Urban Greening Plan

Midway-Pacific Highway

The City of SAN DIEGO

ACKNOWLEDGMENTS

CITY OF SAN DIEGO

Melissa Garcia, Planning Department, Senior Planner
Samir Hajjiri, Planning Department, Senior Traffic Engineer
George Ghossain, Planning Department, Associate Traffic Engineer
Vickie White, Planning Department, Senior Planner
Jeremy Barrick, Planning Department, Urban Forestry Program Manager

CONSULTANT TEAM

ENVIRONS LANDSCAPE ARCHITECTURE

Martin Schmidt, Principal
Laura Shobar, Project Manager

CHEN RYAN ASSOCIATES, INC.

Sherry Ryan, Principal

FUSCOE ENGINEERING

Eric Armstrong, Principal
Ken Kozlik, Project Manager

GRAPHIC SOLUTIONS

Simon Andrews, Principal

PLACE WORKS

Brooke Peterson, Principal

EXECUTIVE SUMMARY

INTRODUCTION

The Midway-Pacific Highway community (study area) is undergoing a comprehensive community plan update to provide land use designations and policies that will help guide future development in the community over the next thirty years. The community plan update will provide a renewed vision and framework for the study area's urban design and address the urban form inconsistencies of the past that have negatively affected the community character, pedestrian safety and mobility, and multi-modal connectivity.

To complement the community plan update and provide additional refinement to urban greening aspects of the plan, the Midway-Pacific Highway Urban Greening planning process was initiated. The Midway-Pacific Highway Urban Greening Plan is consistent with the policies identified in the community plan update, and takes concepts identified through the community planning process and applies them to the specific areas within the community.

The study area is bounded by I-8 to the north, by the I-5 on the east, by Laurel Street on the south, and by the San Diego International Airport, the Marine Corps Recruit Depot, and the Liberty Station development on the west. It is located between San Diego Bay, Mission Bay Park, and the San Diego River Park, and it is adjacent to the communities of Old Town, Downtown, and Point Loma.

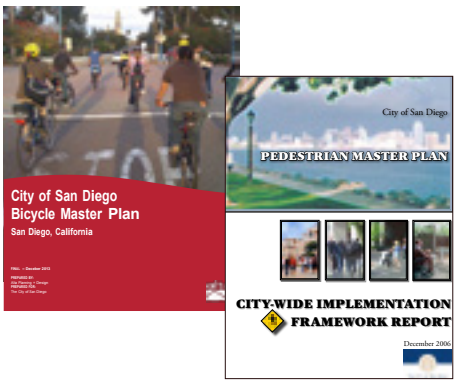
The Midway-Pacific Highway community initially developed with an industrial focus to serve the aviation industry prior to and during World War II. Its subsequent development occurred during the heyday of the automobile in the 1950-1970s. The Plan has been prepared to provide improved mobility, efficiency and safety for pedestrians, bicyclists and transit users; to provide additional green spaces and recreational opportunities; and to identify improvements that will result in an enhanced urban environment and public health. The Plan is intended to result in street tree planting; enhanced linkages between surrounding communities and activity centers, nearby parks and open spaces; and enhanced community identity with the incorporation of gateway and wayfinding elements into the study area. The Plan is also designed to address storm water pollution, acknowledge sea level rise, and reduce greenhouse gas emissions.

REFERENCED DOCUMENTS

The Plan builds upon work underway as a part of the Midway-Pacific Highway Community Plan update and the City's pedestrian and bicycle master planning efforts to identify improvements to pedestrian and bicycle facilities in the community, with a goal toward completing planning-level work to facilitate future capital improvement projects.

The draft Midway-Pacific Highway Community Plan is heavily referenced, along with many other existing plans and documents including:

- City of San Diego General Plan
- City of San Diego Bicycle Master Plan
- City of San Diego Pedestrian Master Plan
- City of San Diego Street Design Manual
- City of San Diego Storm Water Design Guidelines
- City of San Diego City Council Policies 200-5 and 900-19
- National Design Standards for Pedestrians and Bicycles Circulation
- San Diego Association of Governments (SANDAG) Bicycle Master Plan
- San Diego Area Regional Standard Drawings



COMMUNITY ENGAGEMENT

A total of three (3) public meetings were held to present initial analysis and concepts and to gather ideas to help develop the Plan. Existing site conditions were field-verified, findings for mobility, public parks, public health and sustainable planning were documented and presented at the public meetings. Corridors were identified that provide critical pathways within the community and provide linkages to Downtown San Diego, Mission Bay, the San Diego River, San Diego Bay, the Old Town Transit Center, Old Town, Point Loma, and Ocean Beach.

The five (5) primary street corridors in the community serve as either gateways to the study area and/or have historical significance within the community. These corridors provide an opportunity to provide community identity.

The corridor themes identified through the public engagement process are:

- Pacific Highway is the Historic Highway 101
- Rosecrans Street was the former La Playa Trail
- Sports Arena Boulevard and Barnett Avenue/ Lytton Street constitute the Bay to Bay Link
- Midway Drive is a community Main Street

FIRST COMMUNITY MEETING-WORKSHOP #1

The first meeting was convened on July 30, 2014 at the San Diego Urban Corps Conference Room located at Urban Corps at 3127 Jefferson Street. A substantial effort was made to contact stake holders, community members, staff from agencies that have interest in the project, property owners and representatives from the Marine Corps Recruit Depot (MCRD), the U.S. Navy Space and Naval Warfare Systems Command (SPAWAR) and the San Diego County Regional Airport Authority (SDCRAA). The total number of attendees was approximately 30 people.

A presentation was made showing what the current conditions of the community's primary street corridors, and some imagery of what the corridors could become with the implementation of urban greening and green street concepts. The focus of this meeting was to display and discuss the initial survey of information and documentation of existing conditions for the attendees to see and the opportunity to communicate their issues, concerns, desires and ideas for the project within the plan area. The consultants and staff engaged with the attendees and documented what their feedback was and documented for use in the development of the design and concepts for presentation at Workshop #2.

Public Meeting Number One

SECOND COMMUNITY WORKHOP-WORKSHOP #2

The second meeting was convened on November 19, 2014 at the San Diego Community College District's West City Continuing Education Center, located at 3249 Fordham Street. Consistent with the initial meeting, notification was sent to stakeholders, community members, staff from agencies that have interest in the project, property owners and representatives from MCRD, SPAWAR and SDCRAA. The meeting was scheduled to occur immediately after the monthly Community Planning Group meeting, during which the consultants had made a presentation about the Urban Greening Plan. The total number of attendees was approximately 20 people. The meeting was conducted as an 'open house' where attendees could arrive at any time to review presentation panels and boards and meet and talk with the consultants and staff about the features and concepts of the initial urban greening designs, along with their potential application to specific locations areas within the Planning Area. Draft street sections and storm water facilities designs were prepared, including tree inventories and recommendations, and transportation facilities including vehicular, mass transit, bicycle and pedestrian modes. Signage and graphics concepts for community gateways and wayfinding were also presented at the workshop. Input from the attendees was documented for refinement of the concepts and incorporation into the project.

Public Meeting Number Two: Graphic display board of existing trees located in the community.

THIRD COMMUNITY WORKHOP-WORKSHOP #3

The third meeting was convened on September 16, 2015 at the San Diego Community College Continuing Education Center. Consistent with the prior two meetings, notification was sent to stake holders, community members, staff from agencies that have interest in the project, property owners and representatives from MCRD, SPAWAR, and SDCRAA. The 'open house'-style meeting was scheduled to occur immediately after the monthly Community Planning Group meeting, during which the consultants had made a presentation to the Planning Group. The total number of attendees was approximately 20 people.

Presentation panels and boards of the final corridor concepts and urban forest recommendations were displayed for review and discussion to generate input from the attendees. Physical exhibits were assembled to visually demonstrate the soil volume needed for tree planting for a healthy urban forest, as well as a planting technology that can be used to allow for suspended pavements to be incorporated into the rights-of-way within the Planning Area to increase the potential for street trees establish the mass and scale to thrive for 50 - 75 years with proper care and maintenance. Also, demonstration boards were prepared that described the research that had been done for the Urban Greening Plan regarding what soil volume, scale of root zone area, soil types, and relative compaction are best for trees, and that depicted proposed storm water management improvements and how to incorporate those into the rights-of-way in combination with with the proposed tree planting concepts.

Public Meeting Number Three: Street corridor concept display boards.

Public Meeting Number Three: Physical display of how much room a tree needs to grow in a healthy manner.

EXISTING CONDITIONS

The existing conditions of the right-of-way, circulation network, and urban forest for the Midway-Pacific Highway community have developed over several decades based on various standards and criteria. The entire community is in need of urban greening and pedestrian and bicycle improvements, which provides an opportunity to develop new designs for each of the main community corridors that incorporate concepts for improved pedestrian and alternative transportation facilities, storm water and urban forest concepts, along with adjustments in the vehicular lane profiles and designs. Currently, the community's street corridors are designed primarily for vehicular circulation. They provide minimal space for pedestrians and bicyclists, and do not incorporate Green Street or Complete Street concepts. Also, most of the main existing intersections are vehicle-centric, including Sports Arena Boulevard/Rosecrans Street/Camino del Rio West; Rosecrans Street/Midway Drive; and Barnett Street/Midway Drive/Pacific Highway The goal of this Plan is to assess the urban greening and active transportation needs within these corridors and develop specific improvements for incorporation into each of the roadways based on refinement of concepts outlined in the draft Midway-Pacific Highway Community Plan

Pacific Highway

Camino Del Rio West/Rosecrans Street

Midway Drive

Rosecrans Street

URBAN GREENING PLAN RECOMMENDATIONS

A Street Tree Master Plan consisting of 68 species and a plant palette has been developed for the study area. Chapter 6 provides additional information regarding the type and species of tree recommended for each of the Villages and Districts identified in the draft Community Plan. All of the recommended trees and planting materials are either California native species, species from Mediterranean climate regions and/or regionally appropriate drought-tolerant species.

The draft Midway-Pacific Highway Community Plan provides the basis for the urban design and mobility recommendations in the Urban Greening Plan. For roadways, three primary street typologies – Boulevards, Green Streets and Main Streets – are used to create a framework for recommended improvements. Green Streets have the potential to address and mitigate flooding during storm events in the project area. Implementing Green Street features which will provide a medium to high level of treatment for the pollutants as required by the MS4 Permit and will promote infiltration, retention, and detention, along with storm drain system improvements, to reduce flooding. Additionally, the 'Green Street' Tool Box included in this plan will be an integral component of creating a robust street improvement program for the project area, and can be utilized by the city for other street projects.

A summary report of studies related to climate change adaption needs in the San Diego Region has been created. The report is intended to establish a framework for climate change policies and how they relate to the Midway-Pacific Highway Urban Greening study area.
Regarding mobility and active transportation, the draft Community Plan provides recommendations consistent with other relevant city mobility planning documents to improve bicycle and pedestrian access and transit use, and provides additional improvement concepts to develop safe multi-modal connections. New and improved pedestrian facilities and linkages are proposed to complete the overall pedestrian network within the community and provide inviting connections to regional open space amenities. The concepts for Urban Loops and other trail linkages have been identified in the Urban Greening Plan to complement existing and proposed pedestrian and bicycle facilities and provide enhanced connections and linkages to transit facilities, within the community, to neighboring communities, and to other destinations in the region.

While general street improvement concepts are proposed, each segment of street needs to be individually analyzed and designed to implement this plan's concepts since street widths, number of lanes, desired sidewalk widths, and physical constraints vary greatly from block to block.

This plan also includes a comprehensive Sign Program including wayfinding solutions – directional signs and related elements – that will have the practical effect of enhancing connections and the flow of all transportation modes. In addition, community and village branding, gateways, arch, interpretive signs and graphics, and corridor theming as proposed by this plan will create a sense of place and reinforce economic development efforts for the community, revealing its history and stories through imagery, forms, materials, colors, and typography.

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1 Vision

Street lined with mature trees

1.1 PURPOSE

The Midway-Pacific Highway Urban Greening Plan (the Plan) provides additional conceptual designs for the development of green streets and the urban forest within the community. This Plan is intended to complement the Midway-Pacific Highway Community Plan.

The primary purpose of the Plan is to:

- Connect community destinations through improved bicycle, walking and transit features
- Create specific streetscape designs for each of the community's major roadways
- Create an urban forest through updated standards and location specific-design
- Implement "complete streets" elements to enhance the experience of all users of the roadway
- Create multi-purpose improvements in the right-of-way such as storm water treatment features, streetscape improvements, multi-modal trail improvements, and other features to maximize the benefits to the community from future investment of infrastructure funds
- Provide a gateway and wayfinding signage program to enhance community identity and benefit the users of the new mobility improvements.
- Provide connections to local and regional bicycle and pedestrian circulation facilities consistent with the City of San Diego's Bicycle Master Plan, the City's Pedestrian Master Planning effort, and the SANDAG Regional Bike Plan.
- Create an 'urban loops' element for the recreational benefit of the community, tourists, and other user groups, incorporating planned bicycle and pedestrian improvements and wayfinding elements.
- Identify and incorporate open space and greenbelt opportunities into the proposed right-of-way improvements

The five (5) major street corridors in the project area (Pacific Highway, Rosecrans Street, Sports Arena Boulevard, Midway Drive, and Barnett Avenue/Lytton Street) are the primary focus of the Plan. Street tree plans have also been provided for the community's Districts and Villages outside of these corridors. This Plan, while consistent with regional and City land use and mobility plans, provides recommended revisions to standards (including the City's Low-Impact Development Design Guidelines) and identifies standards in need of new detail (such as the City of San Diego Street Tree List and Urban Forest Planting Standards) to successfully implement the Plan.

"URBAN GREENING" VERSUS A "GREEN STREET"

URBAN GREENING

Urban Greening is a focused effort to create and integrate the urban forest into the public right-of-way with implementation of street trees in the parkways and medians. The urban forest brings numerous benefits to the roadways and creates a sense of community. Urban Greening also incorporates additional landscape in understory plantings, improvements to the pedestrian zone with site furnishings and amenities to enhance the experience and promote user activity, and potentially storm water management and treatment infrastructure.

Pacific Highway Proposed Greening

GREEN STREET

A Green Street is a street right-of-way that, through a variety of design and operational treatments, captures and filters storm water run-off. A Green Street utilizes a designed soil media, plant material and mulch to remove a majority of pollutants from captured storm water, and either releases the 'cleansed' water into the storm drain system or retains it for infiltration into the site's soil to supplement irrigation. Green Streets also give priority to pedestrians, bicycle circulation, and open space in conjunction with other transportation uses. Treatments to facilitate pedestrian and bicycle transportation may include sidewalk widening, landscaping, traffic calming and other pedestrian-oriented features.

Pacific Highway Existing Conditions.

URBAN GREENING AND GREEN STREETS

The long-term strategy to implement urban greening and green streets in the Midway-Pacific Highway community is to develop re-envisioned roadway concepts, provide improvements for the community's public right-of-way that incorporate street trees and landscape improvements, storm water treatment and management, and alternative transportation facilities to improve the community circulation. With the implementation of the concepts included in this Plan, the community will become more pedestrian- and bicycle-friendly and the urban forest and landscape improvements can reduce heat gain and pollution and increase carbon sequestration.

URBAN GREENING BENEFITS

- Enhance and expand public open space.
- Reinforce sustainable land use and transportation patterns.
- Strengthen connections between the Midway-Pacific Highway community and other communities including Downtown by improving the streetscape for pedestrians, bicycles, and transit patrons.
- Support economic activity in the community by creating an attractive and welcoming 'front door' for pedestrians.
- Maximize opportunities for trees and other landscaping to create high-quality open space.

1.2 Midway-Pacific Highway Community Plan Vision

The Midway-Pacific Highway Community includes the City's Sports Arena and adjacent residential and industrial areas; region-serving commercial areas along Rosecrans Street and Sports Arena Boulevard; the Pacific Highway corridor which connects the community to Old Town and Downtown and is home to a mix of residential, commercial, and airport-related uses; federal government and military lands, including military housing, the Marine Corps Recruit Depot, and the SPAWAR campus; and Port of San Diego-administered tidelands and land within the California Coastal Zone adjacent to the San Diego International Airport.

Community Plan Vision

The development of a strong public realm with unique districts and villages connected through a system of landscaped streets that will link to Mission Bay, the San Diego River, San Diego Bay, and to traditional and non-traditional parks within the community to enhance community character and livability. To achieve this vision, the following Guiding Principles provide the framework for more detailed community plan policies.

Friedrichshain, Berlin

Kungsgatan, Stockholm

Distinctive Districts and Villages

The organizing concept of the Community Plan is the establishment of Districts and Villages, each with a distinct emphasis. Districts and Villages will have their own distinct character, range of uses, streetscapes, public places, urban form, and building design. Villages will serve multiple purposes as mixed-use, commercial, employment, and residential nodes.

A Center of Economic Activity

The Community Plan bolsters Midway-Pacific Highway as a sub-regional employment center by ensuring availability of employment land for the development of office and research uses. The creation of jobs within the community along with residential and commercial uses served by transit will support the economic viability and attractiveness of the community.

A COMPLETE MOBILITY SYSTEM

The Community Plan acknowledges that Midway-Pacific Highway functions as a regional gateway for vehicles, while also envisioning a complete multi-modal transportation network that provides options for people to walk, ride a bicycle, or take transit to recreational space, regional open space, shops, services, entertainment attractions, housing and employment areas to enhance the livability and character of the community. The enhancement of the mobility system for all transportation modes will support the economic growth and identity of the community.

Portland, Oregon

A PLACE CONNECTED TO ITS CONTEXT AND TO THE REGIONAL RECREATIONAL AND OPEN SPACE AREAS

The Community Plan seeks to connect Midway-Pacific Highway's Districts and Villages to regional open space and recreational areas with Boulevards and Green Streets that will serve as connectors for pedestrians and bicyclists and that incorporate gateways to provide a sense of arrival into the Midway-Pacific Highway Community. The plan will foster the reestablishment of the community's historic relationship to the Presidio, San Diego Bay, Mission Bay, and the San Diego River, while linking Midway-Pacific Highway with the surrounding communities.

Midway-Pacific Highway (foreground), the San Diego River, Mission Bay, and the Pacific Ocean

1.3 Urban Greening Vision

The urban greening vision for the Midway Pacific-Highway Comunity is to:

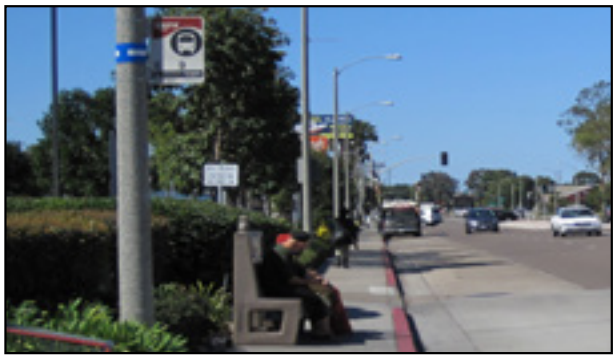
- Develop and implement 'Green Street' design features for the primary corridors in the community based on their planned function. Regardless of function or primary or secondary importance, all streets in the community can be recipients of 'Green Street' improvements recommended in the plan.
- Foster the urban forest by creating new landscape criteria and details for the planting of street trees. The criteria and details will address trees, landscape, and storm water bio-remediation facilities in the City right-of-way.
- Conceptually design key transportation corridors to provide bicycle and pedestrian facilities and urban greening features within the right-of-way.
- Incorporate thematic trail facilities along the primary roadways consistent with the Community Plan.
- Create an 'Urban Loops' program to benefit inter- and intra-community travel for recreational users as well as regional commuters.
- Create a community gateways and signage program that includes location and signage design reflecting the identity of the villages and districts. The signage program will provide cognitive connectivity to optimize mobility, enhance awareness of the environment, and encourage appreciation for the area's history and importance to the region.

The Midway-Pacific Highway Community provides important linkages and connectivity for the City of San Diego. The community is the crossroads of circulation for the surrounding communities as well as for regional transportation facilities. With a robust effort to complete the connections and linkages via existing and proposed streets, trails, bicycle and pedestrian facilities, the Plan facilitates a comprehensive circulation network to and through the community.

As discussed in the previous section, the draft Community Plan's vision is to develop a strong public realm with unique districts and villages connected through a system of green landscaped streets. These green streets will provide a visually cohesive link to Mission Bay, the San Diego River, San Diego Bay, and to green spaces within the community to enhance community character and livability.

This Urban Greening Plan will identify opportunities, and show through careful design, how street furnishings, storm water improvements, and multi-modal transportation (vehicular, bicycle, pedestrian, and transit) may be implemented in a constrained right-of-way. This Plan provides recommendations to re-envision the existing urban landscape to incorporate green street concepts, improving the community's infrastructure visually and functionally for the benefit of the community and the region.

Boulevard Example - Park Boulevard, San Diego, CA



Multi-modal transportation

1.4 The Benefits of Green Streets

Currently, the roadways in the community serve high-volume and high-speed automobile traffic. Pedestrians and bicyclists have limited accommodations due to the vehicular focus of the area's streets. The proposed improvements identified in this Plan will enhance the urban forest, improve storm water facilities and management, create new trails, identify infrastructure improvements to benefit all users of the roadway, and create a sense of community through urban design, gateways, signage, and wayfinding components. Specific benefits that will be realized through the design and implementation of the following concepts.

Established tree canopy - Santa Barbara, CA

Traffic Movement and Safety

Large-scale trees and tree canopies along with understory landscaping (the layer of vegetation beneath the main canopy of a forest) slows traffic, creates visually appealing roadways, and changes the perceptions of drivers. Additionally, implementation of the 'complete streets' concept of street design incorporates facilities for vehicles, public transit, bicycles and pedestrian to create safer roadways for all users.

Alternative modes of transportation - Arlington, VI

Additional Bicycle and Pedestrian Routes/ Linkages

Identifying and implementing missing linkages for the local and regional active transportation network offers opportunities for alternative transportation, leading to a reduction in vehicular traffic and air pollution. This Plan incorporates improvements consistent with the San Diego Regional Bike Plan, the City of San Diego Bicycle Master Plan, and the City of San Diego Pedestrian Master Planning effort. Thematic trails and circulation components from the draft Midway-Pacific Highway Community Plan are also incorporated.

TreePod Biofilter Installation

Storm Water and Roadway Flooding Management

Due to its flat topography and low elevations relative to mean sea level, the community is subject to flooding during rain events and impacts from periodic 'king tides' (high tides) that adversely affect the storm drain system. Implementation of bio-retention and treatment facilities at key locations and throughout the community can address the current conditions and treat / cleanse storm water that drains directly into San Diego Bay and San Diego River.

Robust Urban Vegetation

Pollution Reduction and Initial Effort Towards Regional Climate Change Mitigation

The most significant desired results of this plan will be achieved by the sum total effect of planting and maintaining a robust urban forest (carbon sequestration), the reduction of vehicular traffic and the promotion of active transportation (source reduction), along with the treatment and cleansing of storm water.

Improved Right-of-Way

Community and Business Upgrades

Investment in the public right-of-way often catalyzes investment in private property in the form of building and property redevelopment or renovations. Building and site design requirements that complement the Green Street improvements in the right-of-way can result in a general elevation of community visual quality and business activity. The value of real estate within the study area in this central coastal location and the opportunities for redevelopment of the Sports Arena properties and the former Midway Post Office, right-of-way improvements have the potential to lead to significant community-wide improvements.

Volunteer Group in their Community

COMMUNITY PRIDE AND INCREASE IN PROPERTY VALUES

Implementation of Green Street and complete street improvements can create momentum for additional improvements projects in the community, for both the functional and aesthetic benefits. Often times, investment in the public domain is followed by private investment that increases property values and benefits the community as a whole.

Recreational Open Space - Bancroft, Ontario

OPEN SPACE AND GREENBELTS

The identification of new open space and park opportunities is a high priority within the study area due to the lack of parks and open space facilities in the community. This Plan combines the urban forest, bio-remediation storm water facilities, alternative modes of transportation and complete street features with open space and greenbelts to provide the maximum return on investment.

Well-Developed Tree Cover - San Diego, CA

CREATION OF AN URBAN FOREST

Trees in an urban environment are not only beneficial to the community members, in that they create safer and friendlier neighborhoods, but they also create a healthier community as a whole. San Diego's 2015 Draft Urban Forest Management Plan outlines the benefits of trees and investing in an Urban Forest: positively influenced climate, cleans air, saves energy, reduces street maintenance, raises property value, cleans water, cools pavement, protects wildlife, builds safe communities, calms traffic, and reduces stress.[1]

1 Alliance for Community Trees 2011. Benefits of trees and urban forests: a research list. Unpublished white paper, 19 pp.

1.5 STUDY AREA

The Midway-Pacific Highway community, is bounded on the north by Interstate 8; on the east by Interstate 5; on the south by Laurel Street and the San Diego International Airport; and on the west by Navy Boating Channel and the Peninsula Community. It is the hub of the central coastal area of the City of San Diego. As such, it is an essential location to provide attractive connections for pedestrians, bicyclists, transit and automobiles to adjacent communities, recreational facilities and regional assets.

