.
- Require manufacturers with established history of light fixture production.
- Snap together assembly or comparable system for ease of installation.
- Use fixtures that can host other uses including emergency call boxes, banners, and signs.
- Use products supported with complete engineering drawings and patents.

Energy Use and Maintenance

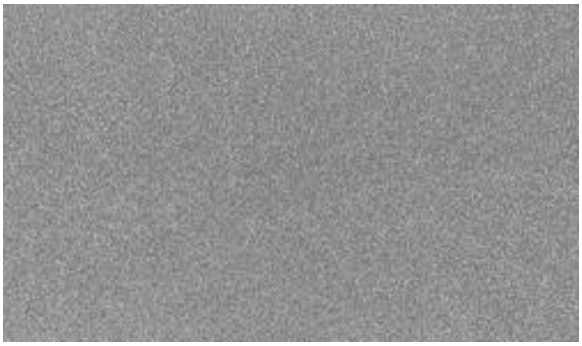
- Use solar powered light fixtures along the river wherever possible.
- Use fixtures made with recycled content where possible
- Ensure fixtures have LED cartridges that are easily replaced.



LA RIVER EXAMPLES LIGHTING FAMILIES



EXAMPLE LUMINAIRE



RAL 9007 GREY

EXAMPLE LUMINAIRE

Figure 325. (Top) Luminaires should have a modern, simple form without ornamentation.
Figure 326. (Left) Luminaires should be Dark Sky compliant and not have protruding features. Source: Torres Area Light, Landscape Forms, 2017.
Figure 327. (Top Right) All finishes should be a solid metallic grey color matching RAL 9007. Source: RAL-Color 9007, Wikimedia Commons, 2007.
Figure 328. (Bottom Right) Luminaires should occur at a regular cadence to illuminate the path. Source: Rama Area Light, Landscape Forms, 2008.

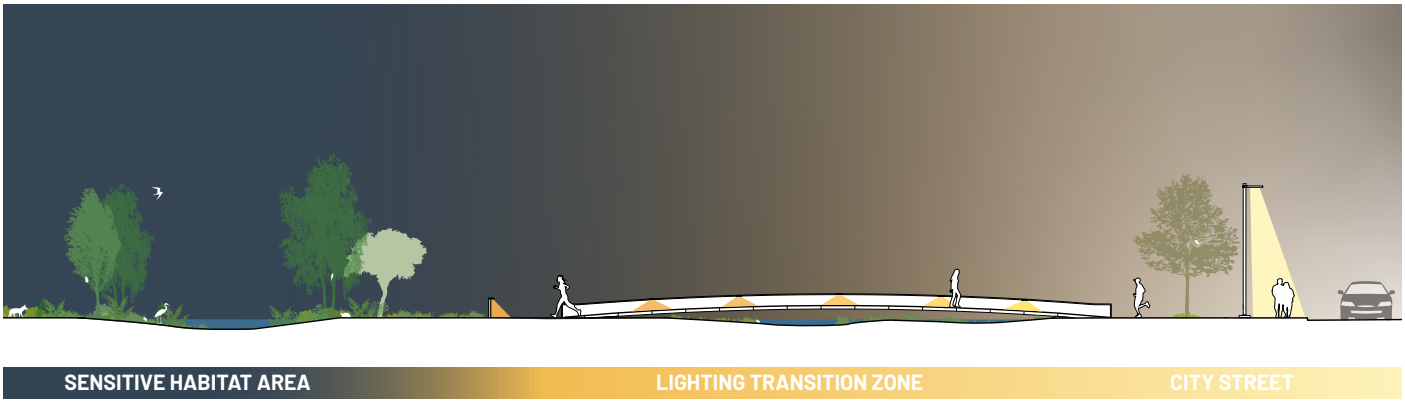


Figure 329. Factors such as light color temperature should step down incrementally when transitioning from street lighting to sensitive habitat areas that are not lit. Qualified lighting designers, landscape architects, and ecologists should work to limit the amount of light fixtures, reduce color temperature, and eliminate light spillover on a project by project basis.

Lighting for trails or paths of egress along the LA River must meet the following:

- Use only what fixtures are needed, and the warmest color temperature possible to provide safety and egress. Do not over-light or make lights unnecessarily bright.
- Provide fixtures and controls capable of dimming or shutting off lighting when occupancy loads are low (example: dimmable driver and occupancy sensor).
- Color rendering should be at least 80 CRI.
- Avoid light bollards where possible.

Lighting for wildlife habitat areas must meet the following:

- Use as few fixtures as possible. Fixtures should be low-level lighting. Avoid tall poles where possible.
- Use the warmest color temperature possible, no more than 2200K as a maximum. Consider other measures that impact wildlife when selecting an appropriate fixture, such as the light spectrum emitted.
- Transition to a warm color temperature in gradual steps if moving from a street or path of egress to a habitat area.
- Provide fixtures and controls capable of shutting off lighting on a timer, such as when a park is closed, to limit the duration of lighting to the absolute minimum period possible.
- No CRI level is required. Light should be as amber as possible.

Sample fixtures that may meet requirements include Landscape Forms RAMA, Landscape Forms Torres, and Hess Linea. BEGA also carries low-level lighting fixtures that may meet requirements for lighting wildlife habitat areas.

SITE FURNISHINGS: EMERGENCY CALL BOXES

Emergency call boxes are crucial to the perceived and actual safety of users along the LA River. They are important in case a user does not own or have access to a cell phone and because they allow emergency response to pinpoint the exact location of a caller.

Emergency call boxes along the LA River must meet the following:

Aesthetics

- Select product with an identifying light or beacon on top. There should be no protrusions or ornamentation.
- Provide accessible push-button calling.
- Along trail, call box should be directional towards the trail. In an open area with many angles of approach, the call box should be non-directional.

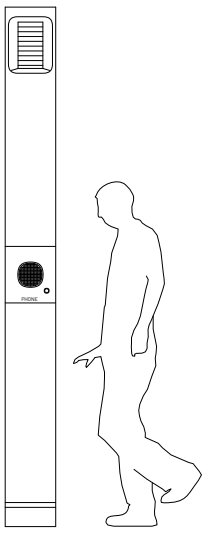
Installation, Assembly, and Manufacturer

- Locate call boxes along bike path every 1/2 mile minimum, to be coordinated with river pavilion locations. They should be clearly visible from the trail.
- Ensure that the call box is TTY (text telephone for the deaf) equipped.
- Provide on-site programming option and option to program up to 2 emergency phone numbers.
- Functioning temperature range should withstand extreme heat (up to 150F).
- Cellular or hard lined to be determined by presiding agency.

Energy Use and Maintenance

- Use solar powered call boxes along the river wherever possible.
- Maintain call boxes, deter graffiti where possible and inspect for continued functionality and other damages.

CALL BOX LIGHT BEACON



CALL BOX ELEVATION

Figure 330. (Left) Call boxes should have an identifiable and visible top. When possible, call boxes should match the LARMP Blue, RAL 5013. Source: Blue Light Tower, CASE Emergency systems, 2019.

Figure 331. (Middle) Call boxes should be freestanding tall structures with push button calling. Blue Light Tower, CASE Emergency systems, 2019.

FACILITIES AND AMENITIES CHECKLIST

Reference the LACFCD and Public Works Permitting checklist on page 36 for an overview of project permitting and applicable codes.

Detailed Technical Requirements Checklist for Facilities and Amenities

Occupancy

- ☐ Shade Pavilions (Tier I) must be sized for the following approximate occupancy rates:
  - Compact | Linear (27′ x 9′) : 5 occupants
  - Compact | Square (15′ x 15′): 5 occupants
  - Moderate (30′ x 20′): 10 occupants
  - Expanded (35′ x 25′): 20 occupants
- ☐ Rest Pavilions (Tier II) must be sized for the following approximate occupancy rates:
  - Compact | Linear (77′ x 13′): 20 occupants
  - Compact | Square (30′ x 30′): 20 occupants
  - Moderate (45′ x 40′): 30 occupants
  - Expanded (60′ x 50′): 50 occupants
- ☐ Gathering Pavilions (Tier III) must be sized for the following approximate occupancy rates:
  - Compact | Linear (105′ x 26′): 50 occupants
  - Compact | Square (55′ x 50′): 50 occupants
  - Moderate (75′ x 55′): 100 occupants
  - Expanded (132′ x 77′): 500 occupants

River Pavilions

- ☐ Follow applicable building codes: Federal, state, and county requirements, such as California's Title 24 Part 6 Building Energy Efficiency Standards, and local building codes, zoning regulations, and parking requirements.
- ☐ Shade Pavilions (Tier I) must include:
  - Shade structure or mature canopy trees and seating
  - River education display
  - Drinking fountain
  - Emergency call box
  - Litter and recycling receptacles
  - Pet waste station

- ☐ Rest Pavilions (Tier II) must include everything in the Shade Pavilions (Tier I) plus the following:
    - Single occupancy restrooms / basic sanitation facilities
    - Charging station
    - Bike racks (number based on occupancy and local codes)
    - Snack station
    - Picnic tables
- ☐ Gather Pavilions (Tier III) must include everything in the Shade Pavilions (Tier I) and Rest Pavilions (Tier II) plus the following:
    - Locker rooms / enhanced sanitation facilities
    - Public safety station
    - Cafe

Common Elements

- ☐ All projects must provide:
    - Benches and seating (to follow requirements on page 352)
    - Bike racks (to follow requirements on page 351)
    - Litter and recycling receptacles (to follow requirements on page 350)
    - Drinking fountains (to follow requirements on page 353)
    - Lighting (to follow requirements on page 354)
    - Emergency call boxes (to follow requirements on page 357)
    - Use graffiti-deterrent finishes where possible.

Detailed Maintenance Program Checklist for Facilities and Amenities

River Pavilions

- ☐ Develop a pavilion-specific maintenance plan and schedule - frequent and special attention is required to prevent vandalism and ensure proper use of facilities.
- ☐ For Rest (Tier II) and Gathering (Tier III) Pavilions, dedicated full-time staff is required.

Common Elements

- ☐ Coordinate with presiding agency for lighting, trash and litter receptacles, and emergency call boxes.
- ☐ Inspect furnishings regularly for damages and continued functionality.

Figure 332. Attendees listening to the Jessica Henson speak about the Master Plan at the Canoga Park commu nity meeting at river mile 51.
Source: OLIN, 2018.