Formerly called Dutch Flats, the area was a wetland slough that was a part of the San Diego River delta until the the construction of a levee (Derby's Dike) in 1853. The area's history contributes to specific site conditions which influence this Urban Greening Plan. Predominantly flat, at low elevation relative to sea level, and with a high water table, the community experiences flooding during high tides and storm events. Due to its low elevation, in the future the community may be impacted by rising sea levels. The varied soils that exist are a result of the deposit of sediment from the San Diego River and the fill of the former wetlands which facilitated the community's development. The soils are primarily silts and sands, with better drainage properties than the predominant clay soils of the mesas and hillsides surrounding the project area.

The Midway-Pacific Highway community is comprised of approximately 1,313 acres of land area, with the majority currently utilized for commercial (300 acres), military (300 acres), and transportation and roadway (330 acres) uses. The residential component (150 acres) of the community is proposed to grow with the adoption of the draft Community Plan, the implementation of its "Villages and Districts" framework concept, and the potential future redevelopment of the existing Sports Arena site and other opportunity areas. The plan area is directly adjacent to the Old Town community, but has been physically separated from Old Town since the construction of Interstate 5 in 1962. Prior to the introduction of Interstate 5, Highway 101 (Pacific Highway) had served the region as the primary north-south highway since the 1930s. In recent years, significant investment has been made in transit services that provide access to various parts of the City and County via the Old Town Transit Center.

Figure 1.5-1 Study Area - Regional Context

Figure 1.5-2 Study Area Boundaries

As more residential units and commercial space are added in the future, the need to complete the linkages within the community and to the regional multi-modal transportation system will increase. Providing for the recreational needs for residents and visitors and long-term transportation needs as the community redevelops is also important. Design and implementation of re-imagined roadways that address all modes of transportation and incorporate urban forestry and landscape features will result in an improved community.

Utilizing elements of the community's history to provide community character and quality design elements is one goal of this Plan. Historical elements and opportunities include:

- Significant transportation connections including the Historic La Playa Trail, Historic Highway 101, and the Bay-to-Bay link.
- The historic significance of the aviation industry in this area. The community's history includes pioneers of aviation including Claude Ryan and Charles Lindbergh, the former Consolidated Aircraft manufacturing plant and its contributions to the war effort during World War II, and the San Diego International Airport.
- The historic significance of the United States military in this area, including the development and operation of the Marine Corps Recruit Depot and the former Naval Training Center, and the current SPAWAR facility in the former Consolidated Aircraft manufacturing plant.

1.6 Previous Planning Efforts

Since 1980, there have been several planning projects within or including the Midway-Pacific Highway community planning area that have provided mobility and/or urban design recommendations. The following is a list of the planning projects and efforts and the agency or organization responsible for the project.

1991: Midway/Pacific Highway Corridor Community Plan and Local Coastal Program (City of San Diego)

1999: Amendment to the Midway / Pacific Highway Corridor Community Plan to incorporate the Bay-to-Bay Canal concept (City of San Diego)

2004: North Bay Conceptual Plan (North Bay Association)

2010: Bicycle Master Plan (City of San Diego)

2010: San Diego Pedestrian Master Planning Study (City of San Diego)

2010: Bicycle Master Plan (SANDAG)

2013: Midway-Pacific Highway Community Plan update, Discussion Draft (City of San Diego)

2015: Climate Action Plan (City of San Diego)

2015: San Diego Forward: The Regional Plan (SANDAG)

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2 Existing Conditions & Solutions

Pacific Highway - Proposed Multi-use Trail and Bike Facilities

2.1 Introduction

The Midway-Pacific Highway community is located at an important juncture for multi-modal regional connections. Currently, the community has vehicle-centric street connections to adjacent communities and regional parks, including Mission Bay, the Pacific Ocean, Ocean Beach, Old Town, the San Diego River and San Diego Bay. Facilities planned in the community plan and other regional planning documents include new freeway and roadway connectors to major destinations, additional sidewalks and accessibility for pedestrians, additional regional and local bikes paths, with recreational opportunities, and improved/extended transit services for residential and commercial areas.

Existing regional trolley service is available at the Old Town Transit Center just east of the community, and trolley stops are also located at Washington Street and Palm Street in the community. Additionally, future rapid bus service is planned along Sports Arena Boulevard and Rosecrans Street and new trolley lines are proposed to connect to Old Town Transit Center as part of the Regional Transportation Plan. These planned new services will improve connections for the Midway-Pacific Highway community to neighboring communities. The proposals in this Plan would create safer and more attractive bicycle and pedestrian connections along routes that connect to transit stops and stations.

However, the older grid street pattern that extends from Old Town has been bisected by I-5, then by Camino Del Rio West. The bisection of the community and the development of the western portion of the community during the auto-oriented 1940s and 1950s created super-blocks, small lots, and remnant parcels, with negative impacts to connectivity for vehicles and pedestrians.

As part of the existing conditions evaluation, existing street trees in the project area were documented, along with their respective health and vigor. The tree species in the project area lack any sort of pattern due to the development history of the site and lack of a cohesive street tree plan. The two exceptions are the shopping center on Sports Arena Boulevard, opposite the Sports Arena and the military housing complex on Barnett Avenue which were developed according to a master plan.

Parks, recreation facilities, and open space areas were not planned for, nor included in the original build-out of the community, resulting in a lack of green space. This urban greening plan, when implemented, will bring comprehensive improvements in the form of landscaped parkways, greenbelts, and medians to complement future planned parks and open spaces throughout the community. The community plan has identified proposed parks and equivalences that total 22.84 acres; less than the population based park acreage requirement of 30.8 acres for the area.

Storm water issues in the Midway-Pacific Highway community include flooding due to storm events, water quality impairments, and anticipated future flooding due to the topography's low elevations and anticipated sea level rise. Currently flooding occurs during moderate and extreme storm events on Midway Drive, Rosecrans Street, Witherby Street, and Pacific Highway.

Existing Street Pattern in Study Area

Example of Existing Street Trees in Study Area

2.2 PUBLIC REALM

This plan proposes both Urban Greening and " Complete Streets" improvements to the public right-of-way, or "public realm," of the community. The terms Urban Greening and Complete Streets have some commonalities and overlap regarding the proposed design of the public right-of-way in transportation planning, as shown in their definitions below. The comprehensive design and planning effort of the Midway-Pacific Highway Urban Greening Plan incorporates the principles of complete streets and urban greening.

Complete Streets

Complete streets advocate for all modes of transportation to be considered and incorporated into the right-of-way design. Pedestrian, bicycle, public transit and vehicular mobility components all need to be integrated to create a complete street.

Complete Street - Santa Barbara, California

Urban Greening

Urban greening is a focused effort to create/ integrate the urban forest into the right-of-way concepts and implementation of street trees in the parkways and medians. The urban forest brings numerous benefits to the roadways and creates a sense of community. Urban greening can also incorporate the concepts of storm water management and treatment, the inclusion of additional landscape in understory plantings, improvements to the pedestrian zone with site furnishings and amenities to enhance the experience and promote user activity.

Understory Planting and Furnishings - Santa Barbara, California

2.3 Design Components

The Urban Greening Plan began by analyzing and evaluating the existing conditions of the project area. Currently, the study area is designed to accommodate primarily vehicular and public transportation travel, with only basic pedestrian facilities and bicycle facilities. This Plan introduces aspects of complete streets and urban greening into the design process of the existing transportation system to incorporate as many aspects and features as feasible into the existing right-of-way. In some instances, not all features can be incorporated, so a process of prioritizing improvements was incorporated to identify what components should be incorporated to create successful green streets.

Each of these components are discussed in detail in the following sections. The design challenge in a built-out community like Midway-Pacific Highway is to get all of these features into a constrained space attempting to maximize the performance and value of proposed improvements. Additional information and proposed options are identified for integrated solutions at specific locations.

Urban Forest:

Existing and proposed trees and understory landscape provide many benefits including creating shade to reduce heat gain, the creation of community character, improving the pedestrian experience, and improving air quality.

Storm Water Management

The expansion of surface area and sub-surface volume of soil will benefit both the capture and treatment of storm water, recharging groundwater and providing water for the new trees and understory.

Multi-Modal Mobility

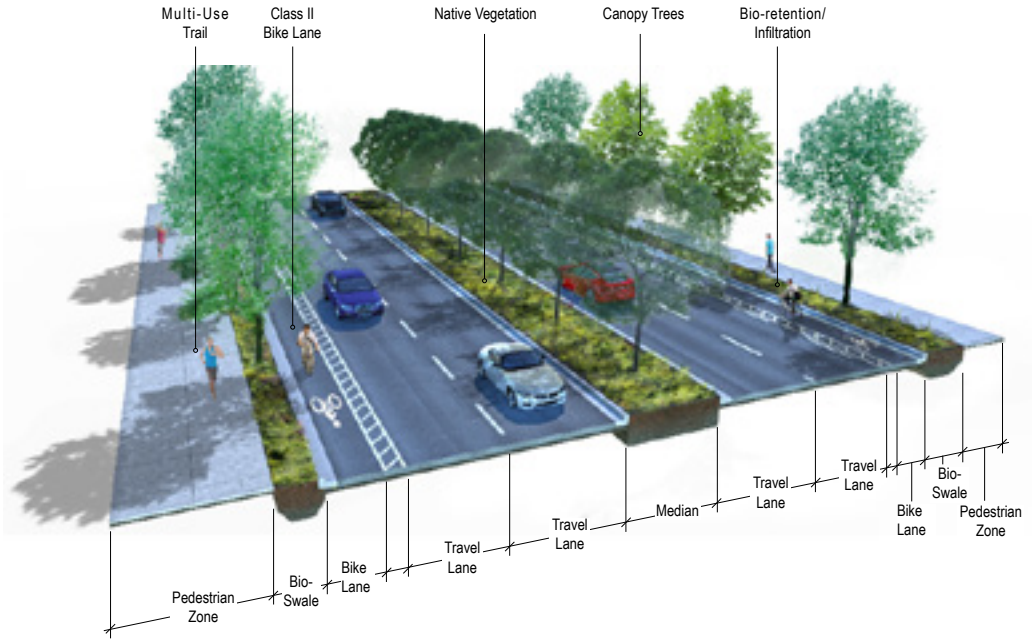
The re-distribution of space within the right-of-way creates the opportunity to provide increased areas for the proposed urban trails.

Open Space

Creating multi-modal trails within the community will benefit pedestrians and bicyclists by providing active transportation facilities inside of the project area, linkages to the adjacent communities and to regional assets, and the opportunity to implement greenbelt corridors and parklets in the community.

Gateways and Wayfinding

An extensive signage program is envisioned to identify the Midway-Pacific Highway community at the major gateways into the community. A location- and trail-specific signage program for all modes of transportation is also proposed. The La Playa Trail, Historic Highway 101 Trail, Bay to Bay Trail and Midway Trail will each have their own style of signage. Additionally, the community's historic locations of interest are proposed to be commemorated with plaques/markers.



Green Street Design - Section Diagram of Proposed Design for Rosecrans Street

2.4 Urban Forestry

Urban forestry is the cultivation and management of native or introduced trees and related vegetation in urban areas for their present and potential contribution to the economic, physiological, sociological, and ecological well-being of urban society.[8] The benefits of trees include:

- Provide shade and reduce the urban heat island effect, reducing ambient air temperature
- Reduce air pollution through carbon sequestration and oxygen creation
- Reduce energy demand through shading of buildings, resulting in additional pollution reduction
- Reduce traffic speeds, potentially leading to fewer accidents and injuries
- Create safer, more desirable walking environments
- Protect pedestrians from rain, sun and heat
- Reduce rainwater impacts/flooding and potential erosion
- Provide access to nature in the city - trees, plants, and wildlife benefit the human psyche
- Provide improved street imagery with a robust tree and understory planting program
- Screen / mitigate unattractive structures or features
- Increase security through greater use and interaction by users
- Improve business and opportunities through increased clientele from making the area more appealing with trees, landscape, and improvements
- Increase value to homes and businesses
- Create additional employment for construction and horticultural job sectors
- Improve aesthetics for the streets and communities where implemented

Critical to achieving a healthy, successful, long term, local and regional urban forest are the identification, evaluation, and protection of the existing tree canopy. For future planting and additions to the urban forest, it's important to develop future urban forestry standards and details, determine planting locations and long term maintenance criteria to create a thriving urban forest. Key tasks in this effort will be to design opportunities utilizing constrained right-of-way areas for greening components and identify locations that require additional right-of-way acquisition.

8 California Urban Forestry Act of 1978

Existing City Tree Planting Standards

The current street tree standards for the City of San Diego is one 24" box size tree at 30' on-center spacing in a tree planting area that is to have a minimum of 40 square feet in surface area. During the development process, many times driveways, sight visibility triangles, utilities, and other impediments occur along the frontage that impacts the locations and ability to place the trees at the required spacing. In all cases, the total number of street tress is still required to be met requiring the trees to be planted on an even tighter on-center spacing.

Several issues specific to the requirements identified above should be addressed with recommendations to revise the City Standards, specifically:

Street Tree Planting Requirements

Research conducted into the actual soil volume requirements and soil condition to optimize the growing conditions for new tree plantings identify that large scale trees require a minimum of 1,000 cubic feet of soil volume to grow, establish, and have a longer life expectancy.[8] The current requirement of 40 square feet of surface area x 2' depth is 80 cubic feet of prepared soil volume, an insufficient amount of soil volume to provide for the long term viability of the proposed Urban Forest for the City.

San Diego standard 40 square foot tree well opening

Soil Condition Testing

The soils in the planting areas are typically not tested for soil condition. Consequently, it is not known what amendments to the soil are needed to provide the desired soil condition for tree growth.

Soil Compaction

The soil is typically compacted to a 90% or above to accommodate sidewalk and street construction. With compacted soil, pore space is limited, water infiltration rates and distribution are slow and restricted, and tree rooting is restricted. Because of these conditions, typically roots stay at or near the surface of the soil. When this occurs, the tree roots may damage street improvements. Once damage occurs, additional funding is invested to remove the trees and root mass, remove the damaged infrastructure, replace the sidewalks, curb and gutter, and repair the roadway. Then, many times, another tree is planted the same way as was done previously.

Soil compaction causing surface roots and sidewalk damage

8 Phillip K, Kevin N, Carlos P, Ning Z. 2014. "Growing Condition Improvements for Streetscape Trees." Available at: http://www.austintexas.gov/edims/document.cfm?id=210174

Proposed Revisions

To break the cycle of continually planting and removing trees, and repairing damaged infrastructure, this Plan is proposing that the design, detailing, implementation and installation / maintenance of the new street trees + urban forest be done correctly the first time. Even though these efforts will cost substantially more per unit initially, the monies and time saved over the long term, in addition to the fact that the trees will be growing and ultimately result in a successful urban forest should be less expensive in the long run and will result in a successful tree planting program.

A new approach must be designed and implemented to assure that the efforts being made to implement green streets and an urban forest are successful. The primary components of this effort are

- Prepared soil planting and soil volume
- Tree selection
- Planting and irrigation
- Maintenance
- Funding and oversight / diligence

As stated above, numerous studies and installations have been done over the previous 20+ years that have tested various soil mixtures / types, volumes and conditions, with follow up investigations documenting the performance and success of these various efforts. Early on, it was understood that trees had to have a minimum soil volume to allow the roots to grow, have no surface restrictions to allow the root crown to develop and a tree to mature especially without damaging the city infrastructure. The basic need of a tree, in terms of soil volume, should be a minimum of 1,000-1,500 cubic feet.[9] Two primary options have developed in an effort to address the growing medium / soil issue - the first was a suspended pavement with pre-manufactured soil cells and the second is a soil matrix (engineered soil) that was designed by staff at Cornell University and is composed of aggregate and soil composed of smaller sieve size with the resulting pore space intended to provide additional air space for the tree roots to grow without damage to pavements and infrastructure.

Recent studies tracking the relative success of the trees planted utilizing both approaches have demonstrated that the suspended pavement / soil cell approach is highly successful. The Soil Matrix option tended to result in trees that would go into decline over the long term, presumably due to the lack of soil particles / fines, and the overabundance of aggregate which provides no nutrients to the roots, but is responsible for creating the pore space for the roots to grow into. With those tests and documented results available for review and consideration, the recommendation for the City to consider is the Suspended Pavement / Soil Cell concept. Where specific conditions merit, structural soil can be considered for use under hardscape to facilitate additional root volume areas.

A range of details with the product in various configurations has been prepared and are included in the Toolbox in the last section of this document for consideration and application for numerous conditions, but is limited to the planting of street trees. These details also do not address the issue of the City of San Diego (Low Impact Development) LID Design Guidelines explained in the next section.

Suspended pavement with sufficient soil volume for trees to develop deep roots

9 Phillip K, Kevin N, Carlos P, Ning Z. 2014. "Growing Condition Improvements for Streetscape Trees." Available at: http://www.austintexas.gov/edims/document.cfm?id=210174

Tree Planting and spacing

The City's Landscape Ordinance requirement of planting trees at 30' on-center, or tighter, depending on the location and quantity of utilities and infrastructure in the right-of-way is too close for several reasons:

In a commercial district, the primary concern for businesses is the visibility of signage. Obstructions to signage can be detrimental to business patronage. Project examples throughout the City exist where new landscapes and trees were installed on the private development area per landscape requirements and approved plans, only to have the trees cut down when they begin to obstruct business signage. With limited enforcement to track these removals, the benefit of providing landscaping to the community from these projects is eliminated.

This issue is compounded when the spacing is required to be even closer together due to existing utilities and infrastructure. Even more trunks and tree canopies become obstructions for business signage and minimal space between trees leads to more root crowding and damage to infrastructure. When trees are planted in small spaces or very close together, tree roots and trunk flare can damage infrastructure. This results in more damage to the right-of-way improvements, even when the parkway strip is an open continuous landscape area. In this case often times surface roots will run the length of these areas and cause damage resulting in the removal and replacement cycle.

Trees at 30' on center, blocking business signage - San Diego

Tall trees not blocking signage - Santa Barbara

Planting Recommendations

Other cities such as Portland, Oregon, New York, New York, Minneapolis, Minnesota, and Austin, Texas, have had success in addressing their respective tree planting efforts and details. After a review of their standards and practices, the City of San Diego can make the following recommended revisions to the street tree and landscape requirements for right-of-way, to build a successful urban forest.

Scale of Tree

Elevate the height of the tree to addresses several aspects of desirable streetscape design.

- Taller trees have higher / broader tree canopies that improve the spaces beneath for sidewalk activities, uses, and shading.
- Elevated tree canopies do not obstruct, signage from local businesses, with the exception of the tree trunk. However, this obstruction can be offset by the value gained in contributing to the community character.

Spacing of Trees

The spacing of trees should be extended to allow for trees of larger sizes to grow and mature, and to eliminate root crowding and damage. 40' - 50' on-center spacing, depending on roadway speed, is the distance recommended. Less than 40' on-center would only be for 25 - 30 mile per hour (MPH) roadways.

Selection and Planting of the Tree

The tree planting detail and the soil volume / type / condition should be improved to support the growth of these trees.

- A minimum of 500 cubic feet to the desired 1,000 cubic feet of soil volume needs to be provided, depending on tree type, size and quantity.
- The compaction of the soil should be loosened for the root zone, from the 90%+ compaction

to a 75% - 80% range. If the on site soil has to be deep ripped and amended based on soil testing and analysis, then those steps should be mandatory and required. Also, site observation, verification, and documentation should occur at planting. After planting and once the area is buried it would have to be re-excavated to confirm proper preparation.

- Selection of healthy, height, form, rooting, and structure of the tree from the nursery is imperative. Correct facing and placement in the planting area is necessary to assure that the existing branching structure is oriented correctly to have the tree grow, mature and fill the area as envisioned.
- Structural Pruning- Trees should be structurally pruned. This consists of selective pruning in order to improve tree and branch architecture, thus establishing a dominant leader with strong and properly spaced scaffold branches by removing interfering, overextended, defective, weak, and poorly attached branches.[8] Pruning and shaping also establishes the correct height to assure pedestrians and bicyclists have clearance and that high profile vehicles also are accommodated to prevent 'truck pruning' from occurring and damaging the trees.
- Irrigation should provide coverage from the top of the root ball and the deep bubbler stand pipes to promote deep rooting within the prepared planting medium.

Maintenance of the Tree / Urban Forest

- Trees with similar maintenance regimes should be clustered together to increase efficiencies in maintenance (i.e. Pines – low maintenance and Palms – very high maintenance are not mixed on the same street and rather clustered together)
- The initial maintenance of the tree planting is very important including the proper monitoring of soils and fertilization needs of the trees and plantings.
- Annual or bi-annual trimming and monitoring should be provided.
- Replacement trees, if required due to vehicular damage or other means of loss, must follow the same procedure(s) as outlined above.

8 Tree Care Industry Association. American National Standard, ANSI A300 (Part 1)-2008. Available at:: www.tcia.org

Widely spaced trees - San Diego

Funding and Management

- Securing the funding to design and implement the plantings of trees for streetscapes and to add to the 'urban forest' is the initial step. Providing the necessary funding for City staff to maintain a database for its urban forest, is also mandatory if this effort is to be successful in this community.
- With these core issues addressed trees will be able to establish and mature for the benefit of the Midway-Pacific Highway community and the City of San Diego for many years to come.

Existing Trees – Analysis and Protection/ Incorporation

Throughout the project area there are approximately 1,706 existing trees and palms that have been planted in the right-of-way and undeveloped area. A majority of these trees are in constrained spaces consistent with the old and current tree planting standards. In spite of the lack of area and soil volume, a majority of these existing trees have achieved a level of scale and maturity that merits the trees retention in spite of trunk and root damage to the adjacent curb, gutter and / or sidewalk. The consideration for retention is primarily related to the tree's sustainability to create shade, sequester carbon, generate oxygen and improve the area's aesthetic and community value. The City of San Diego has recently adopted a Climate Action Plan and has allocated initial funding for various projects that are to include planting and trees.

Consistent with numerous cities around the country and with previous efforts by City of San Diego staff, a toolbox of options has been developed to allow existing trees to remain in place with one or more of these options implemented to expand the root zone and surface soil area to protect the tree and root zone, while replacing the damaged infrastructure. Also, the City of Seattle developed details of features for consideration to be applied as needed and necessary for each specific instance / condition to protect and retain mature specimen trees.

Note: A certified Arborist should be retained to inspect and make recommendations as to the best options for selection and implementation to retain and protect trees in place.

Large existing Rainbow Eucalyptus on Sports Arena

EMPHASIS

The planting of new trees to augment the existing trees to complete the Urban Forest. To improve the community and enjoy the benefits provided by trees.

Task 1	The completion of the comprehensive 'Green Street'/ Urban Forest Tree program
Task 2	The completion of the 'Green Street Toolbox' for the benefit of this project and future City projects
Task 3	The identification of a demonstration project for implementation to demonstrate the benefits of a City 'Green Street'/Urban Forest Tree Program

Tree Selection Criteria

Trees should be selected to be consistent with or compliment the predominant exisiting trees. They should also be complementary to the existing trees and help to create the desired functional and aesthetic characteristics. Additionally, trees should be selected to create an urban forest that will provide the environmental, physical and emotional benefits to the community. Specific aspects and qualities to be considered in the tree selection process include:

- Adapted to the climate (Mediterranean climate or California native species preferred)
- Drought, heat, and harsh location tolerant
- Long-lived species
- Sturdy branching and structure
- Low maintenance
- Correct form and scale (height and spread) for the selected location and condition
- Proper selection for soil type, volume, and location
- Low pollen production
- Pest and disease resistant / tolerant
- Preference between colorful and flowering (resulting in leaf and flower litter) or less showy and less litter
- Availability of required tree root zone volume, soil design and compaction in the available root zone in right-of-way (landscape area or suspended pavement) to facilitate the existing and selected tree types for each location
- Opportunity to create tree root zone volume to maximize the available root zone in right-of-way (landscape area or suspended pavement)

Master Street Tree Palette

This Plan identifies opportunities for the implementation of an urban forest and tree planting program. In order to create and establish the urban forest, tree types and species are specified for each of the primary street corridors and neighborhoods in the community. An extensive urban forest has numerous benefits, both functional (shading, heat reduction, carbon sequestration, removal of pollutants) and aesthetic (sense of place, attractiveness, desirability).

The most significant challenge is where and how to plant the proposed trees in a limited shared soil space with storm water management and treatment elements, alternative modes of transportation, and community 'gateways' and 'wayfinding' signage. All of these elements tend to create conflicts.

Given that this community evolved in an eclectic manner over the years, there are specific areas where streets are spatially challenged and may not present an opportunity to plant trees without modifications to the existing condition.

The Street Tree Exhibit has identified the existing and proposed trees for the major corridors / green streets - Rosecrans Street, Sports Arena Boulevard, Pacific Highway, Midway Drive and Barnett Avenue/ Lytton Street with the recommendations included in Section 5.4.

2.5 Storm water management

For the Midway-Pacific Highway community, storm water runoff goes directly to either the San Diego River or San Diego Bay. The untreated storm water carries pollutants and debris to the City storm drain system and into the adjacent water bodies. Storm water from urban areas, also known as urban runoff, is the primary contributor to water contamination of creeks, streams, rivers, bays and the ocean. Chemicals, oil, tire residue, animal waste, trash and landscape debris can all be captured by the runoff and collected by the storm drain system and released from the drainage outfall into local water bodies. Due to the development of the community, no natural sloughs, lagoons or estuaries remain to function as natural water cleansing features. Without those naturally occurring filtration areas, all water contaminants flow unfettered into local waterways.

The incorporation of Low Impact Development (LID) concepts and features can mitigate these pollution constituents by:

- Reducing trash and debris - plastics, paper, landscape materials pollution downstream
- Filtrating and treating storm water to capture chemicals and waste in soil media
- Capturing water to reduce run-off, promote infiltration and healthy soils
- Utilizing urban runoff as a water source asset so that less irrigation is required to grow the urban forest
- Reducing the volume of water in the streets to relieve the typical flooding that occurs on Midway Drive, Pacific Highway, Witherby Street, and Rosecrans Street

However, the implementation of bio-remediation facilities will also be complicated due to high water tables.

Capturing water and filtrating - Portland, OR

Capturing and treating stormwater - Portland, OR

City LID design guidelines - issues and recommendations

To insure the success of this Plan, City of San Diego documents pertaining to the design of the right-of-way were reviewed to evaluate for conflicts and the need to update,

The primary City of San Diego documents referenced for evaluation included:

- Street Design Manual
- Landscape Ordinance
- Low Impact Development (LID) Design Guidelines
- Park and Recreation Landscape Standards

One of the primary goals for this project has been to create a complete street / green street solution utilizing limited right-of-way to facilitate components of infrastructure in the same location. Specifically the utilization of the surface area to provide mobility circulation, site furnishings and features, and street trees while leveraging the entirety of the soil area beneath. By placing utilities and infrastructure in the street, future impacts to the trees are reduced, and the significant issue of storm water drainage and treatment can occur in the tree growing area.

Specifics relating to the Street Design Manual and Landscape requirements have been discussed above. The significant opportunity of designing bio-retention swales and features that also double as streetscape and landscape opportunities is a significant dual-use opportunity for the entire project area.

Numerous requirements in the current LID Design guidelines document are not conducive for the creation and long term success of the urban forest.

The most significant issue is the specifics of the engineered soil mix design and its primary focus on the flushing and treatment of water. The engineered soil is not designed to be a successful planting medium for a robust tree and streetscape installation. The composition is almost entirely sand in an effort to flush a volume of 5" of water per hour as a minimum requirement. Only 5% by volume is compost and treat approximately 5% is loam soil particles. The end result is a soil condition that flushes water at a very fast rate. Relative to growing plant material this is flawed in three ways.

1. The effort to create a successful long term urban forest is dependent on several critical factors - the correct tree type, an appropriate planting detail with correct irrigation, soil type and volume, and maintenance.
2. Long term success and funding for maintenance requires a staffing commitment.
3. The tree and plant list contained in the LID design guidelines are focused on California native plants that are consistent with or are from riparian conditions.

If the soil flushes water at 5" per hour, no residual water will be in the soil to support the plant requirements of riparian plants that require year round moisture. With soil flushing at such a high rate, supplemental irrigation would be required to be run on a daily basis to keep plants alive. Running irrigation on a daily basis is contrary to the efforts to conserve water for both the drought restrictions and the concept behind selecting native plants to conserve water and reduce maintenance. The soil composition and the tree plant list that are in the LID Design Guidelines are in direct conflict with each other and also conflict with the mandate to reduce water consumption.

This project recommends modifications to the LID design guidelines including modify / revise the tree / plant list and soil composition for bio-swales and bio-retention facilities.

LID RECOMMENDATIONS

The Plan area faces significant challenges due to water quality impairments and flooding during storm events. Also due to the low-lying topography of the area, intense storms or extreme high tides can lead to flooding in area streets, making travel difficult and unsafe.

To assist with the mitigation for these conditions, the plan proposes to implement Green Street and LID features to treat, detain, and retain storm water runoff in the project area. A green street, from a storm water perspective, utilizes natural features and processes as a form of streetscape enhancement and storm water management. Green street features include enhanced tree canopies, permeable pavements, integrated runoff treatment, low-volume irrigation, and other LID principles. Green streets will enhance storm water management in the project area by:

- Reducing storm water runoff by reducing impervious surfaces
- Promoting infiltration of storm water into the ground
- Promoting the use of storm water as a water source for the urban forest
- Reducing street flooding by providing areas for ponding and detention of storm water outside of the traveled way
- Removing pollutants from storm water prior to discharge to the San Diego River and San Diego Bay

EMPHASIS

Design solutions to implement bioretention features to capture storm water and reduce / eliminate flooding.

Task 1	Identify and address flood prone locations within the project area.
Task 2	Create a palette of design solutions that can be referenced / implemented for various conditions that exist in the right-of-way to treat the water to remove pollutants
Task 3	Attempt to maximize the use of water as an asset in the maintenance of the proposed urban forest and landscape during treatment and after cleansing

Storm Water Design Considerations

The following factors have been taken into account while developing the storm water strategies for the Midway-Pacific Highway community.

TOPOGRAPHY

Topography of the plan area is generally flat, with elevations mostly ranging from 6-14 above mean sea level and surface slopes in the 0.5-2% range. Historically, the San Diego River ran through the plan area to an outlet to San Diego Bay. In the 1870s, the River was rerouted to its current channel along the northerly boundary of the plan area. The flat topography is a result of deposition of alluvial material of the River and subsequent artificial fill after the River was changed to its current course.

Flat grades such as those exhibited in the plan area are complimentary to LID and green street improvements, since flat grades slow runoff and allow the storm water best management practices (BMPs) measures to most efficiently promote infiltration and filtration.

Project Area Topography

Soils

To determine the suitability of soils within the plan area to accept the infiltration of storm water, a number of resources were consulted. Due to the high degree of urbanization within the plan area, general soils databases classify the majority of the plan area as urban land and are unable to provide the hydrological soil group or other soil parameters. Based on the geotechnical report for a recent project in the project plan area , it is likely that the majority of the plan area is underlain by soils consisting of undocumented fill and alluvium, including sand, clayey silt, silty clay, sandy silt, and clay. This is consistent with the history of the plan area as part of the San Diego River delta as described above, with subsequent placement of artificial fill to raise the ground surface above sea level.

Based on the presence of alluvial materials and sand, it is anticipated that the soils in the project area will display fair to good infiltration rates, although the infiltration rates could be lower in areas underlain by clay deposits. In situ soil infiltration testing will be required to determine the infiltration rates in specific locations of the plan area.

Shallow groundwater should be anticipated throughout the plan area due to the proximity to the San Diego River and San Diego Bay, with depth to ground water generally expected to range from 5-15 feet below ground surface. The determination of the depth to groundwater will be critical to the design of street features which include infiltration of storm water. As a rule of thumb, 10 feet of separation from the bottom of an infiltration facility to the groundwater table is required to protect groundwater quality. However, site specific conditions and methods may allow infiltration with less than 10 feet to the groundwater table. The separation requirement should be evaluated on a case-by-case basis.

Flooding

Based on a review of FEMA Flood Insurance Rate Maps (FIRMs), shaded Zone X flood plain conditions are present in the northerly portion of the project area, generally adjacent to the San Diego River extending south to Sports Arena Boulevard on the westerly portion of the project area, and to Kurtz Street/Camino Del Rio West on the east end of the project area. This shaded Zone X floodplain consists of areas protected by levees from 1% annual chance (100-year) flood. The levees along the San Diego River protect this area from the 100-year flood, but overtopping or failure of the levee system would lead to flooding of this area.

In addition to the FEMA mapped flood plains, portions of the project area experience flooding on a more regular basis. As described earlier, the Midway-Pacific Highway community is at relatively low elevation (when compared to the San Diego Bay) and extremely flat. Much of the runoff in this area is handled by six pump stations, which are in place due to the topographic conditions of the plan area. Any issues that cause the pump stations to perform at less than optimal levels (whether caused by debris, age, vandalism, etc.) have the potential to create localized flooding, which typically impacts the public right-of-way first and occasionally private property.
Areas which have been known to be impacted by pump station capacity limitations are as follows:

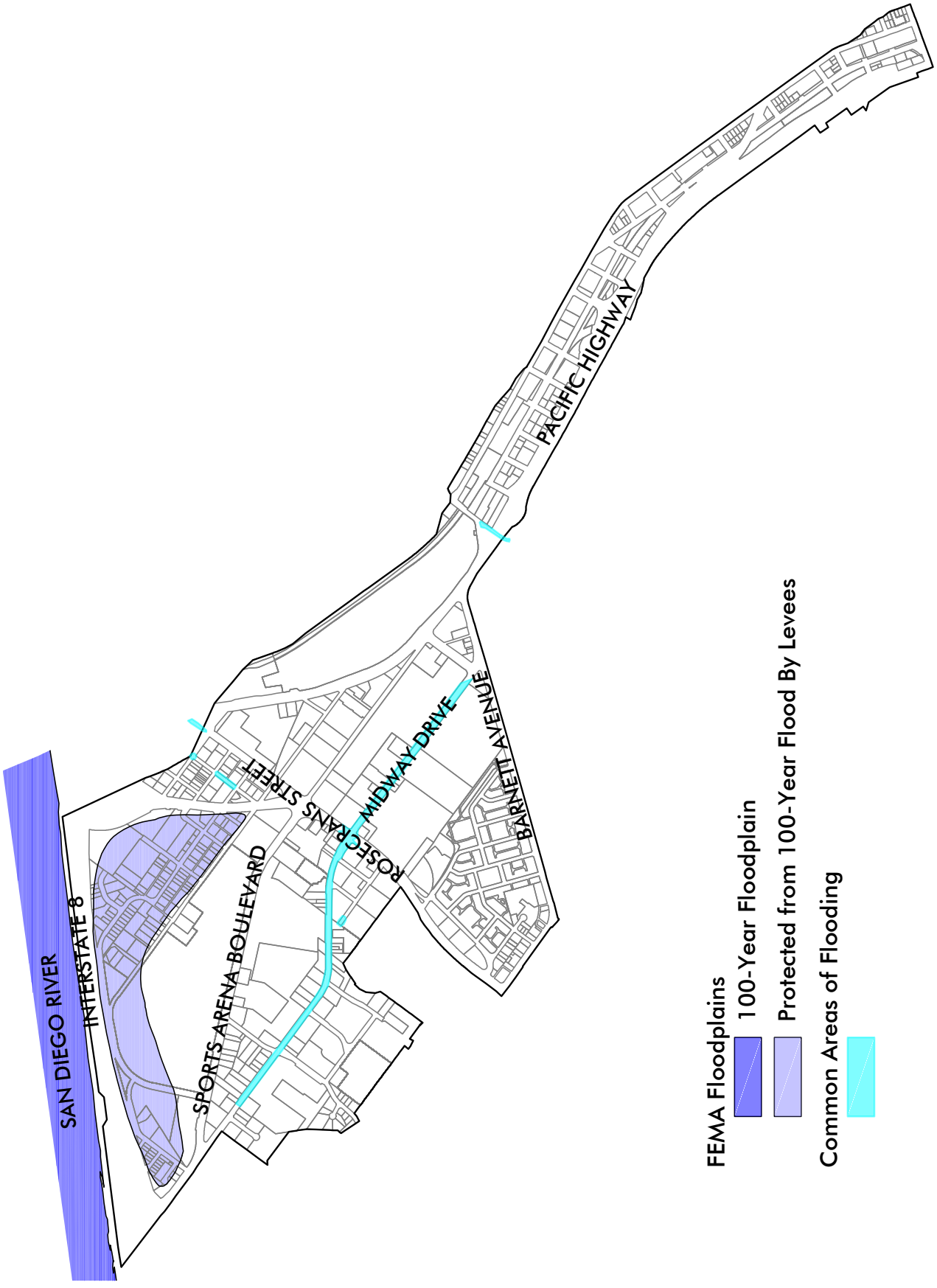
- Pump Station A – Witherby St.
- Pump Station B – Pacific Highway and Barnett Ave.
- Pump Station C – Pacific Highway and Witherby St.
- Pump Station H – Sports Arena Blvd., Kurtz St., Hancock St., Pickett St., Sherman St., and Greenwood St.
- Pump Station L – Pacific Highway, Kurtz St., Witherby St., Noell St., Barnett Ave., and Pump Stations A, B, and C

Although not impacted by the operations of the pump stations listed above, the intersection of Rosecrans Street and Midway Drive is a common location of significant street flooding as well. This intersection floods when the capacity of the storm drains are exceeded due to the lack of an overflow outlet and the low topography.

In addition to the potential for flooding during a storm event, there are certain drainage systems and roadway sections which may flood during periods of extremely high tide. These extremely high tide situations occur about 2-3 times a year and only impact the public right-of-way.

The most extreme example of this situation is Midway Drive just north of Barnett Avenue. There is a low point in Midway Drive with associated storm drain inlets about 500 feet north of the intersection with Barnett Avenue. During extreme high tide events on December 22-23, 2014, and January 20, 2015, water was witnessed backing up into the street and impacting vehicle travel, as can be seen in the photo below. These flooding conditions are worsened when storm events coincide with extreme high tide events, adding storm water runoff to a storm drain system which is already overflowing with tidal backwater.

King Tide Event - Midway Drive Source: Fuscoe Engineering



Project Area Flooding Exhibit

Low Impact Development (LID) Strategies

Low Impact Development strategies focus on controlling storm water at the source. This can be done through simple, non-structural methods that are integrated into the hydrology of a site. The LID features can be multi-functional as well, integrating landscaping and pedestrian friendly elements. Examples of non-structural LID strategies include minimizing impervious surfaces, creating breaks between areas of impervious pavement, dispersing runoff to adjacent landscape areas, using soil amendments to improve water infiltration in landscape areas, and minimizing soil compaction in landscape areas.

Permeable pavement

Shallow Infiltration Strategies

Where soil conditions allow, LID Best Management Practices (BMPs) can be implemented to encourage infiltration of storm water into the ground. Infiltration of storm water can help mimic the natural drainage conditions of the site, prior to urbanization, and preserve the water balance between ground water recharge and surface water runoff. In areas with poor surface drainage, flooding can be reduced by encouraging the ground infiltration of storm water and giving ponded runoff somewhere to go. Infiltration also improves storm water quality by preventing the runoff of pollutants. Shallow infiltration strategies can range from non-structural BMPs, such as depressed landscape areas, to structural BMPs, such as previous pavement and bioretention basins.

Depressed landscape area

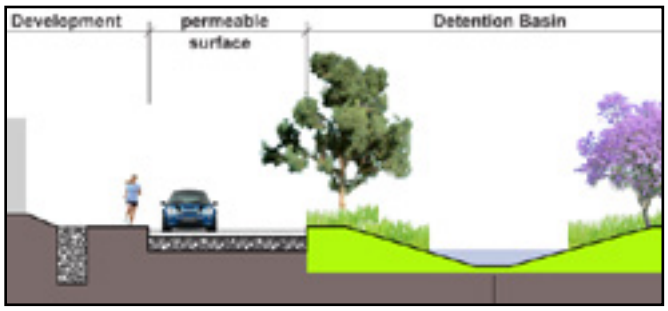
Flow-Through Strategies

Where soil conditions do not allow infiltration of storm water, flow-through LID strategies can be implemented to improve storm water quality and reduce the quantity of runoff. Flow-through strategies include BMPs such as flow-through planters and lined bioretention basins. These BMPs treat runoff by filtering it through a soil media and allowing an opportunity for filtering and uptake of pollutants through the plant material in the BMP. These natural processes also reduce the quantity of runoff through absorption by the soil and plant material as well as evapotranspiration.

Filtering runoff with plant material

Low Elevation/Flooding/Tidal Strategies

LID BMPs can reduce flooding in low lying areas, areas with poor drainage systems, and areas influenced by high tide events. Shallow infiltration and/or flow-through BMPs can reduce flooding by providing storage of runoff out of the traveled way and encouraging evapotranspiration, vegetative uptake, and infiltration of the storm water. LID strategies can also include buffers between tidally influenced areas and development, which can minimize the impact of high tide events.



Sea level rise adaptation

Drainage Inlets and Outlets

A key to all functional drainage systems is to ensure that the inlets and outlets of the system remain clear and well maintained. LID BMPs can prevent the clogging of the storm drain system by filtering trash and debris from runoff prior to it reaching the storm drain system. Proper design and maintenance of the LID BMPs is crucial, however, to prevent clogging of the drainage system by overgrowth, mulch, eroded soil, or loose plant material. Proper energy dissipation should be provided at the inlets to LID BMPs and at all storm drain outfalls.


Low impact design strategy for drainage

Storm Water Strategies

Based on the topography, soils, and flooding conditions in the plan area, the following LID storm water strategies are recommended:

Bioretention with Infiltration

Bioretention basins accept runoff into a shallow ponding area, where it is allowed to filter through a soil media to remove pollutants. Vegetation that is planted within the basin also helps to remove pollutants from the runoff. Where soil conditions allow, the filtered storm water can be allowed to infiltrate into the ground below the bioretention basin, reducing the volume of runoff discharged to the storm drain system. Infiltration based facilities provide high treatment efficiency for all pollutants in storm water.

Bioretention with Infiltration

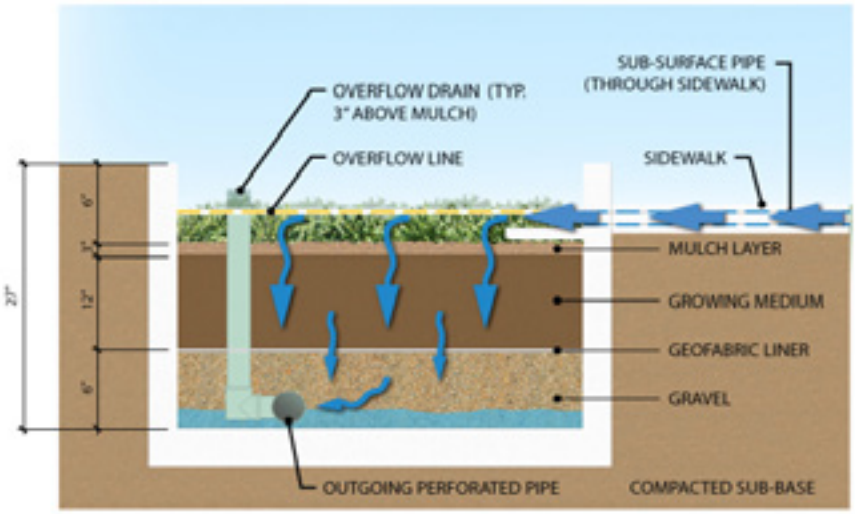
Permeable Pavement

Permeable pavements allow rain to flow down through the pavement surface, rather than running off. An underground gravel reservoir is provided below the pavement, which allows stormwater to be stored and then infiltrate into the soil below. Permeable pavements should only be implemented where the soil conditions allow for infiltration, unless a liner and sub-drain are provided.

Permeable Pavement

BIORETENTION WITH FILTRATION

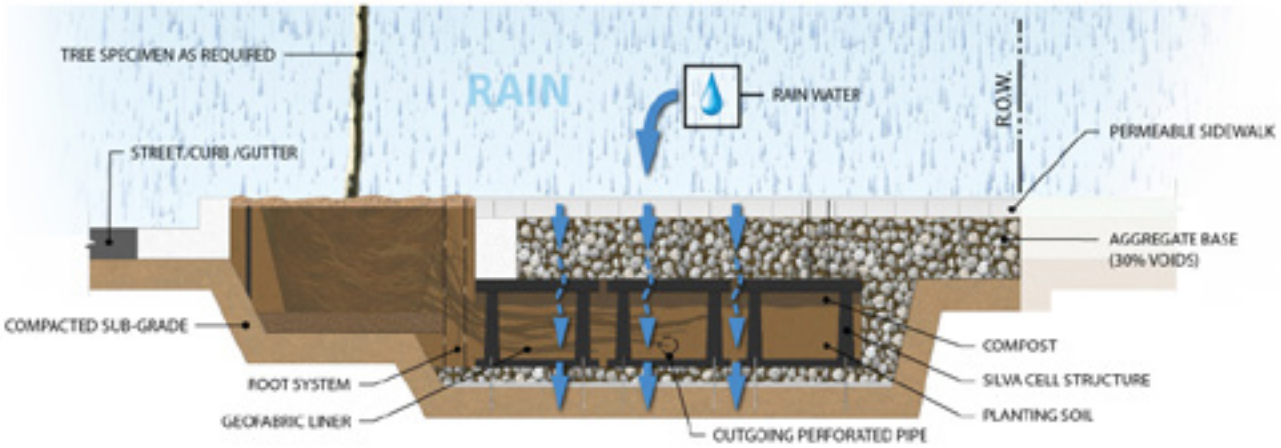
Where soil conditions do not allow infiltration, bioretention basins can be constructed with a perforated sub-drain pipe and an impermeable liner to eliminate infiltration into the soil. Such bioretention basins still provide medium to high treatment efficiency through the filtration in the soil media layers and vegetative uptake of pollutants. Per the City of San Diego BMP Design Manual, the feasibility of infiltration or partial infiltration of storm water runoff should be considered prior to selecting a bioretention basin with an impermeable liner.



Bioretention with Filtration

SUSPENDED PAVEMENTS

Suspended pavements should be considered along with the urban greening to promote healthy street trees. Suspended pavements refer to systems which structurally support a pavement at the surface while allowing the underlying soil to be minimally compacted with a high void ratio to perform as an effective root zone for the street trees. Suspended pavements also have storm water benefits since it allows for the soil to absorb storm water, filter out pollutants, and infiltrate runoff



Suspended Pavement

2.6 Mobility and Health Benefits

Planning and designing a community for increased walking and cycling can influence overall community health in a positive manner. This section addresses multiple dimensions of the mobility/health relationship including walking and cycling, driving, vehicle emissions, climate change and safety. The primary focus of this section is to summarize previous published research on these topics as a way to inform an understanding of the likely health benefits derived from the Plan.

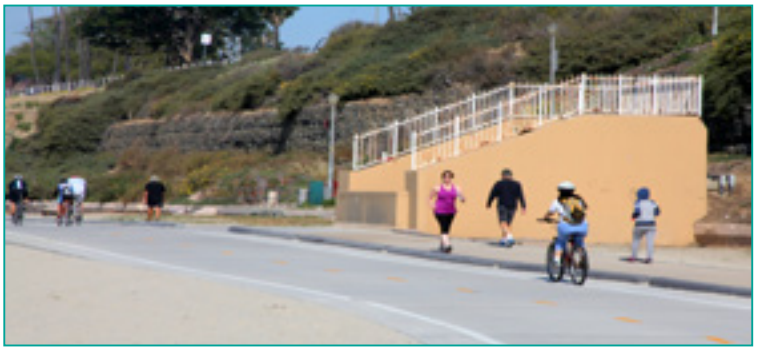
The term mobility encompasses several concepts, each with its own connections to health. Mobility reflects mode choice, or the type of travel one uses to get to a destination, such as car, walking, or bus. This is thought to be a function of vehicle ownership, land use, the density of development and the transportation infrastructure. A variety of travel options can lead to increases in non-motorized or active travel (i.e., walking and biking), which can lead to better health as a result of increased physical activity. Mode choice is also influenced by the cost of transportation, or the affordability of travel by various modes and the level of resources available for other household necessities.

Mobility also reflects how quickly, easily and safely one can travel to desired destinations. Faster and easier travel, which is often a function of vehicle ownership, land use and transportation system configurations, potentially leads to more free time, less stress and more access to necessary goods and services. This can improve health by allowing for more time for health-promoting activities and ensuring that people have access to what is needed to lead healthy lives. Although convenience may be important for mobility, creating conditions that are safe for all modes of transportation is also important.

Lastly, the term can describe accessibility of routine destinations. More access to goods and services necessary to lead healthy lives has been shown to lead to better health. [8]

There are many types of transportation-related improvements (including land use changes) that can lead to increased mobility. There are inherent trade-offs in various types of transportation system improvements. Roadway widening, for example, while beneficial to automobile level of service can serve to increase vehicle mode share and vehicle miles traveled (VMT) per household, while decreasing the quality of the pedestrian and cycling environments, and reducing physical activity and neighborhood completeness.

The following sections review the published literature related to potential health effects associated with walking and cycling, driving, and safety from injury while traveling.



Planning and design of this space promotes walking and cycling

8 Acheson, D. 1998. "Independent Inquiry into Inequalities in Health Report." The Stationery Office, London.

Walking and Cycling

Walking for transportation and leisure is a form of physical activity. Research evidence largely supports the health benefits of physical activity. A comprehensive review conducted by the U.S. Department of Health and Human Services (HHSA) in 2008 documents the evidence for a causal relationship between levels of physical activity and better cardiorespiratory and muscular fitness, cardiovascular and metabolic health, bone health, and body mass and composition in children and youth. In adults and older adults, the evidence shows that compared to less active people, more active men and women may have lower rates of all-cause mortality, coronary heart disease, high blood pressure, stroke, type 2 diabetes, metabolic disorders, colon cancer, breast cancer, and depression. And for older adults, being physically active is associated with higher levels of functional health, a lower risk of falling, and better cognitive functioning. The review also found benefits specifically for walking; the evidence showed a consistently lower risk of all-cause mortality for those who walked two or more hours per week.[8] Physical activity has also been linked to better mental health outcomes. [9]

Similarly, cycling is a practical mode of transportation, physical activity, and leisure, and shares many of the same co-benefits to health as walking. A 2011 report by the World Health Organization documents all-cause mortality benefits from regular cycling for commuting, controlling for socio-demographics and leisure time physical activity.[10] A 20 year longitudinal study in the U.S. found that active commuting (walking or biking to work) was positively associated with fitness in men and women and negatively associated with Body Mass Index (BMI), obesity, and blood pressure in men.[11] Cycling can reduce the risk of serious conditions such as heart disease, high blood pressure, obesity and the most common form of diabetes.[12] Even new cyclists covering short distances can reduce their risk of death, mainly due to the reduction of heart disease, by as much as 22 percent.[13]

Commuting by bike or for leisure reduces health risks

Walking greatly reduces health risks

8 Physical Activity Guidelines Advisory Committee. 2008. Physical Activity Guidelines Advisory Committee Report, 2008. Washington, DC: U.S. Department of Health and Human Services.