RESOURCES

GLOSSARY

1% Flood (100-Year Flood): A flood of a magnitude that has a 1 percent chance of being equaled or exceeded in any given year (i.e. has a recurrence interval of 100 years, on average).

1% Floodplain (100-Year Floodplain): Areas with a 1 percent annual chance of flooding.

0.2% Flood (500-Year Flood): A flood of a magnitude that has a 0.2 percent chance of being equaled or exceeded in any given year (i.e. has a recurrence interval of 500 years, on average).

0.2% Floodplain (500-Year Floodplain): Areas with a 0.2 percent annual chance of flooding.

Active Transport: Modes of transportation that are non-motorized relying on physical activity, such as walking and cycling, in addition to public transportation, which will be understood to require walking or cycling as a part of the whole journey. (Source: Healthy Spaces & Places, Australia)

Alluvium/Alluvial: Any soil or rock material deposit transported by water.

Aquifer: A natural underground layer of porous, water bearing materials (sand, gravel) usually capable of yielding a large amount or supply of water.

Aquifer Recharge: Aquifer recharge (AR) and aquifer storage and recovery (ASR) are processes that convey water underground. These processes replenish groundwater stored in aquifers for beneficial purposes. Although the terms are often used interchangeably, they are separate processes with distinct objectives. AR is used solely to replenish water in aquifers. ASR is used to store water which is later recovered for reuse. (Source: US EPA)

Area Median Income: The median family income calculated by the US Department of Housing and Urban Development (HUD) for each jurisdiction, in order to determine Fair Market Rents (FMRs) and income limits for HUD programs. Also known as HUD Area Median Family Income.

Aspect: The compass direction of exposure of a site to environmental factors (in particular, sunlight).

Beneficial Use: **1.** The uses of water necessary for the survival or well being of man, plants and wildlife. These uses of water serve to promote the tangible and intangible economic, social and environmental goals of mankind. Examples include drinking, swimming, industrial and agricultural water supply, and the support of fresh and saline aquatic habitats. **2.** Defines the resources, services, and qualities of aquatic systems that are the ultimate goals of protecting and achieving. For example, Beneficial Use of Estuarine Habitat are uses of water that support estuarine ecosystems, including, but not limited to preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds), and the propagation, sustenance, and migration of estuarine organisms. (Source: Regional Water Board, Heal the Bay)

Best Management Practice (BMP): In the context of water quality, BMPs are structural, non-structural devices and/or managerial techniques that improve or prevent the pollution contained within dry and wet weather runoff from reaching downstream water ways.

Box Channel: A rectangular-shaped section of a channel, typically made of concrete.

Canopy: The uppermost continuous layer of foliage in forest vegetation formed by the crowns of the trees.

Climate Resourcefulness: An approach to climate resilience and justice that frames resilience in community action and/or activism as well as community self-determination and agency. This framework proposed a re-centering and re-grounding of resilience in communities and progressive, justice movements. (Source: Mackinnon and Derickson, 2013. "From Resilience to Resourcefulness: A Critique of Resilience Policy and Activism." Progress in Human Geography, 37.)

Community Based Process: Varies among communities and project scope but generally includes the following steps: initial community consultation; gathering data, observations, and analysis of primary issues; sharing those issues back to the community for further input; and finally, implementation. (Source: Project for Public Spaces)

Confined Aquifer: An aquifer in which an impermeable layer of soil or rock lays on top and prevents water from seeping into the ground.

Distributed Infiltration: Naturally or artificially allowing rainwater and runoff to percolate into the soil on a widespread basis.

Disturbance: Environmental fluctuations and destructive events, both man-made as well as natural, whether or not these are perceived as 'normal' for a particular system.

Diversity: Full range of variety and variability within and among living organisms, their associations, and habitat-oriented ecological complexes. Term encompasses ecosystem, species, and landscape as well as intraspecific (genetic) levels of diversity.

Ecoregions: Areas where ecosystems (and the type, quality, and quantity of environmental resources) are generally similar. This framework is derived from mapping done in collaboration with EPA regional offices, other Federal agencies, state resource management agencies, and neighboring North American countries. (Source: US EPA)

Ecosystem Function: The biological, geochemical and physical processes that take place or occur within an ecosystem.These processes often benefit human needs directly or indirectly. For example: providing shade, carbon sequestration, or filtering pollutants.

Ecosystem Services: The direct or indirect contributions of ecosystems to human well-being that support our survival and quality of life.

Ecotone: A transition area, or region, of vegetation between two different biological communities (biomes).

Extant Vegetation: The mix of plants and trees present above ground in a vegetated area that still exists from pre-urbanization conditions.

Fence: A barrier for public safety along LA County watercourses at least 60 inches high off the adjacent surface. Designers should reference the latest LA County codes for any updates.

Flood Control Basin: Large, empty basins which hold significant amounts of water during flood conditions to reduce flooding downstream. Examples of flood control basins in LA County include Sepulveda and Hansen.

Flood Channel: Concrete or earthen channels that convey water during large rain events. Flood channels are sometimes built on the courses of waterways as a way to reduce flooding. The LA River and many of its tributaries operate as flood channels.

Flood Control District: The Los Angeles County Flood Control Act (ACT) was adopted by the State Legislature in 1915, after a disastrous regional flood took a heavy toll on lives and property. The Act established the Los Angeles County Flood Control District and empowered it to provide flood protection, water conservation, recreation and aesthetic enhancement within its boundaries. The Flood Control District is governed, as a separate entity, by the County of Los Angeles Board of Supervisors.