9 Stephens, T. Physical activity and mental health in the United States and Canada: evidence from four population surveys. Preventive medicine, 17: 35–47 (1988).

10 WHO/Europe HEAT (Health Economic Assessment Tool). 2011. World Health Organization, Regional Office for Europe. Available at: http://www.heatwalkingcycling.org/index.php

11 Gordon-Larsen P, Boone-Heinonen J, Sidney, S, et al. Active commuting and cardiovascular disease risk: The CARDIA study. Arch Intern Med. 2009;169(13):1216-1223.

12 Carnall D. 2000. Cycling and health promotion: A safer, slower urban road environment is the key. British Medical Journal 320:888.

13 Rutter H. Modal shift: A policy report on the health benefits of increasing levels of cycling in Oxfordshire. Transport and Health. Available at www.modalshift.org/reports/tandh/print_version.htm.

Driving

In contrast to the health benefits mentioned above, studies have shown that there are a number of health effects associated with driving. A study in the United States showed that each additional hour spent in a car per day was associated with a 6 percent increase in the likelihood of obesity, and each additional hour walked per day was associated with a 4.8 percent reduction in the likelihood of obesity.[8] In a California study assessing VMT and obesity, counties with the highest average VMT were positively associated with the highest average rank of obesity.[9]

Driving may also impact mental health and well-being. One study found that regular exposure to traffic congestion affected individual's psychological adjustment, work performance, and overall satisfaction with life.[10] Sitting in traffic can increase blood pressure and decrease one's tolerance for frustration. This of course affects the person experiencing the constraints, but can also lead to aggressive behavior and an increased likelihood of involvement in a crash.[11]

Vehicular use on Barnett Ave.

Vehicular use on Midway Drive

8 Frank, Lawrence, Andresen, Martin and Schmid, Tom (2004). Obesity Relationships With Community Design, Physical Activity, and Time Spent in Cars. American Journal of Preventive Medicine Vol. 27. No 2. June, 2004, pp. 87-97.

9 Lopez-Zetina J, Lee H, Friis R. 2006. The link between obesity and the built environment. Evidence from an ecological analysis of obesity and vehicle miles of travel in California. Health Place12(4):656-64.

10 Novaco, R.W. et al. 1990. Objective and subjective dimension of travel impedance as determinants of commuting stress. American journal of community psychology, 18: 231–257.

11 Mayer, R.E. & Treat, J.R. 1977. Psychological, social and cognitive characteristics of high-risk drivers: a pilot study. Accident analysis and prevention, 9: 1–8.

Vehicle Air Emissions

Personal motor vehicles are recognized as contributors to a number of air pollutants that have been shown to negatively impact public health. Air pollutants in vehicle exhaust can include the following "criteria pollutants": carbon monoxide (CO), particulate matter (PM), and nitrogen oxides (NOx), as well as other "non-criteria" mobile-source toxic air contaminants such as benzene, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, naphthalene, and diesel particulate matter (DPM). Particulate matter, carbon monoxide, nitrogen dioxide, and ozone have well-established causal relationships with human health and are subject to nationwide ambient air quality standards, monitoring and control requirements under the Federal Clean Air Act.[8]

Previous studies have found correlations between the health effects of pollution from traffic sources and asthma and other respiratory diseases,[9] [10] [11] cardiovascular disease,[12] lung cancer,[13] [14] [15]pre-term[16] and low birth weight births,[17] [18] [19] [20] [21]and premature death.[22] [23] [24] There is also emerging evidence about the potential connections between air quality and obesity and neurological effects.[25]

8 USEPA (U.S. Environmental Protection Agency). 2011. Clean Air Act. U.S. Environmental Protection Agency: Washington, DC. Available at: www.epa.gov/air/caa/.

9 Chen, L. 2011. "Health Impact Assessment of the Childhood asthma burden of traffic-related pollution: A qualitative meta-analysis." Working paper.

10 Peters, J.M. 2004. "Epidemiologic Investigation to Identify Chronic Effects of Ambient Air Pollutants in Southern California." Prepared for the California Air Resources Board and the California Environmental Protection Agency.

11 Weinmayr, G., Romeo, E., De Sario, M., Weiland, S.K., Forastiere, F. 2010. "Short-term health effects of PM10 and NO2 on respiratory health among children with asthma or asthma-like symptoms: a systematic review and meta-analysis.

12 California Air Resources Board (CARB). 2007. "Recent research findings: health effects of particulate matter and ozone air pollution" Available at: http://www.arb.ca.gov/research/health/fs/pm_ozone-fs.pdf.

13 Bhatia, .R, P. Lopipero, and A.H. Smith. 1998. "Diesel exhaust exposure and lung cancer." Epidemiology, 9(1): 84–91.

14 Lipsett, M., Campleman, S. 1999. "Occupational exposure to diesel exhaust and lung cancer: a meta-analysis." American Journal of Public Health, 89(7):1009–1017.

15 California Air Resources Board (CARB). 2000. "Diesel Risk Reduction Plan."

16 Ritz, B., Wilhelm, M., Hoggatt, K.J., & Ghosh, J.K.C. 2007. "Ambient Air Pollution and Preterm birth in the Environment and Pregnancy Outcomes Study at the University of California, Los Angeles." American Journal of Epidemiology, 16(9):1045-1052.

17 Centers for Disease Control and Prevention (CDC). 2002. "Infant mortality and low birth weight among black and white infants—United States, 1980–2000." Morbidity and Mortality Weekly Report, 51(27):589-592. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/mm5127a1.htm.

18 Centers for Disease Control and Prevention (CDC). 2010. "Premature Births and the Environment." Available at: http://ephtracking.cdc.gov/showRbPrematureBirthEnv.action.

19 Paneth, N.S. 1995. "The problem of low birth weight." Future Child, 5(1): 19-34. Available at: http://futureofchildren.org/futureofchildren/publications/journals/article/index.xml?journalid=60&articleid=370&sectionid=2478.

20 Wilhelm, M. & Ritz, B. 2003. "Residential Proximity to Traffic and Adverse Birth Outcomes in Los Angeles County, California, 1994–1996." Environmental Health Perspectives, 111(2): 210.

21 Ritz, B., Wilhelm, M., Hoggatt, K.J., & Ghosh, J.K.C. 2007. "Ambient Air Pollution and Preterm birth in the Environment and Pregnancy Outcomes Study at the University of California, Los Angeles." American Journal of Epidemiology, 16(9):1045-1052.

22 World Health Organization, Europe (WHO Europe). 2011. "Health Economic Assessment Tool (HEAT)." World Health Organization, Regional Office for Europe. Available at: http://www.heatwalkingcycling.org/index.php

23 World Health Organization. 2003. "Health aspects of air pollution with particulate matter, ozone, and nitrogen dioxide." Report on a WHO Working Group. Bonn, Germany 13-15 January 2003. Copenhagen: World Health Organization.

24 Brunekreef, B., N.A. Janssen, and J. Hartog. 1997. "Air pollution from truck traffic and lung function in children living near motorways." Epidemiology, 8:298-303.

25 Rundle, A, Hoepner, L, Hassoun, A, Oberfield, S, Freyer, G, Holmes, D, Reyes, M, Quinn, J, Camann, D, Perera, F, Whyatt, R. 2012. Association of Childhood Obesity With Maternal Exposure to Ambient Air Polycyclic Aromatic Hydrocarbons During Pregnancy, American Journal of Epidemiology, 175(11):1163–1172.

Exposure to Air Pollutants in Vulnerable Populations

Some populations may be more physically vulnerable to the impacts of air pollution exposures. The elderly and the young, as well as populations with higher rates of respiratory disease such as asthma and chronic obstructive pulmonary disease (COPD), and populations with other environmental or occupational health exposures (e.g., indoor air quality) that impact cardiovascular or respiratory diseases may be more sensitive to adverse health effects.

The locations of roadways, the volume of traffic on roadways and people's proximity to these facilities determines their exposure to transportation-related air pollutants from vehicle sources. Epidemiological studies have demonstrated that children and adults living in proximity to freeways or busy roadways may have poorer health outcomes. [8] [9] [10] [11] [12] [13]

Health-based standards for ambient air have been developed by the Environmental Protection Agency (EPA) for each of the "criteria pollutants" (O3, CO, PM, NO2, SO2, and lead) as mandated by the Clean Air Act. The Clean Air Act also requires states to develop specific plans to achieve these standards. One way that these pollutants are regulated is through a national network of air quality monitors that provides information on ambient concentrations for each of the criteria air pollutants. Despite promulgation of National Ambient Air Quality Standards (NAAQS) for criteria pollutants, implementation of air quality control plans, and nationwide monitoring, air pollutants are believed to continue to have significant impacts on human health.

High volume of traffic on Rosecrans St./Sports Arena Blvd. Intersection

Vehicular traffic and pedestrian traffic

8 Brunekreef, B., N.A. Janssen, and J. Hartog. 1997. "Air pollution from truck traffic and lung function in children living near motorways." Epidemiology, 8:298-303.

9 Buonocore, JJ, Lee, HJ, Levy, JI. 2009. The Influence of Traffic on Air Quality in an Urban Neighborhood: A Community–University Partnership, American Journal of Public Health, 99 (S3): S629-S635.

10 Health Effects Institute Panel on the Health Effects of Traffic-Related Air Pollution. 2009. "Special Report 17—Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects." Available at: http://pubs.healtheffects.org/view.php?id=306

11 Lin, S., J.P. Munsie, S.A. Hwang, E. Fitzgerald, and M.R. Cayo. 2002. "Childhood asthma hospitalization and residential exposure to state route traffic." Environmental Research, 88(2):73-81.

12 Zhu Y, Hinds WC, Kim S, Shen S, Sioutas C. 2002. Study of ultra- fine particles near a major highway with heavy- duty diesel traffic. Atmospheric Environment 36: 4323- 4335.

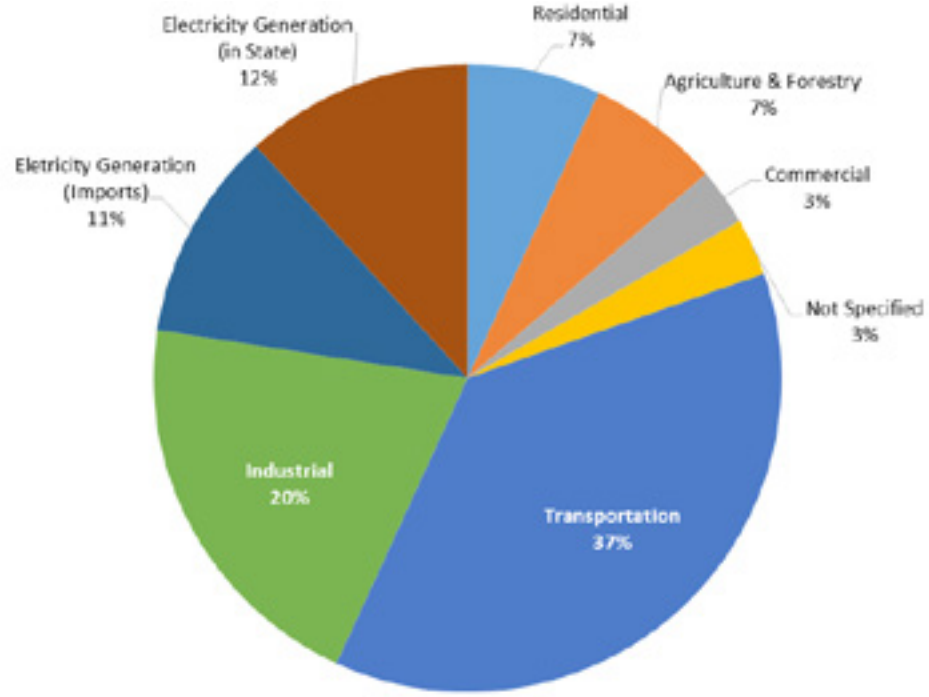
13 Zhou Y, Levy JI. 2007. Factors influencing the spatial extent of mobile source air pollution impacts: a metaanalysis. BMC Public Health 89: 1- 11

Greenhouse Gas Emissions

Studies have indicated that vehicle emissions of greenhouse gases can contribute to global climate change. Greenhouse gases (GHG), through their climate change effects, may increase heat-related illness (i.e., illnesses such as heat stroke that result when a body's temperature control system is overloaded) and death, health effects related to extreme weather events, health effects related to air pollution, water-borne and food-borne diseases, and vector-borne and rodent-borne disease.[8] [9] [10]

Vehicle speeds also have been shown to have an impact on emissions and risks from exposure. In particular, idling vehicles such as trucks and school buses have been highlighted as a source of air pollution because they produce emissions that can contribute to negative health outcomes such as cancer, premature death, and other acute and chronic conditions.[11] [12] Heavy-duty diesel trucks can emit up to 95 grams of CO, 57 grams of NOX, and 2.6 grams of PM10 per hour.[13] Reducing idling-related emissions may be especially important in high truck-trafficked areas, because greater numbers of idling trucks will have a cumulative effect on air pollutants.

The California Environmental Protection Agency's (EPA) Air Resource Board estimates that the transportation sector accounted for about 38 percent of GHG statewide in 2010, as reflected in the chart below.[14]



8 Knowlton, K., B. Lynn, R.A. Goldberg, C. Rosenzweig, C. Hogrefe, J.K. Rosenthal, and P.L. Kinney. 2007. "Projecting heat-related mortality impacts under a changing climate in the New York City region." American Journal of Public Health, 97:2028-2034.

9 Canadian Public Health Association. 2007. "Health effects of climate change and air pollution." Available at: http://www.ccah.cpha.ca/effects.htm.

10 U.S. Environmental Protection Agency (EPA). 2007a. "Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act." Available at: http://epa.gov/climatechange/endangerment.html.

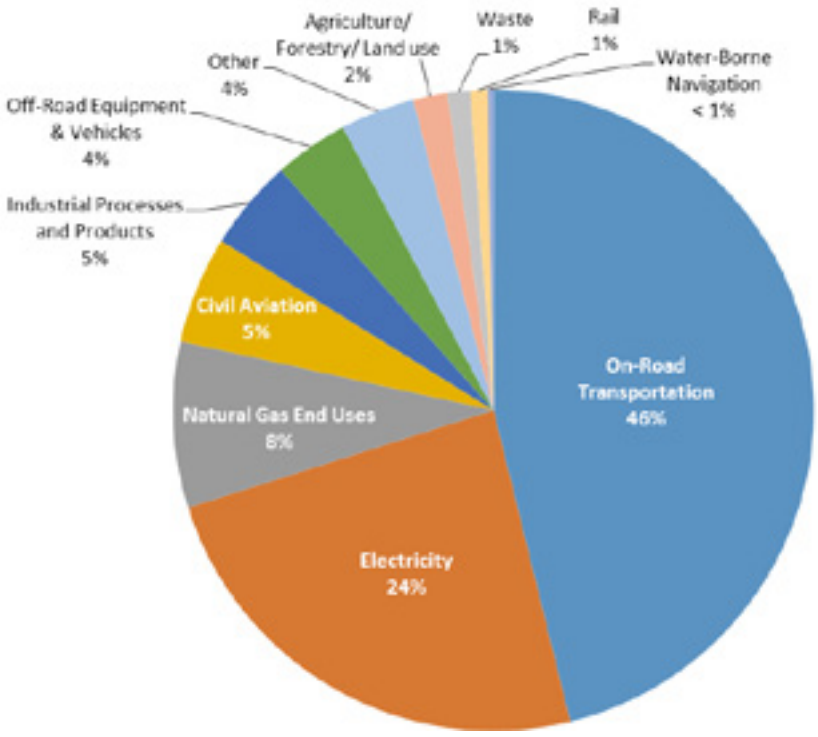
11 California Air Resources Board (CARB). 2008b. "Truck Idling Fact Sheet." Available at: http://www.arb.ca.gov/msprog/truck-idling/factsheet.pdf.

12 California Air Resources Board (CARB). 2009. "School Bus Idling Airborne Toxic Control Measure." Available at: http://www.arb.ca.gov/toxics/sbidling/sbidling.htm.

13 U.S. Environmental Protection Agency (EPA). 1998. "Emissions Facts: Idling vehicle emissions." Available at: http://www.epa.gov/otaq/consumer/f98014.pdf.

14 California GHG Inventory for 1990 — by Main Sector. (2012, November 26).California Environmental Protection Agency Air Resources Board. Governmental. Retrieved fromhttp://www.arb.ca.gov/cc/inventory/data/graph/pie/pie_by_sector_1990.htm

Researchers at the University of San Diego estimated that the transportation sector accounted for a full 46 percent of greenhouse gas emissions in 2008 within the San Diego region, as shown below.



Year 2008 San Diego Greenhouse Gas Emission Estimates

Safety

Transportation Collisions and Injuries

Traffic safety is an issue related to both livability and convenience. In 2011 there were over 32,000 fatalities and over 2.2 million injuries from crashes on U.S. roadways, for all modes of transportation. Fourteen percent of the fatalities and 33 percent of the injuries (ranging from non-severe to severe) were pedestrians. Two percent of the fatalities and two percent of the injuries were bicyclists. Children aged 10-15 have the highest population-based injury rate (33 per 100,000) and people over 74 years have the highest population-based fatality rate (at 2.19 per 100,000 – almost double the overall population rate of 1.33).[8] These rates do not take exposure risk into consideration.

The risk of pedestrian injuries may discourage pedestrian activity and negatively impact physical activity levels. Pedestrians are even likely to limit their exposure if there is a perception of danger.[9] [10] [11]Such impacts to safety are real as well as perceived: environmental variables that may be associated with actual pedestrian collisions include pedestrian volume,[12] vehicle volume,[13] vehicle type,[14] vehicle speed,[15] intersection design, pedestrian facilities, lighting, and weather.[16]

Roadway designs shown to enhance cyclist safety include clearly-marked lanes, paths, and routes[17] (separated by barriers from vehicle traffic when possible),[18] street lighting, paved surfaces, low-angled grades[19] , bicycle signage, shared lane markings and bicycle-specific signals.[20] In addition, these features enhance pedestrian safety by separating bicycles from sidewalks.

Pedestrian activity at a busy intersection on Midway Drive

Limited accessibility for pedestrians

8 US Department of Transportation. Traffic Safety Facts 2009 – Early Edition. Available at: http://www.nhtsa.gov/

9 Centers for Disease Control and Prevention (CDC). "Barriers to Children Walking and Biking to School--United States, 1999." MMWR.Morbidity and mortality weekly report 51.32 (2002): 701-4. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5438a2.htm

10 Li, F., et al. "Multilevel Modelling of Built Environment Characteristics Related to Neighbourhood Walking Activity in Older Adults." Journal of epidemiology and community health 59.7 (2005): 558-64.

11 Transportation Alternatives. Traffic's Human Toll: A Study of the Impacts of Vehicular Traffic on New York City Residents., 2006.

12 Agran PF, Winn DG, Anderson CL, Tran C, Del Valle CP. The role of physical and traffic environment in child pedestrian injuries. Pediatrics 1996;98(6 pt 1):1096-103.

13 Lee C, Abdel-Aty M. Comprehensive analysis of vehicle-pedestrian crashed at intersections in Florida. Accident Analysis and Prevention 2005; 37: 775-786.

14 Paulozzi LJ. United States pedestrian fatality rates by vehicle type. Inj Prev 2005;11(4):232-6.

15 Taylor M, Lynam D, Baruay A. 2000. The effects of drivers speed on the frequency of road accidents. Transport Research Laboratory. TRL Report 421 Crowthorne, UK.

16 Eisenberg D, Warner KE. Effects of snowfalls on motor vehicle collisions, injuries, and fatalities. Am J Public Health 2005;95(1):120-4.

17 Reynolds CCO, Harris MA, Teschke K, Cropton PA, Winters M. The impact of transportation infrastructure on bicycling injuries and crashes: a review of the literature. Environmental Health, 2009; 8:47.

18 World Health Organization (WHO), Edited by Margie Penden, Richard Scurfield, David Sleet, et al. World Report on road traffic injury prevention, 2004.

19 Reynolds CCO, Harris MA, Teschke K, Cropton PA, Winters M. The impact of transportation infrastructure on bicycling injuries and crashes: a review of the literature. Environmental Health, 2009; 8:47.

20 Pedestrian and Bicycle Information Center. Engineer Bicycle Facilities. Available at http://www.bicyclinginfo.org/engineering/ Accessed on August 3, 2011.

VEHICLE VOLUME & SAFETY

Public health and transportation safety research demonstrates that vehicle volumes can be an independent environmental predictor of pedestrian injuries.[8] [9] [10] [11] [12]The magnitude of effect of vehicle volume on injuries is significant. For example, in a study of nine intersections in Boston's Chinatown, researchers calculated an increase in three-to-five injuries per year for each increase in 1,000 vehicles.[13]

Other studies illustrate that as pedestrian and bike volumes increase, collisions with automobiles may decrease. For instance, an analysis of pedestrian and bicycle volume found that with increasing numbers of pedestrians and bicyclists, injury rates decreased.[14] Similarly, an analysis of pedestrian injuries in Oakland illustrated that the risk for pedestrian-vehicle collisions was smaller in areas with greater pedestrian flows and greater in areas with higher vehicle flows.[15]

High volume of vehicles on Kemper Street, a residential street

VEHICLE SPEED

Vehicle speeds predict both the frequency as well as the severity of pedestrian injuries. Below 20 miles per hour (mph) the probability of serious or fatal injury is generally less than 20 percent; this proportion rapidly increases with increasing speed and above 35 mph, most injuries are fatal or incapacitating.[16] Another study showed that the average pedestrian has an 85 percent likelihood of fatality when struck by a vehicle traveling at 40 mph, whereas if the vehicle is traveling at 30 mph the likelihood is reduced to 45 percent, and when vehicles are traveling at 20 mph the likelihood of fatality is only 5 percent.[17]

On average, each one mile per hour reduction in speed may reduce collision frequency by five

8 La Scala EA, Johnson FW, Gruenewald PJ. Neighborhood Characteristics of Alcohol-related Pedestrian Injuries. Prevention Science. 2001: 2:123-134.

9 Agran PF, Winn DG, Anderson CL, Tran C, Del Valle CP. The role of physical and traffic environment in child pedestrian injuries. Pediatrics 1996;98(6 pt 1):1096-103.

10 Roberts I, Marshall R, Lee-Joe T. The urban traffic environment and the risk of child pedestrian injury: a case-cross over approach. Epidemiology 1995; 6: 169-71.

11 Stevenson MR, Jamrozik KD, Spittle J. A case-control study of traffic risk factors and child pedestrian injury. International Journal of Epidemiology 1995; 24: 957-64.

12 Zegeer CV, Steward RJ, Huang HH, Lagerwey PA. Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations: Executive Summary and Recommended Guidelines. Federal Highway Administration, 2002.

13 Brugge D, Lai Z Hill C, Rand W. Traffic injury data, policy, and public health: lessons from Boston Chinatown. Journal of Urban Health 2002; 79: 87-103.

14 Jacobsen PL. Safety in numbers: more walkers and bicyclists, safer walking and bicycling. Inj Prev 2003;9:205-9.

15 Geyer J, Raford N, Ragland D, Pham T. The Continuing Debate about Safety in Numbers—Data from Oakland, CA. UC Berkeley Traffic Safety Center 2005; UCB-TSC-RR-TRB3. Available at: http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1029&context=its/tsc

16 NHTSA. Literature Review on Vehicle Travel Speeds and Pedestrian Injuries. Washington DC: National Highway Traffic Safety Administration, 1999.

17 U.K. Department of Transportation, as reported in the Federal Highway Administration. 2004. PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. Available at: http://www.walkinginfo.org/pedsafe/

2.7 Urban Open Space

The opportunity to create new open space in the Midway-Pacific Highway community to serve its residents and employees is limited since the area is built out. However, some of the San Diego regions most significant open spaces are adjacent to the community - the San Diego River, San Diego Bay and the Embarcadero, Naval Training Center Park, Mission Bay and the beaches along the Pacific Ocean. The potential to improve the roadways to implement multi-modal trails as greenbelts/linear parks and create inviting linkages to nearby regional recreational and open space assets is a prime opportunity for the community.

The benefits to the community of identifying and developing an urban open space/greenbelt system and linear park(s) include:

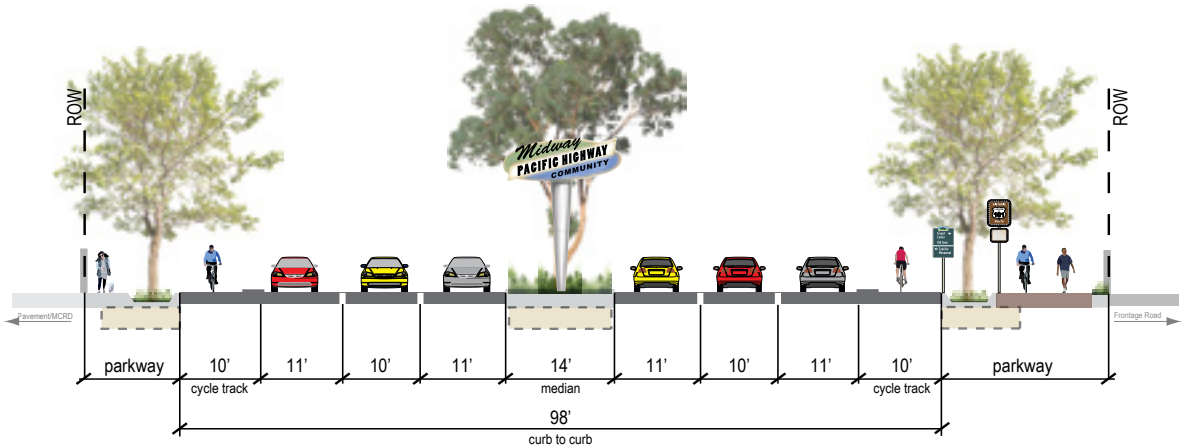
- Additional open space and recreational opportunities through leverage of the underutilized spaces in the right-of-way and any remnant parcels to create trails and parks
- An expanded and reinforced urban forest which contributes to community character
- Improvement of storm water management and flooding conditions through integration of features and facilities to capture urban runoff

Emphasis

Provide parks, open space and greenbelts throughout the project to create recreational and green space opportunities.

Task 1	Identify all opportunities for additional park and greenbelt spaces
Task 2	Identify the linkages to connect regional assets, open spaces and parks
Task 3	Maximize the use and landscape opportunities of all proposed trails and facilities in the project area

Currently there are no parks in the Midway-Pacific Highway project area. The Midway-Pacific Highway Community Plan proposes 6.25 acres of population-based parks and 16.60 acres of Non-Traditional Parks for a total of 22.85 acres of new park space. The ultimate requirement based on the community's estimated population at the 30-year planning horizon (2046) is 30.80, leaving a 7.05 acre deficit for the planning area. Urban greening opportunities will not contribute to the park deficit, however they will bring park like features including trees, landscaping, and trails to the area.



Street Section from Pacific Highway. See Chapter 3.3 for specific design guidelines.

Additional Greenbelt Opportunities

The Pacific Highway corridor area has several additional opportunities to create parklets and greenbelts for the community. The interchange of Pacific Highway at Washington Street currently has remnant areas between off ramp travel lanes and the railroad right-of-way. An opportunity to investigate potential for the creation of a gateway park for the community exists at this location.

SPAWAR frontage drive

Another opportunity space that can be investigated is the area in front of SPAWAR, which is currently a 50´wide by 1,000´long frontage drive. If this area could be utilized for a linear park, the Historic Highway 101 joint use trail design could be extended along the SPAWAR frontage and could integrate urban greening aspects, treat urban runoff, and elements that celebrate the aeronautical history of the community.

The draft Community Plan also identifies the potential for a park to be developed within the Port of San Diego's jurisdiction along Pacific Highway between Bean Street and Laurel Street. If another park is developed within the southern portion of the Pacific Highway corridor, Pacific Highway could connect users to a series of three parklets by a joint use trail with extensive landscaping and storm water BMP facilities. This would create a greenbelt along the entire run of Pacific Highway between Old Town State Park and the Embarcadero at San Diego Bay.

2.8 Gateways and Wayfinding

A comprehensive program of wayfinding solutions for the area will include an integrated system of gateway signs, directional and directory signs oriented to vehicles, cyclists and pedestrians, historic markers and related environmental graphics such as banners and decorative elements.

The program should be developed through a design process in coordination with community stakeholders and City staff, and with assistance of a qualified design professional.

Figures 2.8-1 and 2.8-2 shows suggested schematic locations and sign concepts for Community Gateway, Vehicular Directional and Historic Highway Marker. Once sign design concepts are approved, specific locations for all signs should be determined as part of a Design Development/Construction Documentation phase of the design process. Potential sign locations can be established based on both a review of intended future improvement plans, as well as a detailed field survey to determine potential conflicts with landscape, with other signs (especially regulatory), and with other elements in the visual environment. Some existing directional signs can be replaced by the new program, and some existing poles can sometimes be used for mounting, instead of adding new poles. GIS mapping for sign locations can be valuable here as well – especially useful in maintaining a ready-to-hand database for tracking sign inventory for maintenance and repairs.

Gateways & Wayfinding Program

Community Gateways

Vehicular and Bicycle Directional Signage

Trail Marker Signs

Interpretive Signage

Vehicular directional signs should be located far enough in advance of indicated turnings – based on traffic speeds and number of travel lanes – so that drivers have sufficient time to react appropriately.

Additional considerations for vehicular directionals will include font styles and sizes; use of symbols and arrows; number of listings per sign; margins and borders colors and contrasts; reflectivity and glare reductions; illuminations vs. non-illumination; distances: overhead and from curbs; sustainability of materials, including U/V, vandal, graffiti and sticker-resistance. The California Manual of Uniform Traffic Control Devices also includes guidelines for signs which can be interpreted as required for local communities.

Typically during this design phase, a list of destinations will be agreed upon, and prioritized, and a full-scale mock-up of the approved vehicular directional sign design prepared and installed temporarily in a realistic location in order to evaluate its effectiveness/ readability at different times of day and at night, as well as to evaluate its overall scale in the environment.

Figure 2.8-1 Wayfinding Network: Schematic locations, gateways, vehicular directionals, historic markers

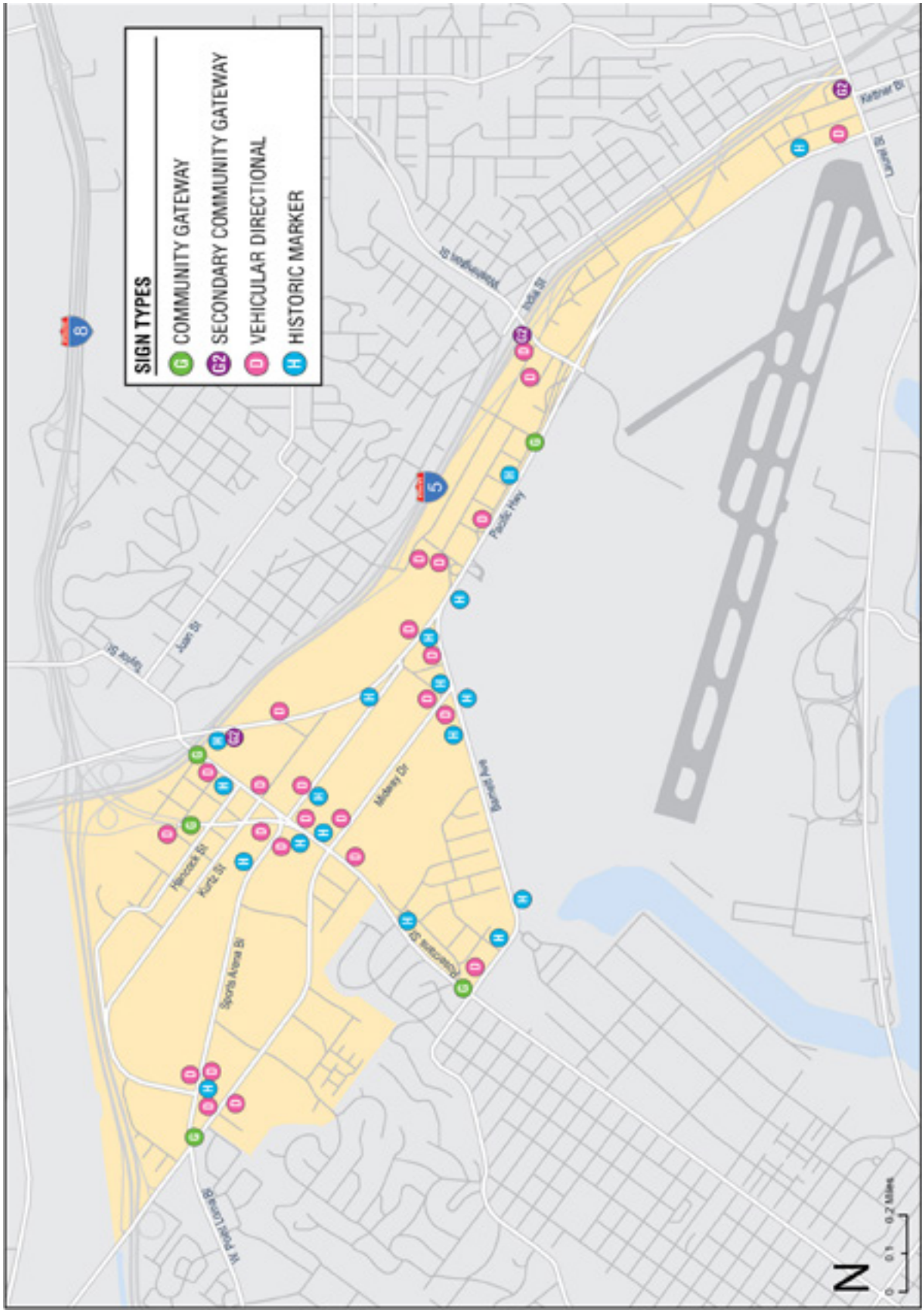


Figure 2.8-2 Gateway and wayfinding signage concepts for the Midway-Pacific Highway area

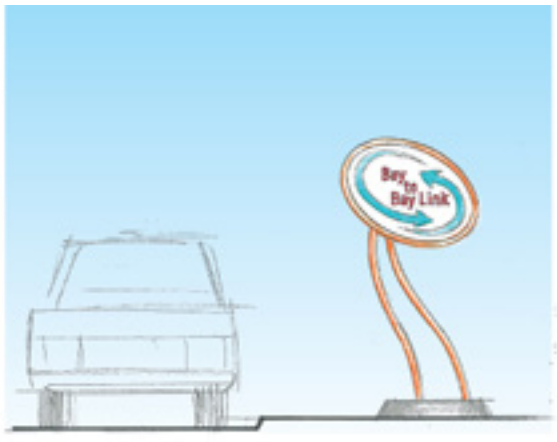
D VEHICULAR DIRECTIONAL (CONCEPT)

G COMMUNITY GATEWAY (CONCEPT)

G2 SECONDARY COMMUNITY GATEWAY (CONCEPT)

H HISTORIC MARKER HWY 101 (CONCEPT)

H HISTORIC MARKER HWY 101 (CONCEPT)



H HISTORIC MARKER - BAY TO BAY LINK (CONCEPT)

BIKE ROUTE MARKER WITH MAP (CONCEPT)

PEDESTRIAN / BICYCLE DIRECTIONAL (CONCEPT)

PEDESTRIAN DIRECTORY (CONCEPT)

3 Green & Complete Streets

Green and Complete Street

The Urban Design Element of the draft Midway-Pacific Highway Community Plan addresses opportunities to implement new urban design improvements and benefits that can be realized from these improvements. The street network is the framework for many of the improvement concepts envisioned for the urban realm in the community. The Community Plan identifies three primary street types (Boulevards, Green Streets and Main Streets) with specific improvement recommendations for each street type, and categorizes major community roadways into these street types to identify which street should receive which improvements. The Urban Design Element also proposes the creation of "trails" through the community to connect Midway-Pacific Highway to nearby open space amenities and adjacent communities. These trails will emphasize their key destinations and historical significance by incorporating tailored wayfinding signage and other design elements. In the previous chapter of this Urban Greening Plan, the design components of the proposed green streets were discussed. This chapter combines those components into cohesive green streets concepts for the primary street corridors in the community. The primary street corridors that will be the focus of this chapter are: Sports Arena Boulevard, Rosecrans Street, Midway Drive, Pacific Highway, and Barnett Avenue/Lytton Street.

3.1 Green and Complete Street System

Streets help define the urban form and public realm of the Community. Streetscape design can improve the pedestrian environment, enhance community character, help support activity centers, and increase connectivity within the community and to adjacent communities. Streetscape typologies will help establish a strong, recognizable design for the entire street corridor within the community and for segments of streets within each district or village as shown in the draft Community Plan.

Streetscape design will include widening existing sidewalks and designing new sidewalks to support pedestrian activity, street furniture and street trees, and landscaped medians, where possible. Sidewalk and walkway width and treatments will improve pedestrian conditions and increase connectivity within the community and to adjacent communities. These actions can be accomplished either through the acquisition of additional right-of-way with the redesign of existing right-of-way, Cross-sections for existing streets have been conceptually designed but will require further design and engineering work since street widths, number of lanes, desired sidewalk widths, and existing physical constraints vary from street to street and block to block. The three (3) street typologies identified in the Community Plan are described below.

"Boulevards"

Boulevards have a symbolic importance and help define the community's character, functioning as linear gateways and providing access to the community. Boulevards will be enhanced to provide a bicycle and pedestrian-friendly environment. The enhancements will provide the opportunity for linear parks, wider sidewalks and bicycle lanes depending on the location and available space. The Boulevard streetscapes will become enhanced linear gateways to the community and connect the Districts and Villages to the San Diego Bay, Mission Bay, San Diego River and increase community identity. Boulevards can include public space and linear parks.

Boulevard Improvements, Park Blvd, San Diego
Photo credit: Richard, https://flic.kr/p/hG786t

"GREEN STREETS "

Green Streets will link parks and public spaces to districts, villages and Boulevard Streets. Green Streets will have the opportunity to incorporate linear parks. Green Streets are envisioned to have a bicycle and pedestrian-orientation, street furniture, pedestrian-oriented street lighting and canopy shade trees. Green Streets will incorporate streetscape enhancements to address urban runoff and allow storm water to replenish the groundwater system.

Green Street, New York

"MAIN STREETS"

Main streets will serve as spines within districts and villages that can include office, retail and residential uses. Main streets will promote slow travel speeds and a pedestrian friendly environment. Main Streets will primarily be located within the superblocks to promote pedestrian activity that supports the surrounding uses.

STREET TREE PLAN

The primary streets in Midway-Pacific Highway are classified according to the street typologies described above as follows:

- Pacific Highway - Boulevard
- Sports Arena Boulevard - Boulevard
- Rosecrans Street - Boulevard
- Midway Drive - Green Street
- Barnett Avenue/Lytton Street - Green Street

Neighborhood character

The application of the street typology policies above to the primary streets in the Midway-Pacific Highway community is shown in the street sections and narrative for each primary street in the following section. In the process of conceptually designing the proposed improvements for these roadways, it was determined that not all of the desired improvements fit within the available right-of-way. Therefore green street features were included on a case by case basis considering the current conditions and available space. It was determined through this process that all the above streets should to be treated as green streets and designed to incorporate storm water improvements.

Trail Plan/ Site Facilities

Consist with the themes developed for the Midway/Pacific Highway Community the following are expanded narratives and graphic exhibits t for each of the respective trails (see figure 5.3-1 Primary Corridors and Trails and Districts and Villages).

Signage Locations and Quantities

Signage and hierarchy program has been developed for the plan. The specific locations and quantities will be determined at the project level.

See example in the demonstration project plan view drawings and elevations.

Bay to Bay Link

Creation of a water link between San Diego and Mission Bays has been discussed for nearly a century. It's been determined to be infeasible, so this plan focuses on a land-link, with special appeal to cyclists and pedestrians.

The Bay to Bay Link includes unique materials and colors with thematic streetscape elements, wayfinding signage, amenities designed for visitors on foot or bike, as well as the marine and nautical features to be discovered and enjoyed at each end.

Banner

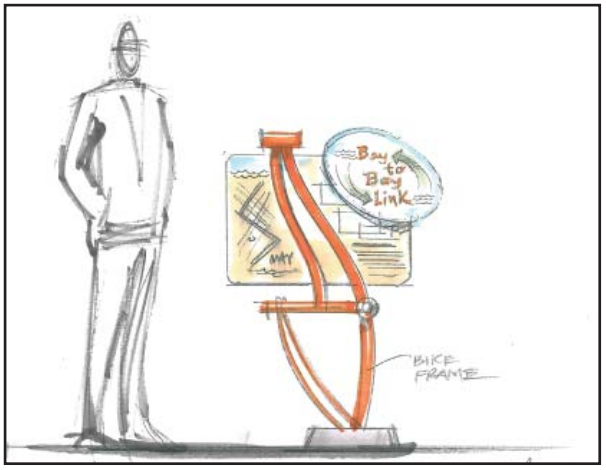
Interpretive Medallions - Call attention to history of the area, and additional levels of meaning to the place, and to the visitor's experience.

Bench

Coffee Cart

Bike Rack

Bike Rack - Design, materials and images of street furnishings can playfully reinforce maritime, pedestrian and bike connections



Interpretive/ Map

A collection of colors evoking beach, nautical and cycling themes

La Playa Trail

In use by Native Americans long before the Spanish arrival in 1769, the La Playa Trail is considered the oldest commercial trail west of the Mississippi.

It stretches from the entrance to San Diego Harbor, our original port known as 'La Playa', to the Mission San Diego de Alcala, and beyond.

Signage and other streetscape elements will express this historical relationship through traditional materials (adobe, wrought iron, timber, shell-aggregate concrete sidewalks, etc.), colors, artisanal workmanship and interpretive signage.

Interpretive/ Directory

Gateway Monument

Street Furniture - Rough-formed timber, adobe block masonry

Coffee Cart

Sidewalk/Trail Texture

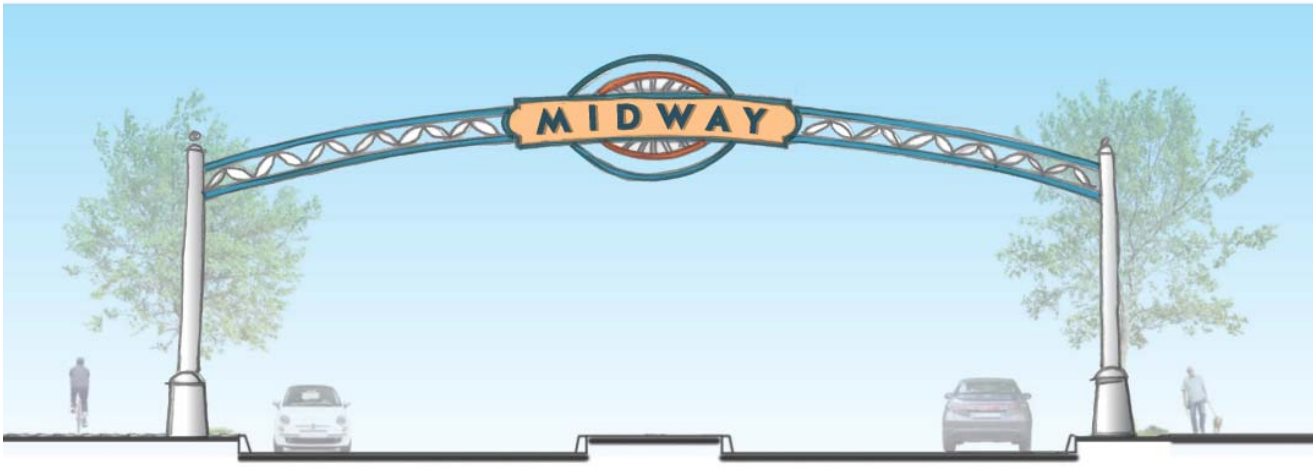
Inspired beach and bay with contrasting wrought iron and rust hues

Midway trail

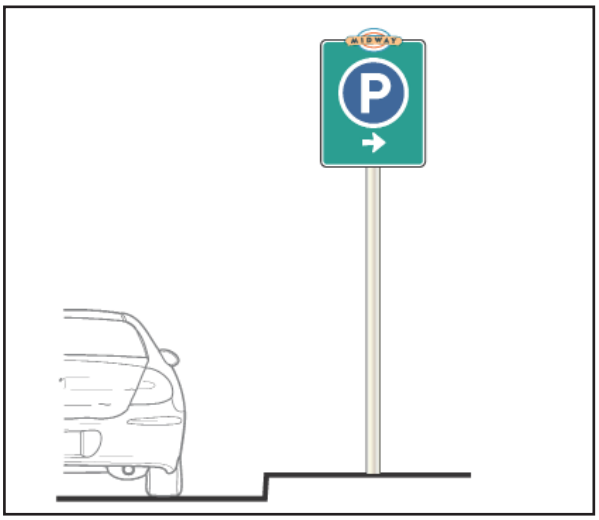
'Main Street' is envisioned as a classic, tree-lined, walkable American Main Street District – with a scale, signage, paving, color palette and amenities recalling nostalgic feelings of an earlier era.

Parking directional and site identifications sign will encourage drivers to "just park it", converting them to pedestrians.

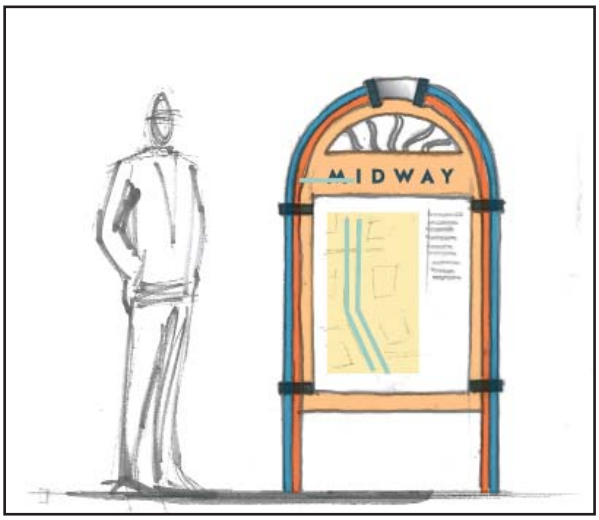
Returning Midway Drive to pedestrian uses will bring back street life, and reinforce economic development efforts, attracting residents and visitors, as well as new businesses.



Gateway Signage



Vehicular Parking Directional



Pedestrian Directory

Highly detailed flatwork - Patterns and textures enriches the pedestrian experience

Street furnishings - With restful seating options in sun or shade

Banner

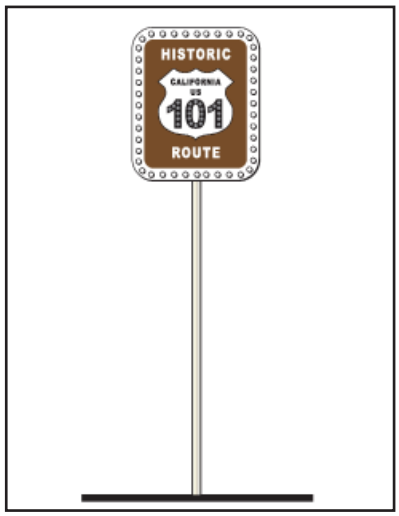
Pastels - Nostalgic of a “50’s main street”

Historic Highway 101

'California's first highway', originally Fr. Junipero Serra's wagon road to connect his string of missions up the California coastline in the late 1700's, and for nearly two centuries the principal north-south route in California.

San Diego's portion, 'Pacific Highway', was an important transportation link between manufacturing plants and the nearby airfields for launching thousands of new airplanes during World War II.

Automotive transportation and aeronautical themes are both suggested by Historic 101 signage, wayfinding, interpretive displays, and streetscape components.



Trail Marker Sign

Trail Marker Sign

Interpretive Signage

Bus Shelter - Use of aluminum, reminiscent of aircraft spars and struts

Food Truck/ Coffee Cart

Bench - Typical of 1940's

Suggested by Air Force insignia, primer yellow and historic 101 sign

Gateways and Signage

The addition of gateway elements for the Midway / Pacific Highway community planning area will help to brand and identify the community and its Villages as they develop, establishing a positive, attractive sense of place.

Gateway signs introducing the community's identity at major entry points, wayfinding directional signage – oriented to vehicles, pedestrians and cyclists – should be designed and implemented to reinforce the identity, while facilitating traffic flow and reducing trips, and create connections to destinations within, and outside, the community.

Consistent with its evolution and growth, according to the Community Plan, there is an opportunity to create an identity for the district. This should be accomplished through stakeholder consensus and should be:

- Authentic to the place, its history and aspirations;
- Concept examples shown in this document suggest picking up on nautical or aeronautical themes;
- Unique (unlike others in the region);
- Recognizable (immediately – through distinctive shapes, colors, typefonts, materials, etc.);
- Easy to remember and pronounce; and
- Applied consistently – through the media: digital and print, as well as signage.

Styles

Styles may be traditional, contemporary or a hybrid of both (e.g., contemporary graphics combined with traditional or nostalgic imagery).

Forms

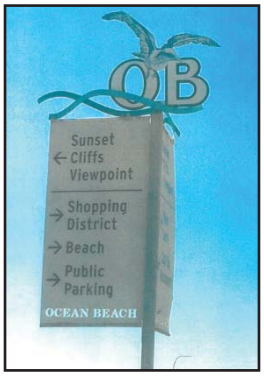
Forms may be measurements, arches, or pedestals – depending on locations and conditions – and should be illuminated for nighttime viewing.

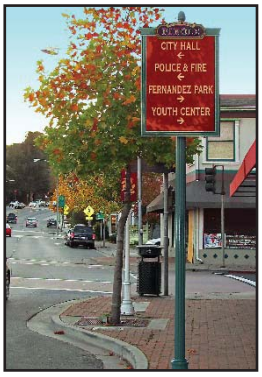
MATERIALS

Materials should be appropriate for reinforcing the character of the district or Village it represents.

WAYFINDING

Wayfinding devices – directional signs, directories and other wayfinding elements point out nearby destinations and amenities, create connections and enhance circulation for drivers, cyclists, and pedestrians.





Employed strategically, wayfinding solutions reinforce the community's economic development efforts.