Forest: An area of closely canopied trees.

Fuel break: A gap, strip, or block of vegetation in which detritus and debris have been removed, and which has been altered to act as a barrier to slow or stop the progress of a wildfire. They are also known as fire breaks, which are more commonly strips or areas of bare soil or fire-retardant material.

Functioning Ecosystem: A dynamic complex of plant, animal, and microorganism communities and their non-living environment that exhibits biological and chemical activities characteristic for its type, regardless of whether the system visually looks like a natural system.

Gate: An aperture along a fence to provide access while maintaining public safety.

Groundwater Basin: Groundwater stored in an area with permeable materials below the ground, typically capable of storing a significant supply of water.

Guardrail: A barrier at least 42 inches high near the open sides of elevated surfaces that minimizes the possibility of a fall. Guardrails should follow the latest code and ADA requirements (such as restrictions on openings).

Habitat: The locality, site, and particular type of local environment occupied by an organism; includes food, water, shelter, cover, and the ability to raise young.

Habitat Linkage: A connection between large areas of habitat that is typically vegetated. Linkages are critical to provide sufficient habitat for wide-ranging animal species with large home territories as well as for other wildlife species.

Historic Floodplain: Areas subject to inundation by the LA River and its tributaries and distributaries prior significant channelization in the 19th and 20th centuries.

Horizontal Structure: Patchiness; the composition and distribution of species that varies widely from one spot to the next.

Hydraulic Reach: A reach is a length of stream or river used as a unit of study. It contains a specified feature that is either fairly uniform throughout, such as hydraulic characteristics or flood damages, or that requires special attention in the study, such as a bridge. (Source: USDA)

Hydraulics: Science that focuses on the movement of water through channels, pipes, and rivers.

Hydrology: The study of water, specifically its properties, movement and interaction with land, and how it affects the earth and atmosphere.

Indeterminate Growth: Growth that continues throughout the lifespan of an individual.

Infiltration: The gradual flow or movement of water into and through (to percolate or pass through) the pores of the soil.

Injection: An injection well is a device that places fluid deep underground into porous rock formations, such as sandstone or limestone, or into or below the shallow soil layer.

Invasive Species: An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. (Source: USDA)

Invasive Plant Species: Plant species that are both non-native and able to establish on many sites, grow quickly, and spread to the point of disrupting plant communities or ecosystems, causing environmental harm and/or harm to human health. (Source: USDA)

LA River ROW: The LA River right-of-way is the "fenceline to fenceline" area of the river channel and typically includes the river, river banks or levees, and LA River Trail. The ROW is owned and maintained by a variety of entities.

LA River Watershed Native Plant Species: Plant species that are a part of the balance of nature that has developed over hundreds or thousands of years in the LA River Watershed. Refer to the LA River Design Guidelines plant community lists, qualified botanists or ecologists, and resources such as the California Native Plant Society (https://www.cnps.org/). (Source: USDA)

Levee: An embankment whose primary purpose is to furnish flood protection from seasonal high water and which is therefore subject to water loading for periods of only a few days or weeks a year.

Local Park: Local parks are under 100 acres and contain active amenities such as athletic courts and fields, playgrounds, and swimming pools. (Source: LA County Parks and Recreation)

Local Tribal Government: Refers to three local Tribal nations that identify themselves as Ventureño, Fernandeño, or Gabrieleno. This list can be obtained from the Nativer American Heritage Commission of California.

Low Flow Channel: In a concrete flood control channel, the low flow channel is a narrow, lowered section within the middle of the channel, designed to concentrate steady, non-wet weather runoff (water treatment flows, irrigation, etc.) by increasing channel velocity and depth.

Low Impact Development (LID): term used to describe a land planning and engineering design approach to manage stormwater runoff as part of green infrastructure. LID emphasizes conservation and use of on-site natural features to protect water quality.

Mafic: Pertaining to rocks rich in magnesium and iron.

Multiuse Trail: Trails which allow for many user types, such as pedestrians, cyclists, and equestrians.

Mycorrhizae:. Largely symbiotic relationships between large and taxonomically diverse groups of fungi and vascular plants that allows for the uptake of water and minerals by the vascular plant, and for the uptake of sugars and carbohydrates from the vascular plant by the associated fungus.

Native Species: A species that is a part of the balance of nature that has developed over hundreds or thousands of years in a particular region or ecosystem. (Source: USDA)

Nature-based: Nature-based strategies aim to protect, manage, and enhance natural or modified ecosystems through sustainable techniques that produce benefits for society and biodiversity. (Source: International Union for Conservation of Nature)

Non Native Plant Species: A plant species introduced with human help (intentionally or accidentally) to a new place or new type of habitat where it was not previously found. Not all non-native plants are invasive and may not reproduce or spread readily without continued human help. (Source: USDA)

Perched Aquifer: Localized zone of saturation above the main water table created by a laterally limited layer of underlying impermeable material.

Perennials: Plants that persist for several years with a period of growth each year.

Planning Frame: A series of nine geographical areas used in the LA River Master Plan to assist in the delineation of reach-specific concepts related to jurisdictional, hydraulic, and ecological zones. The planning frames also offer a more detailed local scale to assess project cadence, character, and community connectivity along the varying conditions of the LA River.