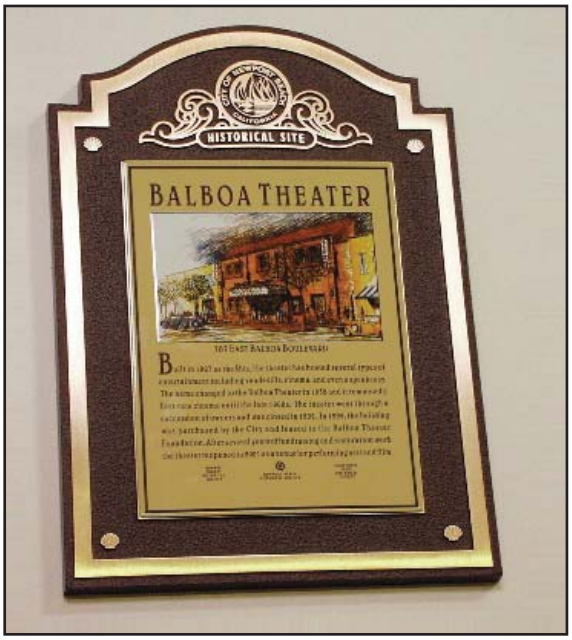
Destinations

Destinations may include the following:

- Parking
- Freeways
- Transit Center / Old Town
- Trolley Stations
- Downtown
- Liberty Station / NTC
- Sports Arena
- Districts / Villages
- Hotels
- Mission Bay Park / Seaworld
- San Diego Bay / NTC Park
- San Diego River / Park
- Beaches
- Parks
- MCRD
- Post Office
- Airport
- Fort Rosecrans
- Cabrillo Lighthouse

Interpretive Signs and Environmental Graphics

Interpretive Signs and Environmental Graphics add depth of meaning to a place, elucidating its history, and reinforcing its identity.



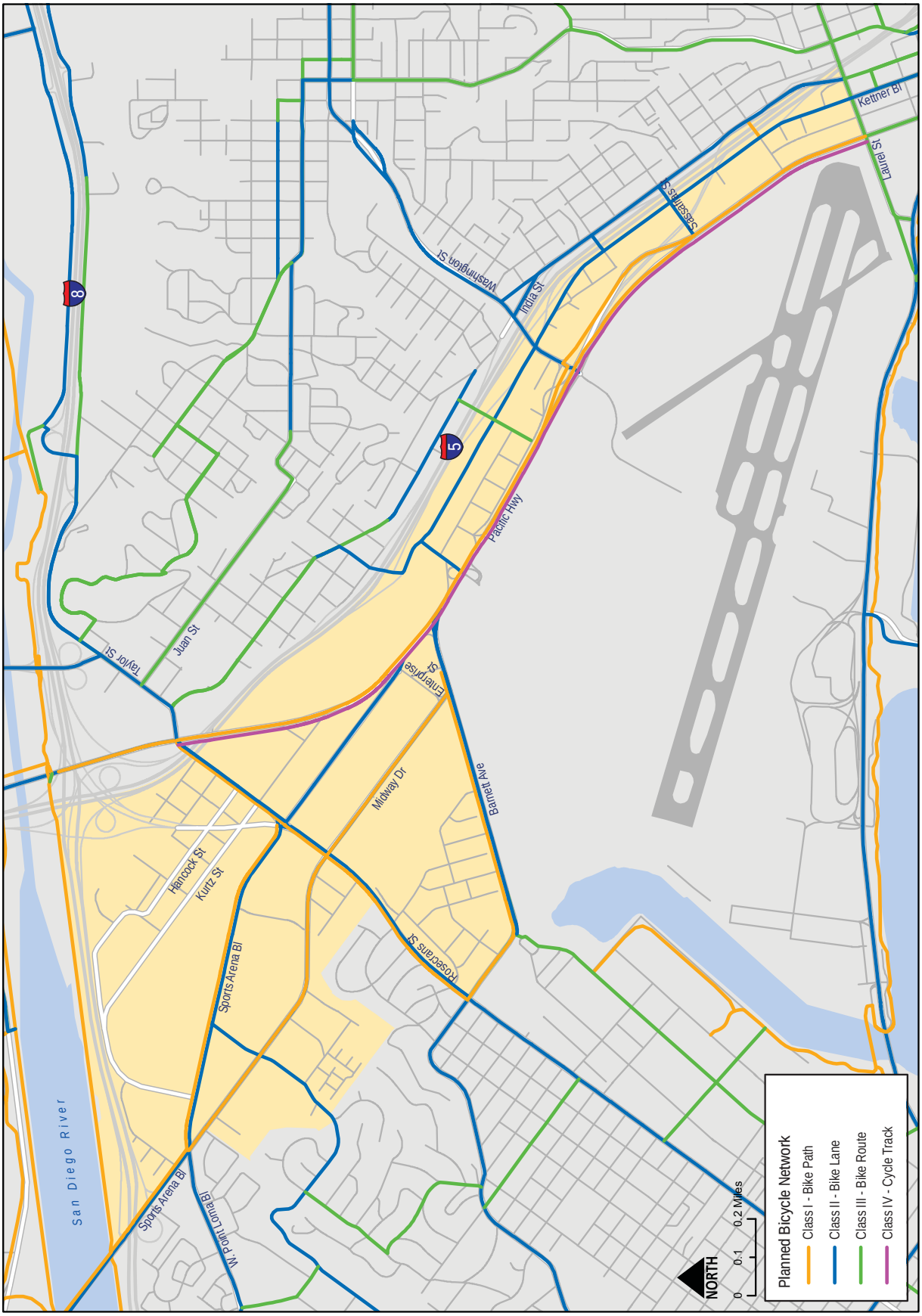
3.2 BICYCLE FACILITIES

This section identifies types of bicycle infrastructure and facilities which may be appropriate for the community however existing conditions require flexibility in their application. Therefore, these guidelines shall serve as a reference tool rather than a rigid set of requirements. Figure 3.2-1 displays recommended bicycle facilities. As shown, the planned bicycle network consists of Class I shared-use paths, Class II bicycle lanes, Class III bicycle routes, and Class IV cycle tracks. A description of each of these facility types is provided throughout this section.

The documents referenced, listed below, should be consulted to determine requirements that would be appropriate for each future bicycle project:

- FHWA Separated Bike Lane Planning and Design Guide (2015)
- Caltrans Highway Design Manual Chapter 1000 (2015)
- City of San Diego Bicycle Master Plan (2013)
- San Diego Regional Bike Plan (2010)
- AASHTO Guide for the Development of Bicycle Facilities (2012)
- NACTO Urban Bikeway Design Guide, Second Edition (2014)
- California Manual on Uniform Traffic Control Devices (2014)
- Association of Pedestrian and Bicycle Professionals (APBP) Bicycle Parking Guidelines, Second Edition (2010)

Figure 3.2-1 Planned Bicycle Network



SEPARATED SHARED-USE PATH

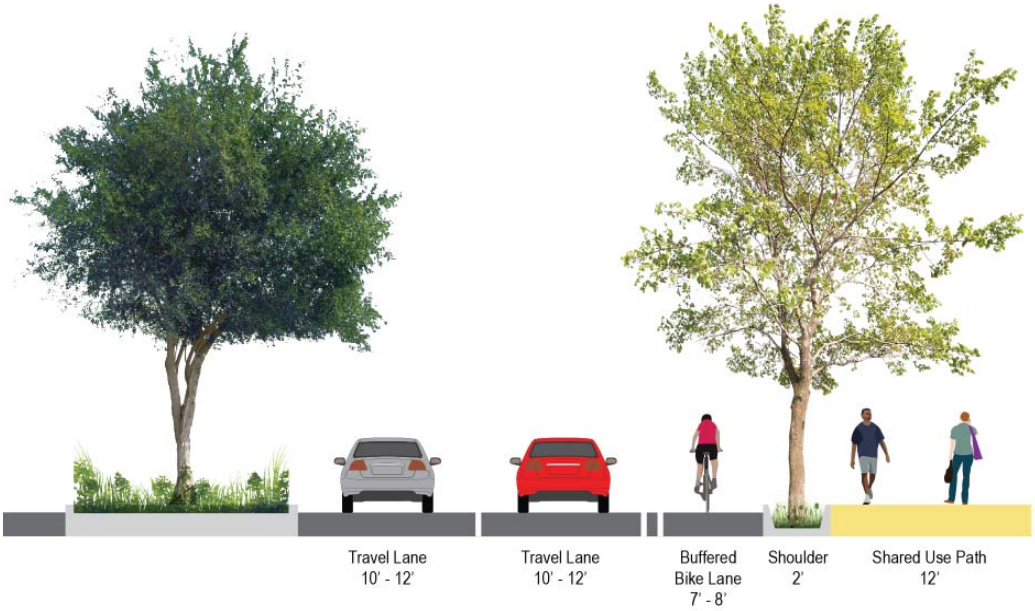
Shared-use paths, also referred to as multi-use paths or Class I bicycle facilities, provide a shared travel way for cyclists and pedestrians that is physically separated from vehicular traffic and prohibits motorized vehicles. Paths are generally intended for two-way travel.

Shared-Use Path, Vancouver, BC

GENERAL GUIDELINES

- Shared-use paths are intended for bicycle and pedestrian use and therefore fall under the accessibility requirements of the Americans with Disabilities Act (ADA).
- The City of San Diego's standard path width is 12 feet. Lesser widths should only be accepted to address unavoidable constraints.
- Standard vertical clearance height is 10 feet, with 8 feet as a minimum and 7 feet over shoulders.
- A minimum shoulder width of 2 feet should be provided on both sides of the path, including bridge and tunnel locations to address potential vertical obstructions.
- Adequate access to the path should be provided to/from the local road network and bicycle facilities.
- Wayfinding signs can be utilized to inform users where path access points are located.
- Lighting should be considered along the path in locations where adequate light is not provided, in high volume locations, undercrossings, and where nighttime security may be a problem. All path lighting should meet IES standards.

Figure 3.2-2 Shared-Use Path Cross Section



Pavement Markings & Signage

- "BIKES YIELD TO PEDS" signage (CA MUTCD R9-6 or similar) should be placed at the beginning of all separated shared-use paths, all access points, and intermittently along the path. Intermittent spacing distance should take bicycle and pedestrian volumes into consideration, however, spacing distance of 300' should be considered.
- "TRAIL CROSSING" signage (CA MUTCD W11-15 or W11-15a, or similar) should be placed on the roadway prior to trails intersecting with roadways.
- Standard "STOP" signs (CA MUTCD R1-1) should be placed on the trail prior to the trail intersecting with roadways to alert trail users.
- "NO PARKING" signage (CA MUTCD R7-9 or similar) should be placed on trails that are adjacent to roadways to prevent motor vehicles from parking on the trail.
- A 4 inch yellow centerline may be used to delineate bidirectional bicycle and pedestrian travel. The centerline should be dashed where passing is permitted and solid where passing is prohibited.

CA MUTCD R9-6


CA MUTCD: R9-6

CA MUTCD: W11-15a

CA MUTCD R7-9

Wayfinding Signage

- Wayfinding signs should be placed at major crossings to direct users to the path and significant destinations. Signs should indicate distances to each destination. Additional guidance is provided under Gateways and Signage of this chapter.

Pedestrian Directional

Bike Route Marker with Map

ONE-WAY CYCLE TRACK

This bicycle facility is intended for exclusive use by cyclists, and is physically separated from vehicular travel lanes and sidewalks. At locations where on-street parking is permitted cycle tracks are to be located to the curb-side of the parking.

One-Way Cycle Track in Washington D.C.

GENERAL GUIDELINES

- Minimum width should be 6 feet with an additional marked buffer width of 3 feet. 7 foot bicycle travel lane widths should be considered in areas of high bicyclist volumes or uphill sections.
- Vertical clearance height is recommended at 10 feet with a minimum of 8 feet.
- Physical barriers such as bollards, planters, parking stops, parked cars or other objects to prevent motor vehicles from entering, must be located within the buffer area.
- If on-street parking is present a 3 foot buffer should be provided between the parking lane and bicycle lane.

Figure 3.2-3 One-Way Cycle Track with Parking

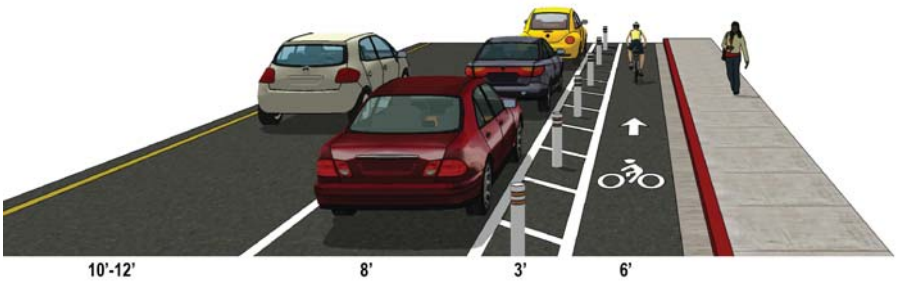
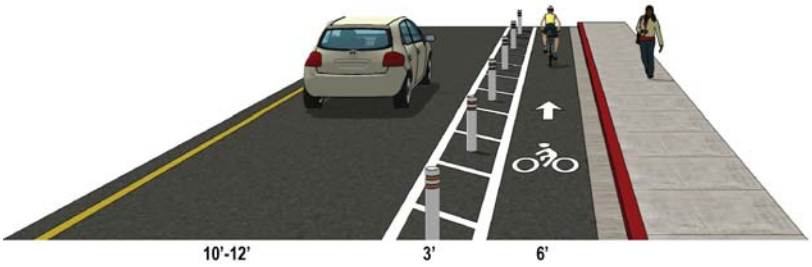


Figure 3.3-4 One-Way Cycle Track without Parking



PAVEMENT MARKINGS & SIGNAGE

- "BICYCLE LANE" word/symbol and directional arrow markings should be placed at the beginning of a side path and periodically throughout to designate the facility for bicyclists and identify direction of travel. Guidelines and graphic images of pavement markings are further discussed in the Bike Lane guidelines.
- If two-way travel is permitted, each direction should be clearly marked with a painted or textured line dividing the two directions of travel.

Standard Bicycle Lane

A standard bike lane reserves a portion of the roadway, designated by striping, for the exclusive use of cyclists. The defined space helps facilitate predictable bicyclist and motorist movements.

Bicycle Lane on Linda Vista Road

General Guidelines

- Standard bike lane width should be 5 feet, however 4 foot bike lanes are acceptable only with continuous surfacing (i.e. absent of gutter seams or other longitudinal joints).
- Minimum bike lane width adjacent to parking should be 5 feet to avoid conflicts with vehicle doors.

Figure 3.2-5 Bike Lane with Parking

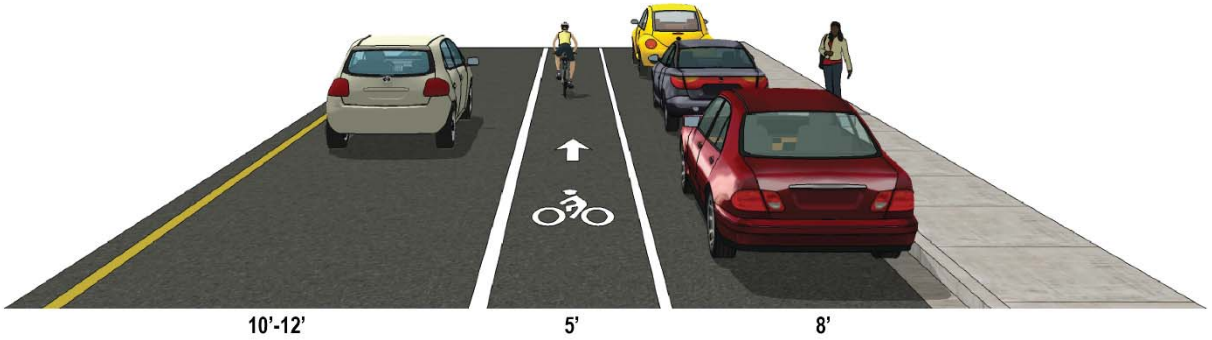


Figure 3.2-6 Bike Lane without Parking

PAVEMENT MARKINGS & SIGNAGE

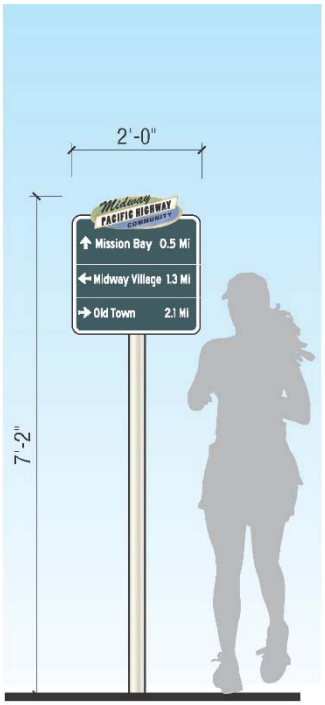
- A solid line shall be used to mark the bike lane. Minimum line width should be 6 inches. If a second line is used to separate the bicycle lane from parking lane striping width should be 6 inches wide.
- "BIKE LANE" word and Helmeted Cyclist symbol and directional arrow markings should be placed at the beginning of the lane and after each intersection to designate the facility for bicyclists and identify direction of travel. The BIKE LANE marking may also be placed at other locations as desired.
- "BIKE LANE" (CA MUTCD R81 or similar) sign should be placed at the beginning of each designated bike lane, at major intersections and at ½ mile intervals.
- "NO PARKING" (CA MUTCD R7-9 or similar) signs may be used to restrict vehicles from parking in a bicycle lane where needed.

CA MUTCD R7-9

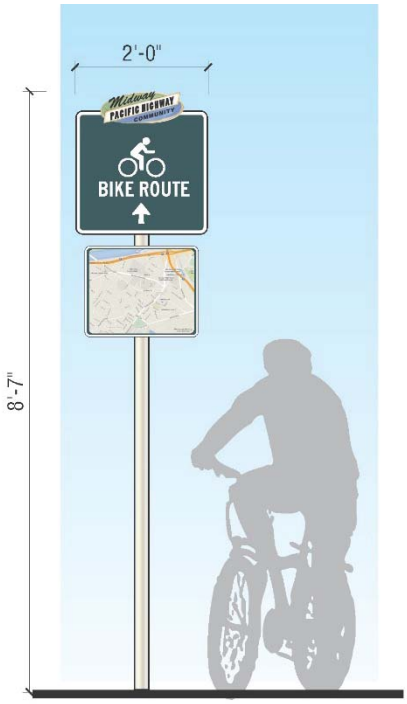
CA MUTCD R81

WAYFINDING SIGNAGE

- Wayfinding signs should be placed at major crossings to direct users to the path and significant destinations. Signs should indicate distances to each destination. Additional guidance is provided under Gateways and Signage of this chapter.



Pedestrian Directional



Bike Route Marker with Map

Buffered Bicycle Lane

Buffered bike lanes are standard bike lanes combined with a designated buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane.

Buffered Bike Lane in San Diego, CA

General Guidelines

- Desired lane width is 5 feet with an additional buffer width of 3 feet. 4 foot bike lanes are acceptable only with continuous surfacing (i.e. absent of gutter seams or other longitudinal joints). Minimum buffer width should be 18 inches.
- Buffer should be marked with 2 solid white lines and interior cross hatching or chevron markings.
- Buffers are recommended on both sides of the bike lane if adjacent to on-street parking. If it is only feasible to have a buffer on one side of the bike lane, it should be on the traffic side (typically the left side).
- Figures 3.2-7 and 3.2-8 display examples of buffered bicycle lane configurations adjacent to on-street parking and adjacent to the curb, respectively.

Figure 3.2-7 Buffered Bike Lane with Parking

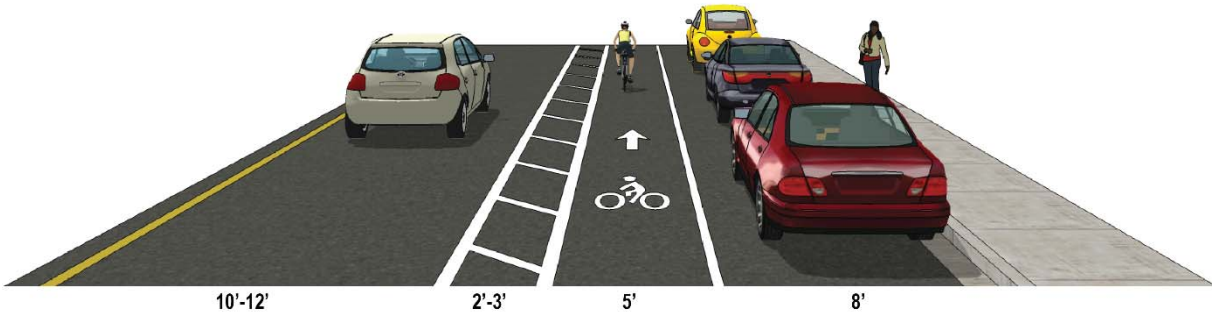
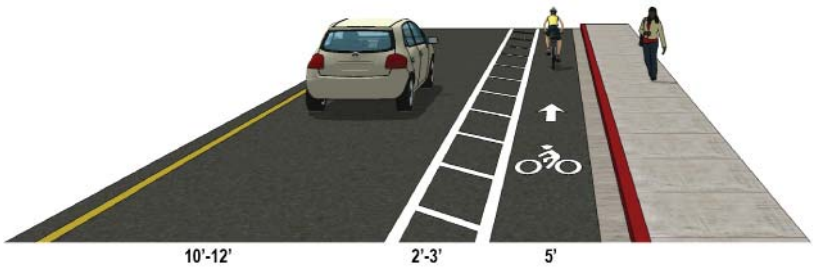


Figure 3.2-8 Buffered Bike Lane without Parking



PAVEMENT MARKINGS & SIGNAGE

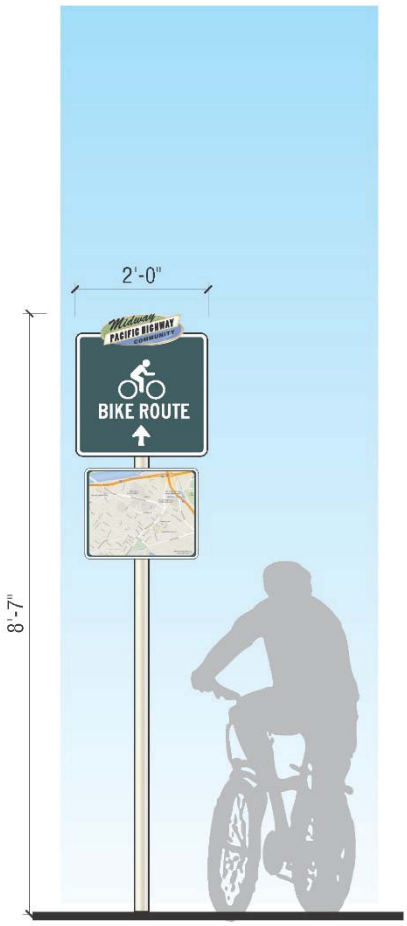
Images of signs and pavement marking described below can be found under the Buffered Bicycle Lane guidelines.

- A solid line should be used to mark the buffer area and bike lane. Minimum line width should be 6 inches wide.
- "BIKE LANE" word/symbol and directional arrow markings should be placed at the beginning of the lane and after each intersection to designate the facility for bicyclists and identify direction of travel. The BIKE LANE marking may also be placed at other locations as desired.
- "BIKE LANE" (CA MUTCD R81 or similar) sign shall be placed at the beginning of each designated bike lane and at major intersections.

WAYFINDING SIGNAGE

Wayfinding signs should be placed at major crossings to direct users to the path and significant destinations. Signs should indicate distances to each destination. Additional guidance is provided under Gateways and Signage of this chapter.

Pedestrian Directional



Bike Route Marker with Map

Bicycle Route

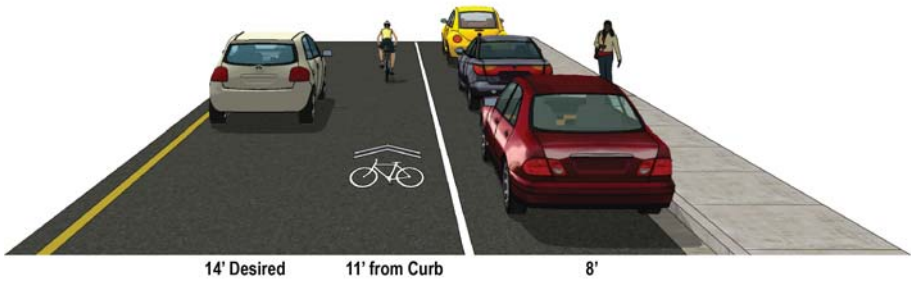
Designating a roadway as a bicycle route is intended to identify preferred routes through high demand corridors, or to serve as connections to other bike facilities. Bicycle routes are designated by signs, and can be further enhanced to improve bicyclist safety by implementing traffic calming measures or shared roadway markings along the route.

Shared Roadway Marking on J Street

General Guidelines

- Bicycle routes are preferably located on low speed, low volume roadways.
- Outside lane widths of 14 feet or greater are desirable to allow motorists to pass bicycles without encroaching into the adjacent lane.
- Bicycle routes are identifiable by the "BIKE ROUTE" (CA MUTCD D11-1) sign.
- Implementing traffic calming measures along bike routes may help reduce vehicle speeds and volumes, creating a more appealing shared use space for bicyclists.

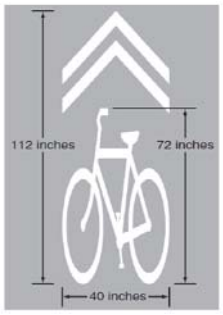
Figure 3.2-9 Bike Route with Parking and Shared Lane Marking



PAVEMENT MARKINGS & SIGNAGE

- "BIKE ROUTE" (CA MUTCD D11-1 or similar) sign should be placed at the beginning of the route, after intersections, and at ½ mile intervals throughout the route to designate the roadway as a bicycle route.
- The markings help to alert drivers that bicyclists may be present. Shared lane markings and arrow signs ("sharrows") may be used to assist bicyclists with lane positioning in narrow lanes and on roadways with on-street parking to reduce conflicts with vehicle doors. If used, markings should be placed at intersection approaches, immediately after an intersections, and spaced at intervals not greater than 250 feet thereafter.
- "BICYCLES MAY USE FULL LANE" (CA MUTCD R4-11 or similar) signs should be placed on roadways without a shoulder and too narrow for motor vehicles and cyclists to operate side by side and on all roadways where sharrows are present.

CA MUTCD D11-1

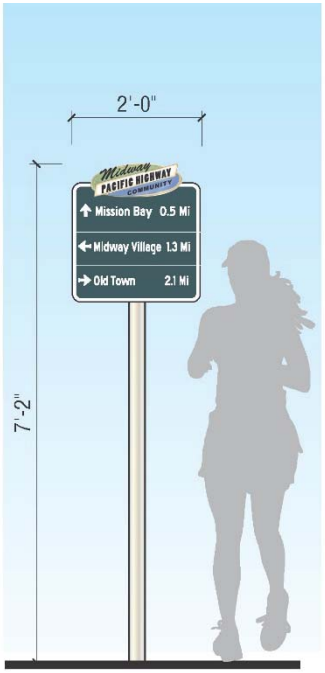


CA MUTCD
Shared Lane Marking

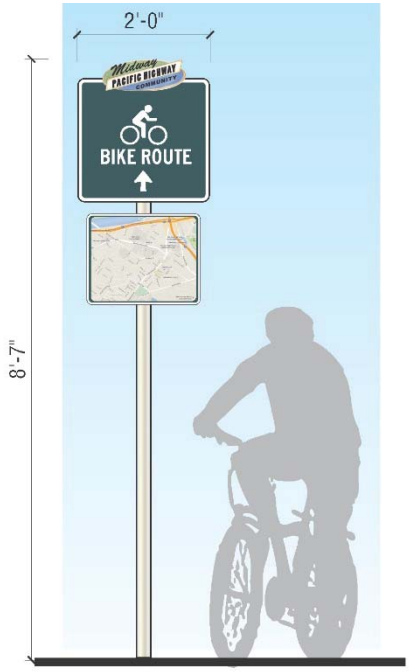
CA MUTCD R4-11

WAYFINDING SIGNAGE

Wayfinding signs should be placed at major crossings to direct users to the path and significant destinations. Signs should indicate distances to each destination. Additional guidance is provided under Gateways and Signage of this chapter.



Pedestrian Directional



Bike Route Marker with Map

Bicycle Parking

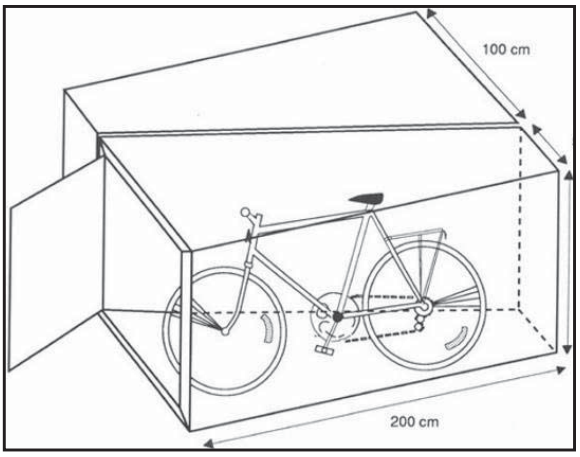
Bicycle parking is a critical component to creating a successful citywide bicycle network. These guidelines are intended to provide information regarding desired quantity, location, and type of bicycle parking facilities.

Long-Term Parking – Bicycle Lockers

Long-term parking generally refers to bike lockers which provide a secure, fully enclosed location to park one's bike. Bike lockers are intended for users expected to park longer than two hours such as commuters, residents, and employees. Bike lockers provide the greatest level of security, however, they require the most space and are the most expensive form of bicycle parking. Because of the space and cost requirements, bike lockers are recommended for high bicycle volume locations such as major employment centers and transit stations.

- Bicycle locker installation should provide a clearance area of 6 feet in front of both sides of the locker to allow for locker entry and exit.

Figure 3.2-10 Bike Locker Diagram



Source: National Urban Transit Institute

Transit Center Bike Locker

Short-Term Parking – Bicycle Racks

Bike racks provide cyclists a place to park, support, and secure their bicycle. Bike racks are intended for use by visitors, customers, and others expected to depart within two-hours. Racks in high-visibility locations may be suitable for longer periods of parking. Racks are the most common and affordable type of bicycle parking.

- Rack design should support the bicycle upright by providing two points of contact. Allowing for the frame and one or both wheels to be secured to the rack.
- A single U-lock should be able to lock the frame and one wheel to the rack.
- Rack should resist being cut and unsecured from the ground by common hand tools.

Figure 3.2-11 Bicycle Racks

From left to right: Inverted U Rack, Meter Post Ring, and Bike Corral

Bicycle Parking Siting Recommendations

Bicycle parking should be required for all non-residential development. The minimum number of required spaces should be two spaces or 5% of the required automobile parking space minimum, whichever is greater.

- Locate racks in well-lit and visible areas, preferably within 50 feet of a building entrance.
- Commercial districts, schools, libraries, transit stops, restaurants, parks and recreational facilities are and uses and destinations that generally have the greatest bicycle parking demand.
- When placing racks on sidewalks consideration must be made for pedestrians, ADA access, and vehicle doors if adjacent street parking is permitted.

Bike Share Stations

Bike sharing is a service where a fleet of bicycles are made available for short-term, one-way trips for patrons at unmanned rental stations distributed throughout a given service area. DecoBike is the City of San Diego's bike share operator. DecoBike's San Diego operation, which launched in early 2015, includes 1,800 bikes distributed at 180 stations primarily within Downtown San Diego, Uptown, Greater Golden Hill and Greater North Park. Components of a station include a kiosk for transactions and 16 dock spaces. Stations must strike a balance between availability of bicycles for rental and availability of docks for patrons to end their trips – the bike share operator physically redistributes bicycles between stations as needed to achieve this balance.

While expansion of the system is not currently being planned, the Midway-Pacific Highway community planning area is adjacent to Downtown and Uptown, two communities which have high station densities.

Figure 3.2-12 Bike Share Station, San Diego, CA

Bike Share Station Siting Recommendations

DecoBike stations are approximately 40 feet in length by 7 feet in width but can vary in size to account for demand and location constraints. They are typically situated in the roadway adjacent to the curb, as shown above, or within the furnishing zone of the sidewalk.

3.3 Green Street Designs

For the application of the master street tree palette of site features and improvements envisioned for the roadways within the project area, the existing site conditions and dimensions where taken into consideration as well as the features envisioned by the draft Community Plan. With the challenge that none of the streets in the planning area are uniform in width and dimension, have variable right-of-way conditions from end to end, the ultimate design and inclusion of features was on a project by project basis, requiring the selection of specific components to enhance the roadway. With the understanding of this variability, the following are a series of proposed roadway sections and plans that identify what can be considered 'typical conditions' for the individual roadways.

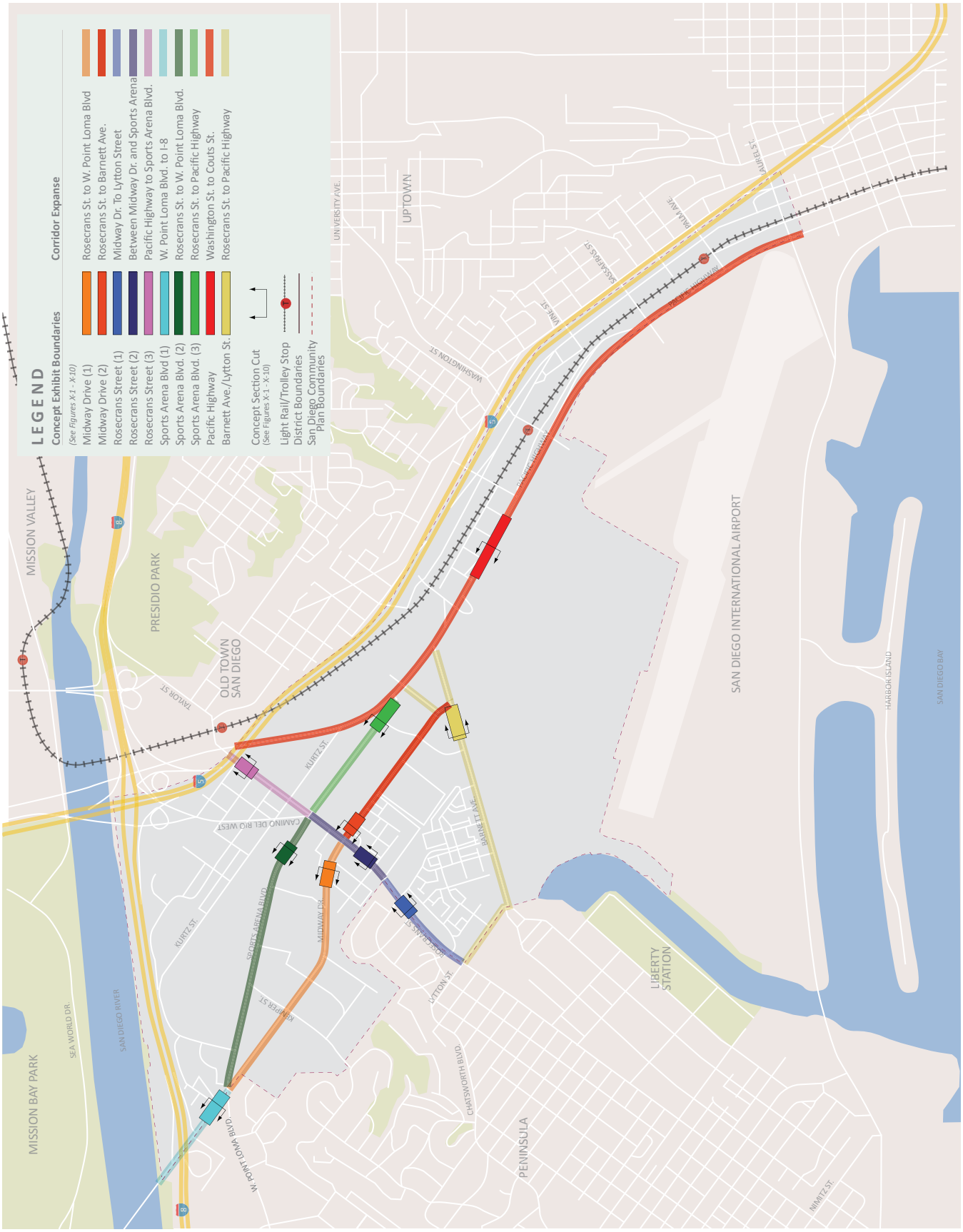
Where significant differences occur on a roadway, multiple sections where prepared to address site-specific conditions.

Sports Arena Blvd.	(3) Sections
Rosecrans Street	(3) Sections
Midway Drive	(2) Sections
Pacific Highway	(1) Section
Barnett Avenue	(1) Section

Street Concepts

Five major street corridors extend through the Midway-Pacific Highway community and will create four distinct linkages: Pacific Highway (Historic Highway 101), Rosecrans Street (Historic La Playa Trail), Midway Drive (Midway Trail), and Sports Arena Boulevard and Barnett Avenue/Lytton Street (Bay to Bay Link). These corridors and linkages present further opportunities for place-making, revealing unique stories about the area's history, creating identity and a sense of place, and enhancing mobility for all user groups. These themed linkages will be visually identifiable by incorporating cohesive tree palettes, wayfinding signage designs, and coordinated street furnishings and amenities including light fixtures, bus shelters, bike racks, drinking fountains, seating, carts and kiosks and paving.

Figure 3.3-1 Street Concept Exhibit Locations



SPORTS ARENA BOULEVARD - BAY TO BAY TRAIL

Consistent with the draft Midway-Pacific Highway Community Plan for a trail to replace the Bay to Bay canal concept found in the 1991 Midway/Pacific Highway Corridor Community Plan. The concept for the Bay to Bay canal was to provide a water connection from the Navy Boating Channel portion of San Diego Bay to the San Diego River Channel and Mission Bay. The Bay to Bay Trail is proposed to follow the conceptual canal alignment but serve pedestrian and bicycle users. The Bay to Bay Trail will be complemented by an extensive street tree program and will provide a connection to adjacent communities and regional recreational facilities.

Sports Arena Boulevard has several challenges that will need to be addressed to implement the proposed improvements. The southern reach from Rosecrans Street to Pacific Highway is currently a two-lane roadway with power poles and lines on both sides of the street, stretches with no existing sidewalk, and drainage structures in the middle of the road. The land uses along this section of Sports Arena Boulevard are industrial, warehouse, and commercial with unimproved frontage conditions and parallel parking in front. The conceptual design for the southern segment includes new curb, gutter, and sidewalks with storm water inlets into landscaped parkways. A trail would be implemented on the east side of the road and will continue on to San Diego Bay via Dutch Flats Parkway, Enterprise Street, Barnett Street and Lytton Avenue. This segment of the Bay to Bay Trail will also connect to the Historic Highway 101 trail at the southern end and to the La Playa Trail at Rosecrans Street.

The northern reach of Sports Arena Boulevard from Rosecrans Street on the south to the Midway Drive/ West Point Loma Boulevard intersection at the north end. This section is a five or six lane roadway with turn lanes in the center. The land uses are primarily commercial with the Sports Arena and some residential developments at the north end. The proposed concept includes bike lanes and widened sidewalks. When applying these facilities to the existing right-of-way cross section, there is insufficient space for all facilities to be implemented within the right-of-way. With the elimination of all on-street parking, it is possible to incorporate bike lanes on both sides and to widen the sidewalks sufficiently to incorporate street trees. Center medians can be included in the reaches between turn lanes - some will only be wide enough for hardscape - some other areas may be wide enough for trees to be implemented. The trail connections for this reach would be to the La Playa Trail on the south and to the final segment of the Bay to Bay Trail along Sports Arena Boulevard north of West Point Loma Boulevard that leads to the San Diego River and Mission Bay.

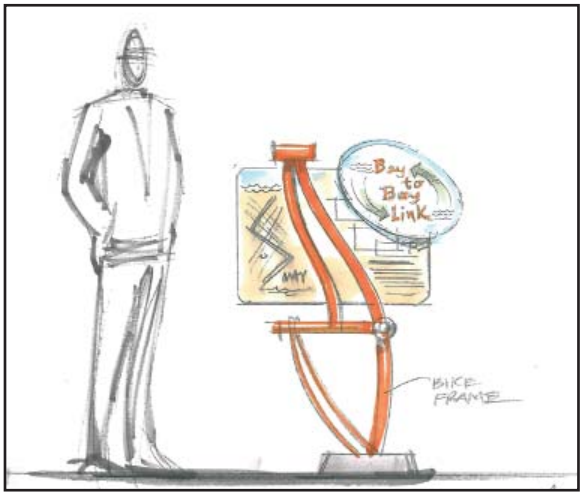
Bay to Bay Trail Tree Palette

Metrosideros Detail

Geijera Detail

Jacaranda Detail

Bay to Bay Trail Site Improvements Palette



Interpretive Map

Pedestrian Directional

Bike Route Marker with Map

Sports Arena Boulevard - W. Point Loma Boulevard to I-8

This stretch of roadway is the confluence of the Bay to Bay Trail and the Midway Trail in addition to the proposed Urban Greening and roadway improvements. The roadway also has varying right-of-way widths and a high volume of traffic, so the existing narrow paved median will be retained and renovated with new hardscape. Street trees will be planted in the sidewalk buffer zone and drainage improvements incorporated into the areas adjacent to the existing storm drain facilities.

Refer to Chapter 5, section 5.4 Plant Palette- Primary Corridors and Trails, and section 5.5 Plant Palette - Districts and Villages/Local Streets, for recommended tree species.

Concept:

To create a northern gateway into the community addressing all of the street improvements and trail facilities identified the draft Midway-Pacific Highway Community Plan Update and consistent with the proposed improvements for the other segments of Sports Arena Boulevard.

Figure 3.3-2 Street Concept Plan Exhibit - Sports Arena Blvd.., W. Point Loma Boulevard to I-8

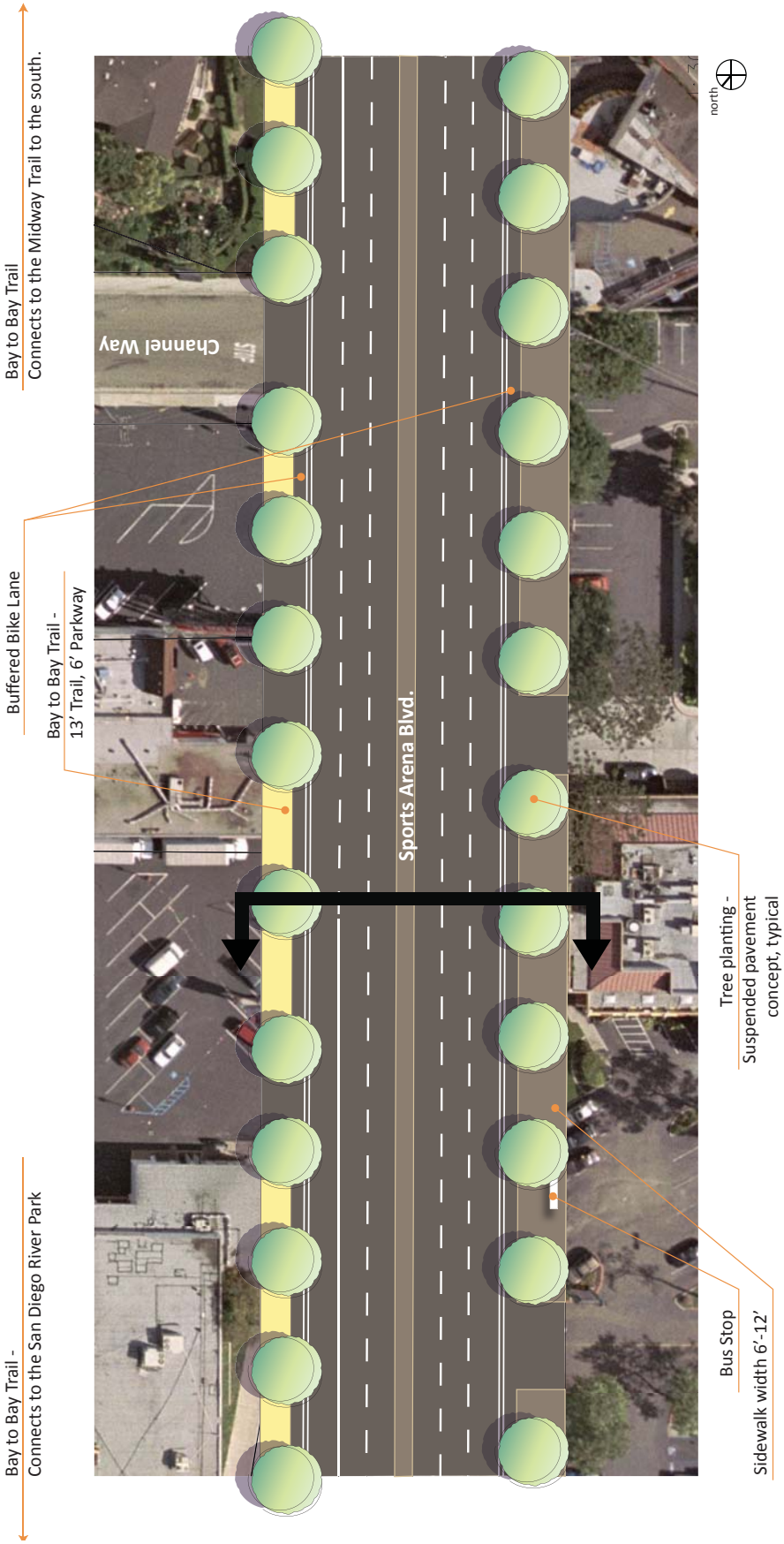
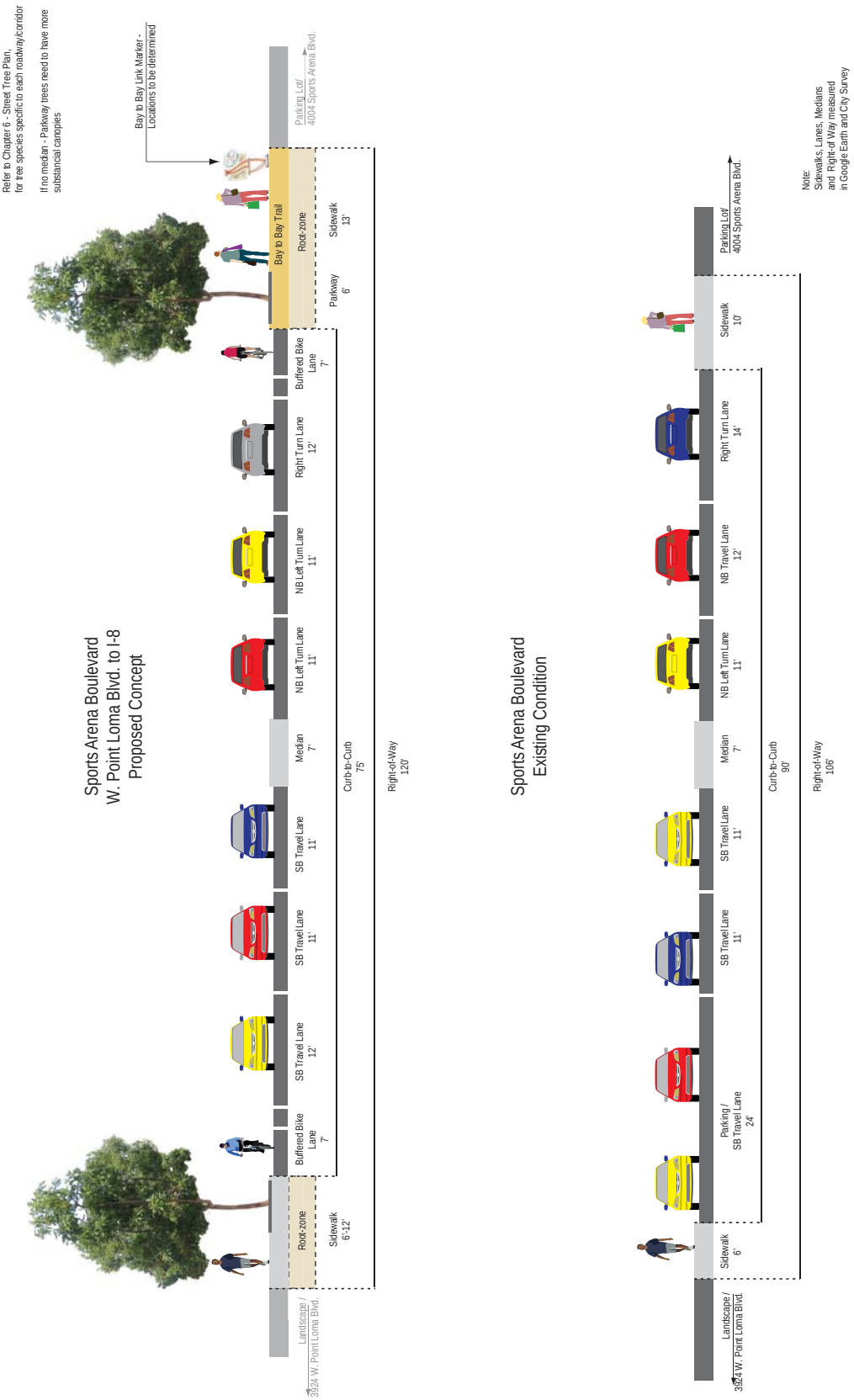


Figure 3.3-3 Street Concept Section Exhibit - Sports Arena Blvd.., W. Point Loma Boulevard to I-8



Sports Arena Boulevard - Rosecrans Street to W. Point Loma Boulevard

The central segment of Sports Arena Boulevard from Rosecrans Street to the Midway Drive/West Point Loma Boulevard intersection is a five to six lane roadway with turn lanes in the center. The land uses are primarily commercial with the Sports Arena and some residential at the north end. With the elimination of all on-street parking, it is possible to incorporate bike lanes on both sides and to widen the sidewalks sufficiently to include street trees.

The trail connections for this reach would be to the La Playa Trail on the south and the continuation of the Bay to Bay Trail to the north that leads to the San Diego River and Mission Bay.

Refer to Chapter 5, section 5.4 Plant Palette- Primary Corridors and Trails, and section 5.5 Plant Palette - Districts and Villages/Local Streets, for recommended tree species.

Concept:

To create a conceptual identity and design right-of-way improvements and landscape to achieve the

Figure 3.3-4 Street Concept Plan Exhibit - Sports Arena Blvd., Rosecrans St. to W. Point Loma Blvd.