Platform Park: A park situated on a structural deck spanning over a space typically unsuitable for parkland, such as a roadway or waterbody.

Potable Water: Water quality that is suitable for drinking.

Propagule: Any part of an organism, produced sexually or asexually, that is capable of giving rise to a new individual. (for plants: seeds, cuttings, divisions, etc.)

Public Art: The creative community expression which includes permanent and temporary installations, cultural facilities and uses, and community engagement and programming. Other examples include, but are not limited to: sculpture, murals, portable paintings, fixtures, exhibit or performance space, conservation, performing arts, literary art, media art, new media, education, special events, arts services, community engagement, food, building arts, and environmental arts. (Source: LA County Department of Arts and Culture)

Railing: A barrier that separates trail uses or provides a visual separation but is not required to follow code.

Receiving Waters: All distinct bodies of water that receive runoff or wastewater discharges, such as streams, rivers, ponds, lakes, and estuaries.

Recharge: Process of addition of water to the saturated zone such as an aquifer. (Source: USGS)

Recharge Area: An area in which water reached the zone of saturation by surface infiltration. (Source: USGS)

Reclaimed Wastewater: Wastewater-treatment plant effluent that has been diverted for beneficial uses such as irrigation, industry, or thermoelectric cooling instead of being released to a natural waterway or aquifer. (Source: USGS)

Regional Detention (Basin): A detention basin which collects stormwater runoff from a relatively large area, and has been designed to use storage as a means of reducing downstream flood peaks, reducing possible flood damage, or reducing downstream channel construction costs. Regional facilities are usually multi-purpose, and normally are the responsibility of a public entity.(Source: Pima County Regional Flood Control District)

Regional Park: Park over 100 acres and contains active amenities such as athletic courts and fields, playgrounds, and swimming pools.(Source: LA County Parks and Recreation)

Resiliency: The capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow, no matter what kinds of chronic stresses and acute shocks they experience. (Source: 100 Resilient Cities)

Restoration: Altering an area in such a way as to reestablish an ecosystem's structure and function, usually bringing it back to its original (pre-disturbance) state or to a healthy state close to the original. Management techniques that attempt to enhance or bring back the natural pre disturbance form and functions of a self-sustaining community or ecosystem; measures taken to return a site to pre disturbance conditions.

Revegetate: Establish vegetation on disturbed lands.

Rhizomatous: Having an underground horizontal stem that bears reduced scaly leaves.

Riparian: Pertaining to the banks of a stream,most often used to describe the hydrophilic (water-loving) vegetation along a stream.

River Mile: A measure of distance along the river centerline from its mouth. The LA River river mile system was developed in 2016 to reduce confusion between different jurisdictional reach designations. This numbering system is used consistently throughout the LA River Master Plan, with mile zero at the river mouth in Long Beach and mile 51 in Canoga Park.

River Ruler: The river ruler is an analysis tool developed for the LA River Master Plan that represents and takes measure of the entire 51 miles of the LA River in a simple vertical straight-line diagram. This approach simplifies and reinforces the river's linearity, allowing the eye to quickly perceive how conditions along the river change from one river mile to the next. This compact abstraction of the river allows for comparing across multiple river ruler categories at multiple locations along the river in a single drawing and is essential for recognizing where planning and design proposals can achieve multiple benefits at a particular location.

Senescence: The biological process of aging.

Solarizing: Weed management technique whereby sunlight is used to kill weed seed in the soil by using either transparent or black plastic to capture radiant heat energy from the sun, thereby causing physical, chemical and biological changes in the soil. Solarization reduces populations of weeds, disease-causing organisms, harmful invertebrates and insect pests in the top three to six inches of soil without environmental contamination; and increases populations of warmth loving beneficial soil organisms.

Spreading Basin: Basin used to impound water to allow for slow percolation of water into the ground in order to recharge the underlying groundwater aquifer.

Spreading Grounds: A spreading ground is a water conservation facility that retains surface water long enough for it to percolate into the soil where it can be stored and pumped for later use. Spreading grounds must be located within soft bottom channels or adjacent to rivers and flood channels and situated where underlying soils are permeable and in hydraulic connection to a target aquifer.

Stormwater: Stormwater runoff is generated from rain and snowmelt events that flow over land or impervious surfaces, such as paved streets, parking lots, and building rooftops, and does not soak into the ground. The runoff picks up pollutants like trash, chemicals, oils, and dirt/sediment that can harm our rivers, streams, lakes, and coastal waters. (Source: US EPA)

Succession: The geological, ecological or seasonal sequence of species within a habitat or community.

Trapezoidal Section: A section of a channel with a trapezoidal cross-section. This shape is used to efficiently convey flows on a concrete surface.

Tributary: A stream that flows to a larger stream or other body of water.

Unconfined Aquifer: A water table—or unconfined—aquifer is an aquifer whose upper water surface (water table) is at atmospheric pressure, and thus is able to rise and fall. Water table aquifers are usually closer to the Earth's surface than confined aquifers are, and as such are impacted by drought conditions sooner than confined aquifers. (Source: USGS)

Understory: The vegetation layer between the overstory or canopy and the groundlayer of a forest or woodland community.

Upland: Referring to locations elevated above lower-lying locations, often used when discussing two locations within a watershed.

US Army Corps of Engineers: The Army Corps of Engineers provides public engineering services in peace and war to strengthen national security, energize the economy, and reduce risks from disasters.

Vegetation: The assemblage of plant species in a given area; also used as a general term for plant life.

Vertical Structure: Division of vegetation into distinct layers, each adapted to increasingly filtered sunlight if going top down. The layers are: canopy, understory, groundlayer, and the forest (or woodland) floor. Not all forests and woodlands have each layer.`

Water Quality: Surface water conditions suitable for aquatic life and human health.

Water Security: The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socioeconomic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability. (Source: United Nations Water)

Water Supply: Available water provided to fulfill a particular need. If the need is domestic, industrial, or agricultural, the water must fulfill both quality and quantity requirements. Water supplies can be obtained by numerous types of engineering projects, such as wells, dams, or reservoirs. (Source: Encyclopaedia Britannica)

Water Year: The 12-month period from October 1 through September 30 for any given year. Water years are written as the ending year (i.e., water year 1986-87 is written as 1987).

Watershed: The land area that drains into a river or stream. An area of land that contributes runoff to one specific delivery point. Large watersheds may be composed of several smaller "sub watersheds," each of which contributes runoff to different locations that ultimately combine at a common delivery point. Watersheds are usually bordered and separated from other watersheds by mountain ridges or other naturally elevated areas.

Wetland: Any number of tidal and non-tidal areas characterized by saturated or nearly saturated (wet) soils most of the year that form an interface between terrestrial (land-based) and aquatic environments. These include freshwater marshes around ponds and channels (rivers and streams) and brackish and salt marshes. Other common names include swamps and bogs.

Woodland: An area of canopied trees with greater distances between trees than found in forested areas.

RESOURCE LIST

LA County does not endorse any of these suppliers or guarantee that they meet the necessary requirements placed on them from the Master Plan or other applicable documents.

NATIVE PLANT NURSERIES

El Nativo Growers
Large wholesale nursery supplying a range of small to large projects including restoration.
—
200 South Peckham Road Azusa, CA 91702
626.969.8449
www.elnativogrowers.com
sales@elnativogrowers.com

Las Pilitas Nursery
Large wholesale nursery specializing in large projects.
—
3232 Las Pilitas Road Santa Margarita, CA 93453
805.438.5992
www.laspilitas.com
penny@laspilitas.com

Matilija Nursery
Large wholesale nursery with climate suitable varieties of groundcovers, shrubs, trees, perennials, and grasses specializing in large projects including contract grows for restoration.
—
8225 Waters Road Moorpark, CA 93021
805.523.8604
www.matilijanursery.com
matilijanurserweb@gmail.com

A & F
Formerly Mockingbird Nursery, wholesale nursery for shrubs, ornamental grasses, trees, succulents, and annuals.
—
803 Adams Street Riverside, CA 92504-5310
951.352.4922
https://afgrowers.com
office@afgrowers.com

Rancho Santa Ana Botanic Garden
Working with Seed LA initiative (contact Naomi Fraga; nfraga@rsabg.org) for native seed sourcing. Medium sized retail nursery with capacity for contract grows for restoration and mitigation projects.
—
1500 N College Avenue, Claremont CA 91711
909.625.8767
www.rsabg.org
gnnclaremont@rsabg.org; bsale@rsabg.org

Theodore Payne Foundation
Large retail nursery with a focus on native seed sourcing and propagation.
—
10459 Tuxford Street Sun Valley, CA 91711
818.768.1802
www.theodorepayne.org
info@theodorepayne.org

Tree of Life Nursery
Wholesale/retail nursery with capacity for contract growing, an active mycorrhizae program, and local seed mix availability.
—
33201 Ortega Highway San Juan Capistrano, CA 92693
949.728.0685
www.californianativeplants.com
inquiries@treeoflifenursery.com

Antelope Valley Resource Conservation Nursery
Commercial nursery with capacity for contract growing and educational programs.
—
10148 West Ave. I, Lancaster, CA 93536
(661) 942-7306
https://www.avrcd.org
avrcd@carcd.org

Hahamongna Native Plant Nursery
Contact Arroyo Seco Foundation for details
—
Hahamongna Watershed Park, 4550 Oak Grove Dr.
Pasadena, CA 91103
(323) 405-7326

Tarweed Native Plants
Small retail nursery more appropriate for small scale projects.
—
1307 Graynold Ave, Glendale, CA 91202
(818) 419-7034
http://www.tarweednativeplants.com/
tarweed@tarweednativeplants.com

Artemisia Nursery
Small retail nursery more appropriate for small scale projects.
—
5068 Valley Blvd., Los Angeles, CA 90032
323-795-5515
https://www.artemisianursery.com
artemisianursery@gmail.com

Glendora Gardens
Medium sized nursery with drought tolerant species as well as sod, soil, and turf removal services.
—
1132 S. Grand Avenue, Glendora, CA 91740
(626) 914-6718
https://www.glendoragardens.com

Fremontia Horticultural Inc.
Specializing in drought tolerant plants for large scale projects including succulents and grasses.
—
0401 E Riverside Drive, Ontario, CA 91761
(909) 673-0600
https://fremontiahorticultural.com
info@fremontiahorticultural.com

Greenbelt Growers
Specializing in ornamental plants for commercial landscape and restoration projects.
—
9820 Dufferin Avenue, Riverside, CA 92503
(951) 688-4091
https://www.greenbeltgrowers.com/
sales@greenbeltgrowers.com

Pacific Coast Nursery Inc.
Large wholesale nursery specializing in large commercial development projects.
—
1924 Monroe Street Riverside, CA. 92504
951-689-1777
https://www.pacificcoastnursery.com
info@pacificcoastnursery.com

Back to Natives Nursery @ Santiago Park
Prefer to use seeds collected from or near the site. Right now the BTN Nursery is entirely volunteer driven though the scale of projects seem to range from small to large restoration projects.
—
Santiago Park Nature Reserve, Santa Ana, CA 92706
(949) 509-4787
http://www.backtonatives.org/nursery
info@backtonatives.org

NATIVE PLANT SEED

Rancho Santa Ana Botanic Garden
Nursery and regional educational resource.
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1500 North College Avenue Claremont, CA 91711
909.625.8767 ext 404
www.rsabg.org
gnnclaremont@rsabg.org

S & S Seeds
Extensive seed inventory and mixes available for sale.
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P.O. Box 1275 Carpinteria, CA 93014
805.684.0436
http://www.ssseeds.com
info@ssseeds.com

Stover Seed Company
Native and non-native seed company with a native seed database for large scale projects.
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P.O. Box 1579 Sun Valley, CA 91353
800.621.0315
www.stoverseed.com
customer_service@stoverseed.com

Theodore Payne Foundation
Nursery and regional educational resource.
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10459 Tuxford Street Sun Valley, CA 91711
818.768.1802
www.theodorepayne.org
info@theodorepayne.org

Seed LA
New nonprofit working with Rancho Santa Ana Botanic Garden among other nurseries to encourage native seed use. (contact Naomi Fraga; nfraga@rsabg.org)

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TABLE OF FIGURES

ACKNOWLEDGMENTS

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In addition to the named individuals on these pages, many people committed to the future of the LA River contributed significantly to the plan by sharing ideas, priorities, and goals for the river.

This Master Plan was made possible only through their rich contributions.

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Figure 333. Students at the LA River Master Plan Youth Summit move between worksessions to learn about the LA River. Source: OLIN, 2018.

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HEALTH SERVICES
Whitney Lawrence

Figure 334. Community members actively participating in the planning process at the Community Meeting in Studio City.
Source: LA County Public Works, 2019.

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Figure 335. Steering committee members listen and discuss Master Plan items at the 8th Steering Committee Meeting. Source: OLIN, 2019.

The 2020 LA River guidelines are an update of the 2004 Landscaping Guidelines and Plant Palettes. The original 1999 and 2004 guidelines were prepared by:

Jill Benshoof
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Lacey Withers
Verna Jigour
Robert Perry
Bart O'Brien
Ellen Mackey
Barbara Eisenstein
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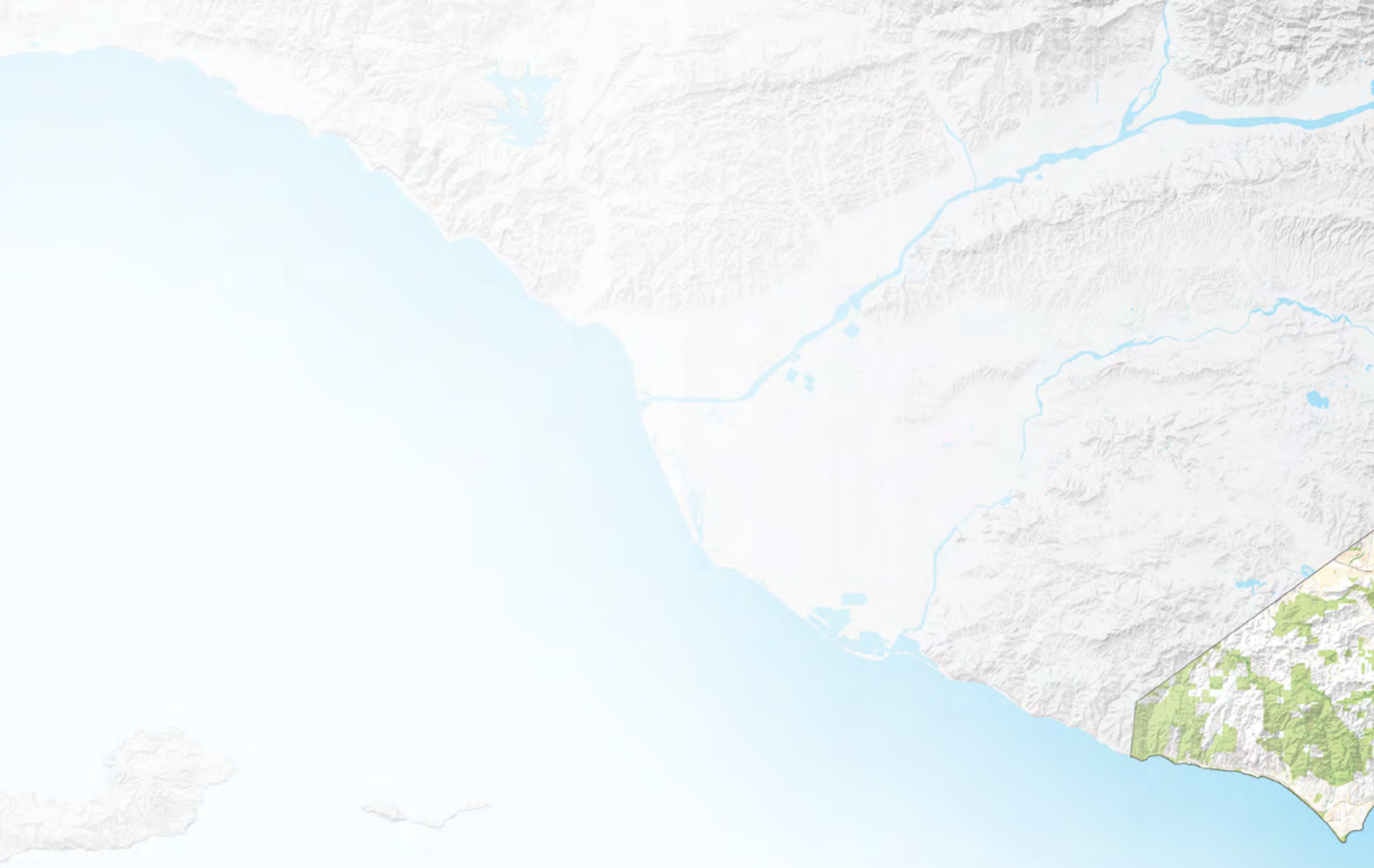

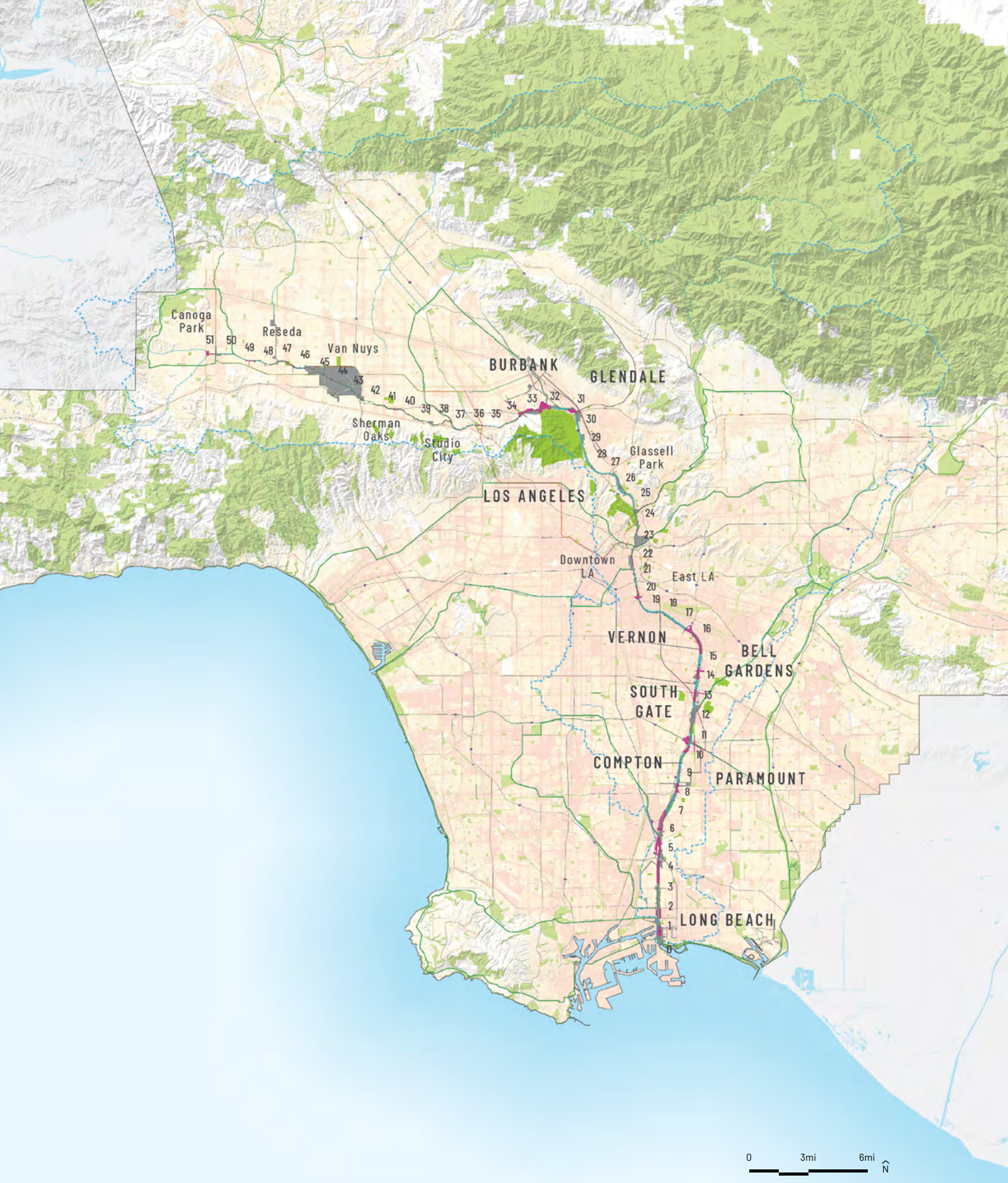
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