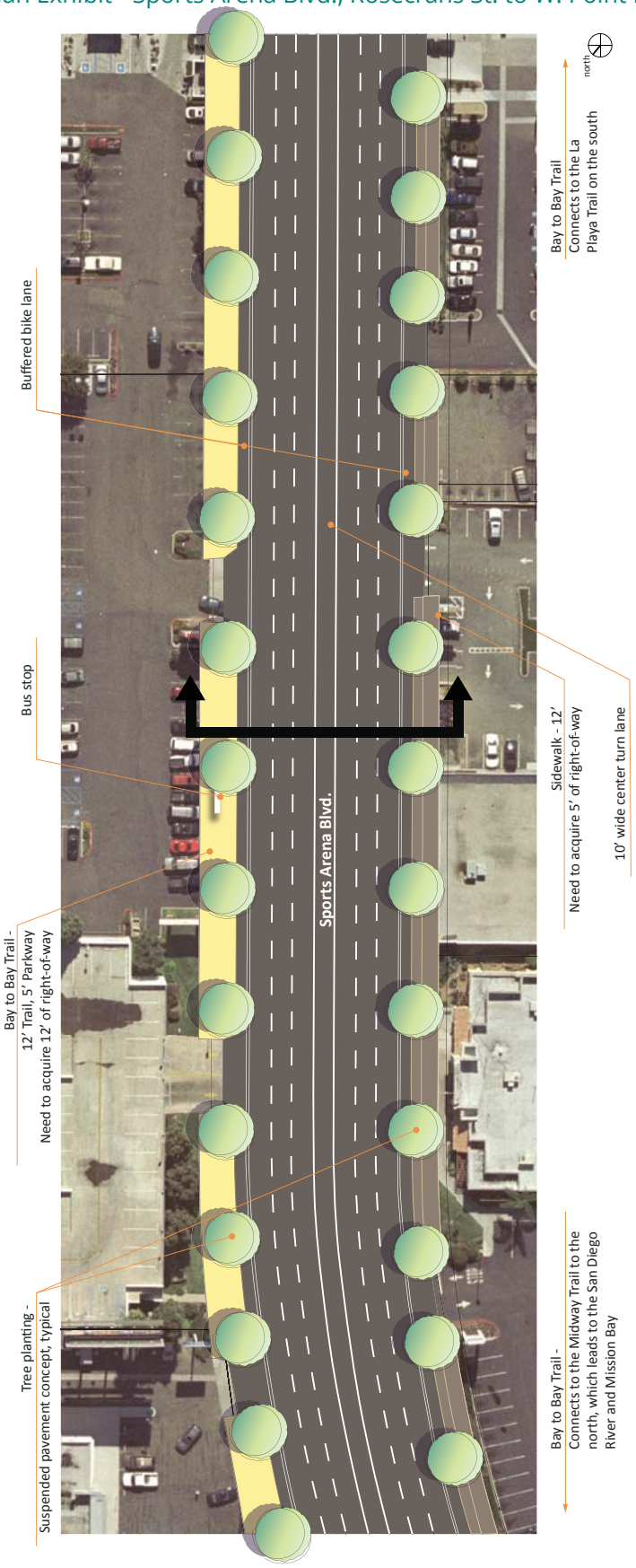
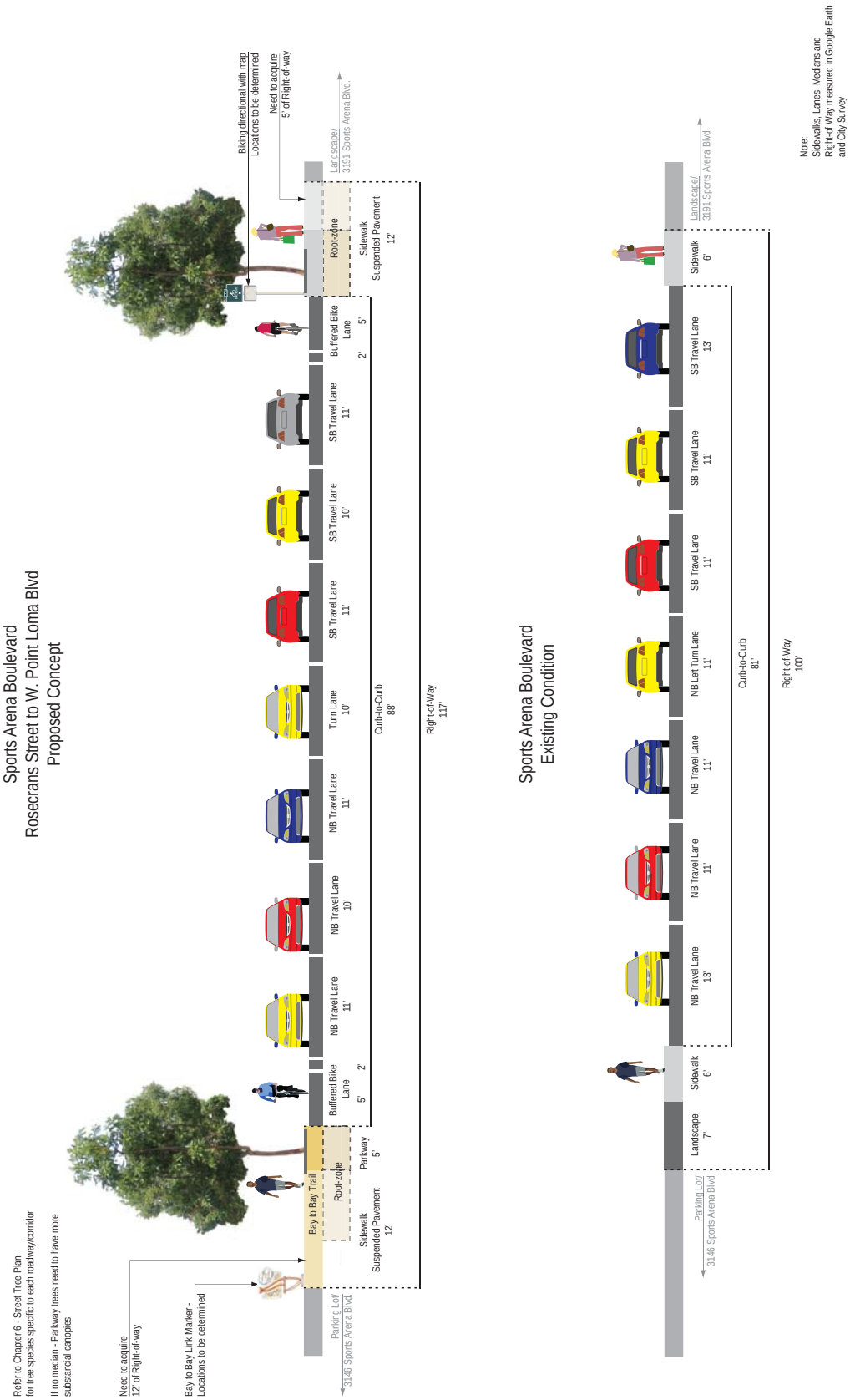


Figure 3.3-5 Street Concept Section Exhibit - Sports Arena Blvd., Rosecrans St. to W. Point Loma Blvd.



Sports Arena Boulevard - Rosecrans Street to Pacific Highway

The southern reach of Sports Arena Boulevard, from Rosecrans Street to Pacific Highway, is currently a two-lane roadway with power poles and lines on both sides of the street, stretches with no existing sidewalk, and drainage structures in the middle of the road. The land uses along this section of Sports Arena Boulevard are industrial, warehouse, and commercial with unimproved frontage conditions and parallel parking in front. The conceptual design for the southern segment includes new curb, gutter, and sidewalks with storm water inlets into landscaped parkways. A trail would be implemented on the east side of the road and will continue on to San Diego Bay via Dutch Flats Parkway, Enterprise Street, Barnett Street and Lytton Avenue. This segment of the Bay to Bay Trail will also connect to the Historic Highway 101 trail at the southern end and to the La Playa Trail at Rosecrans Street.

Refer to Chapter 5, section 5.4 Plant Palette- Primary Corridors and Trails, and section 5.5 Plant Palette - Districts and Villages/Local Streets, for recommended tree species.

Concept:

To implement right-of-way and landscape improvements to achieve the Bay to Bay Trail concept.

Figure 3.3-6 Street Concept Plan Exhibit - Sports Arena Blvd., Rosecrans St. to Pacific Highway

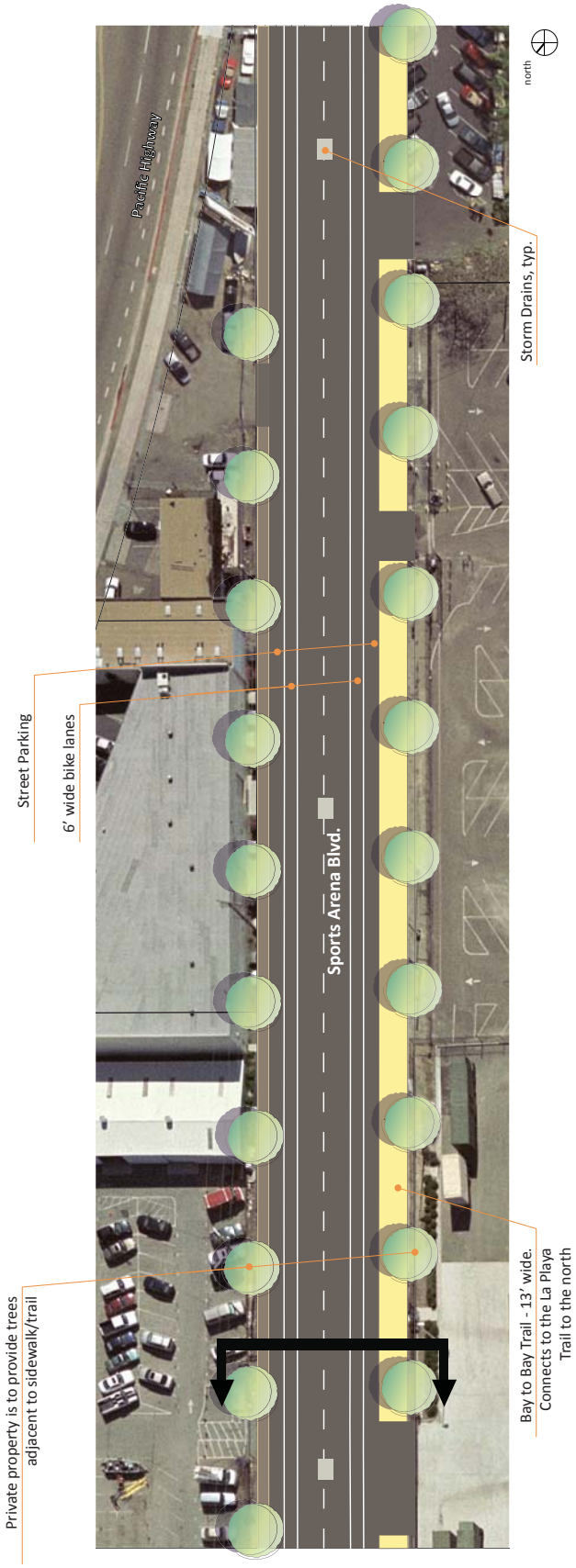
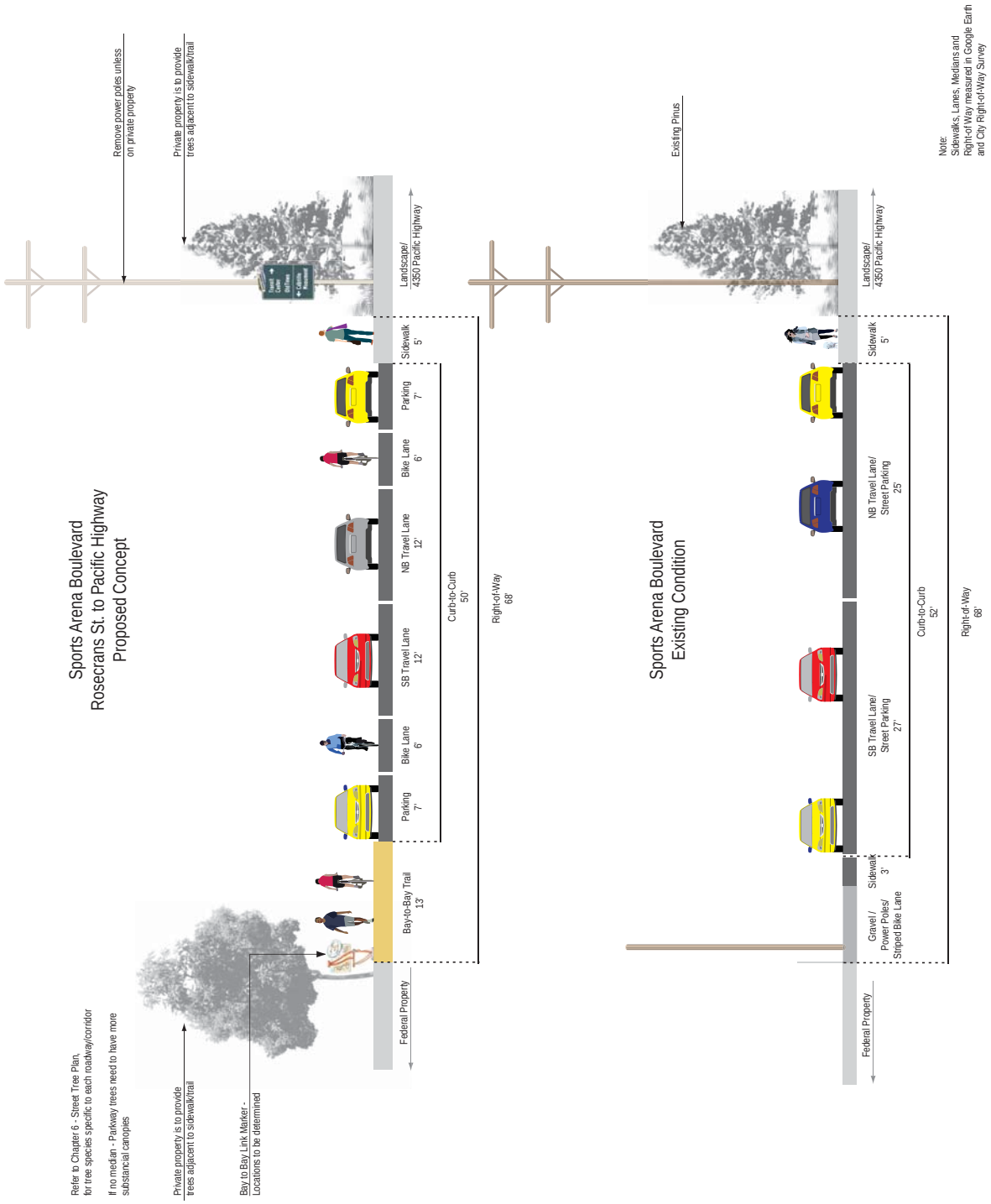


Figure 3.3-7 Street Concept Section Exhibit - Sports Arena Blvd., Rosecrans St. to Pacific Highway



ROSECRANS STREET - LA PLAYA TRAIL

Rosecrans Street has two distinctly different reaches to be addressed. The eastern reach from Sports Arena Boulevard to Pacific Highway is a four lane major street with an existing right-of-way width of 100'. The western reach from Sports Arena Boulevard to Lytton Street is a six lane major with a right-of-way width of 120'. The western reach connects and carries the traffic off of and onto Interstate 8 via Camino del Rio West, more than it carries traffic onto the eastern segment Rosecrans Street leading to Pacific Highway and Old Town.

The concept of the La Playa Trail is consistent with the draft Community Plan and is a significant opportunity to begin addressing the integrated joint-use trail concept in conjunction with the street tree planting program. It is also a high historic value feature that is a basis for selecting specific materials, trees and plants, and the development of signage for this important connector from San Diego Bay to Old Town. The street tree proposal is for planting of California natives and trees that were brought to California by the Spanish explorers and missionary's when establishing the Presidio and the San Diego Mission.

Oaks, sycamores, olives, pepper trees and palms would be the primary tree types for the La Playa Trail on Rosecrans Street. A 10' wide joint use trail on the south side of the road would connect to Old Town, the Old Town Transit Center and Pacific Highway to the east and would extend the entire length of Rosecrans Street in the study area to the western end at Lytton Street.

CONCEPT:

To create a streetscape and trail features that functions as the La Playa Trail and includes landscape and site features to emulate that context.

LA PLAYA TRAIL TREE PALETTE

Platanus Detail

Schinus Detail

Quercus Detail

LA PLAYA TRAIL SITE IMPROVEMENTS PALETTE

Trail Texture

Interpretive/Directory

Street Furniture

Rosecrans Street - Between Midway Drive and Sports Arena Blvd.

This one-block stretch of Rosecrans Street from Midway Drive to Sports Arena Boulevard is a six-lane major street with a right-of-way width of 110'. It is also the primary gateway into the Midway-Pacific Highway area. The implementation of improvements highlighting the Historic La Playa Trail through this area, with the complementary streetscape, urban forest planting, gateway and community signage, thematic street lighting, paving and site furnishings would positively benefit the community.

Refer to Chapter 5, section 5.4 Plant Palette- Primary Corridors and Trails, and section 5.5 Plant Palette - Districts and Villages/Local Streets, for recommended tree species.

Concept:

To utilize the existing right of way and identify any other opportunities to facilitate the implementation of the La Playa Trail and tree plantings focusing on trees that are historically correct in a very constrained space.

Figure 3.3-8 Street Concept Plan Exhibit - Rosecrans St. Between Midway Dr. and Sports Arena Blvd.

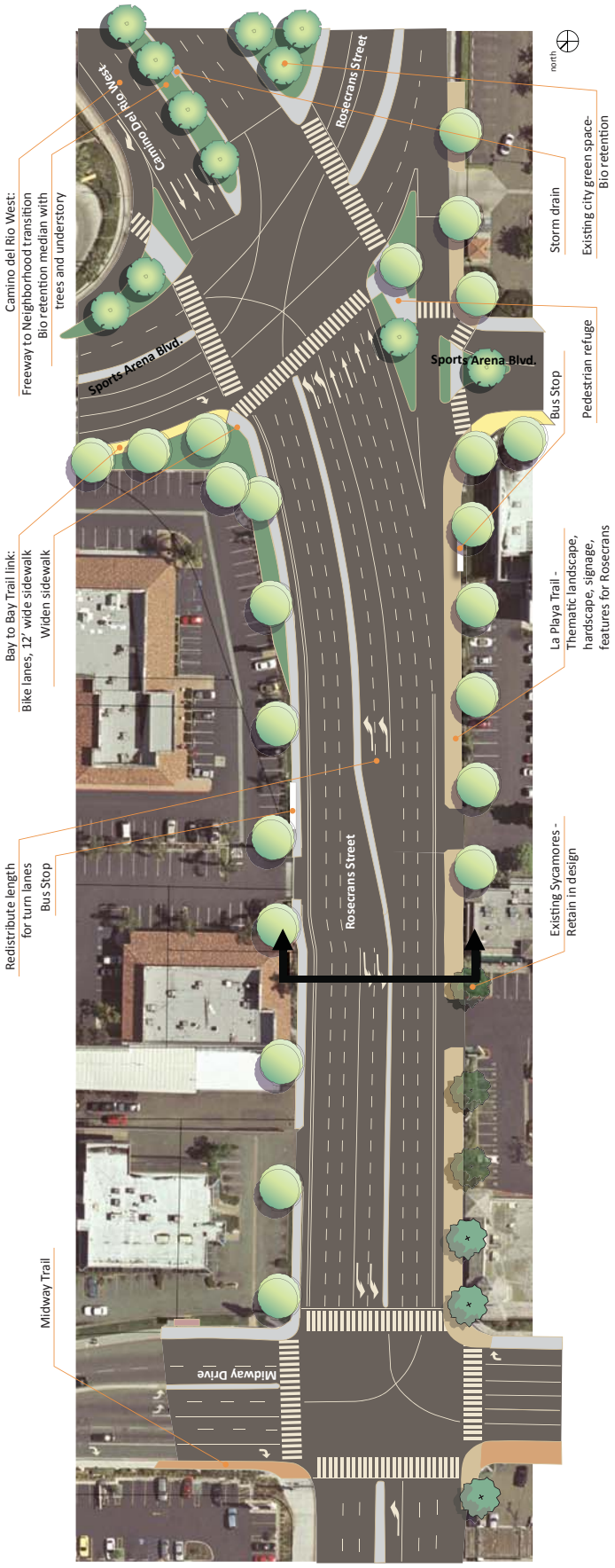
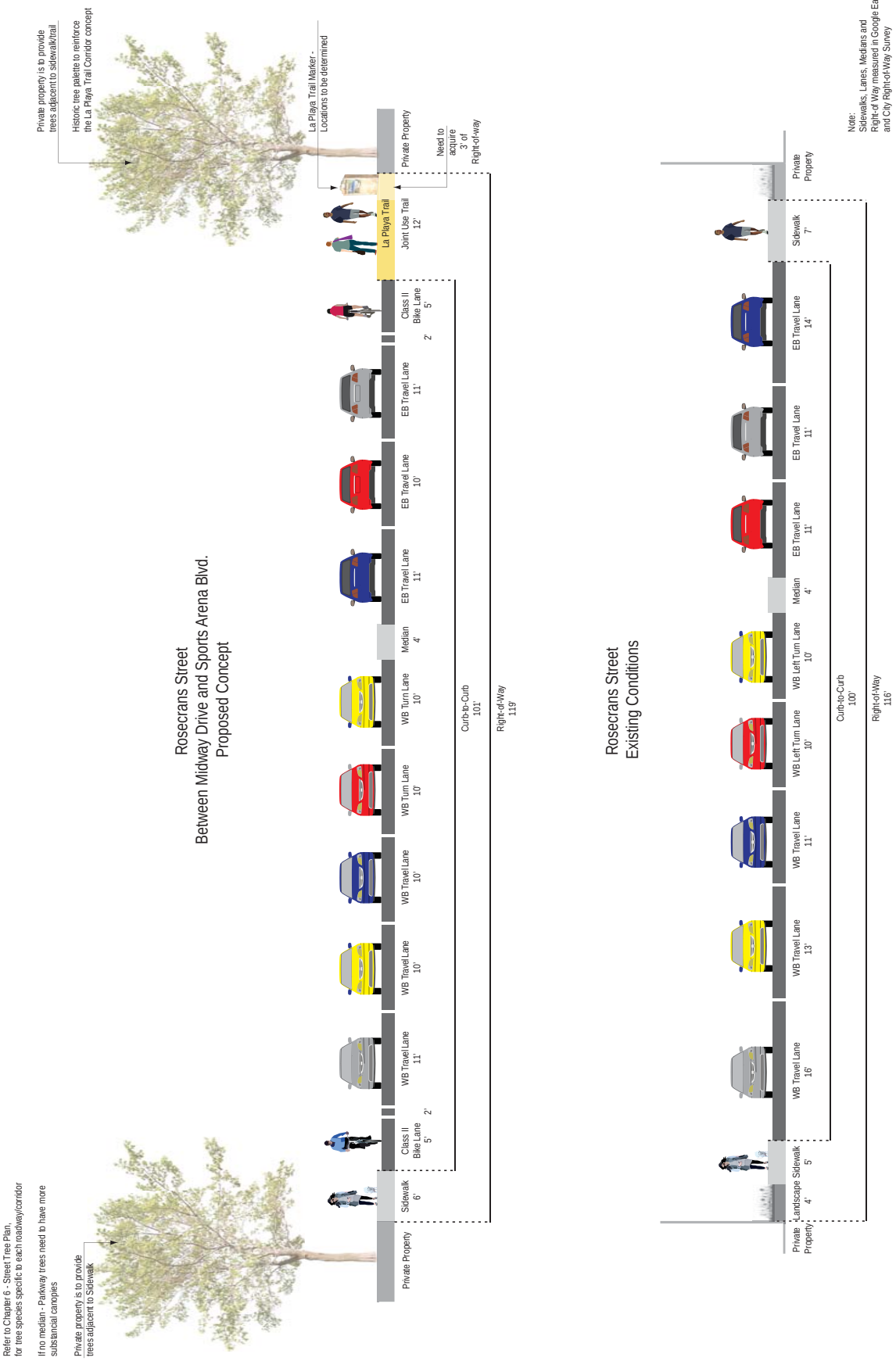


Figure 3.3-9 Street Concept Section Exhibit - Rosecrans St. Between Midway Dr. and Sports Arena Blvd.



The eastern reach of Rosecrans Street from Sports Arena Boulevard. to Pacific Highway is a four lane major street with an existing right-of-way width of 100'.

The concept of the La Playa Trail is a significant opportunity to begin addressing the integrated joint-use trail concept in collaboration with the street tree planting program. The La Playa Trail is a feature with historic basis for selecting specific materials, trees and plants, and the development of signage for this important connector from San Diego Bay to Old Town. The street tree proposal is for the identification and implementation of trees that are California natives and other trees that were brought to California by the Spanish explorers and missionaries when establishing the Presidio and the San Diego Mission.

Oaks, Sycamores, Olives, Pepper Trees and Palms would be the primary tree types for the La Playa Trail on Rosecrans Street. A 12' wide joint use trail on the South side of the road would connect to Old Town, the transit center and Pacifi

Figure 3.3-10 Street Concept Plan Exhibit - Rosecrans St., Pacific Hwy. to Sports Arena Blvd.

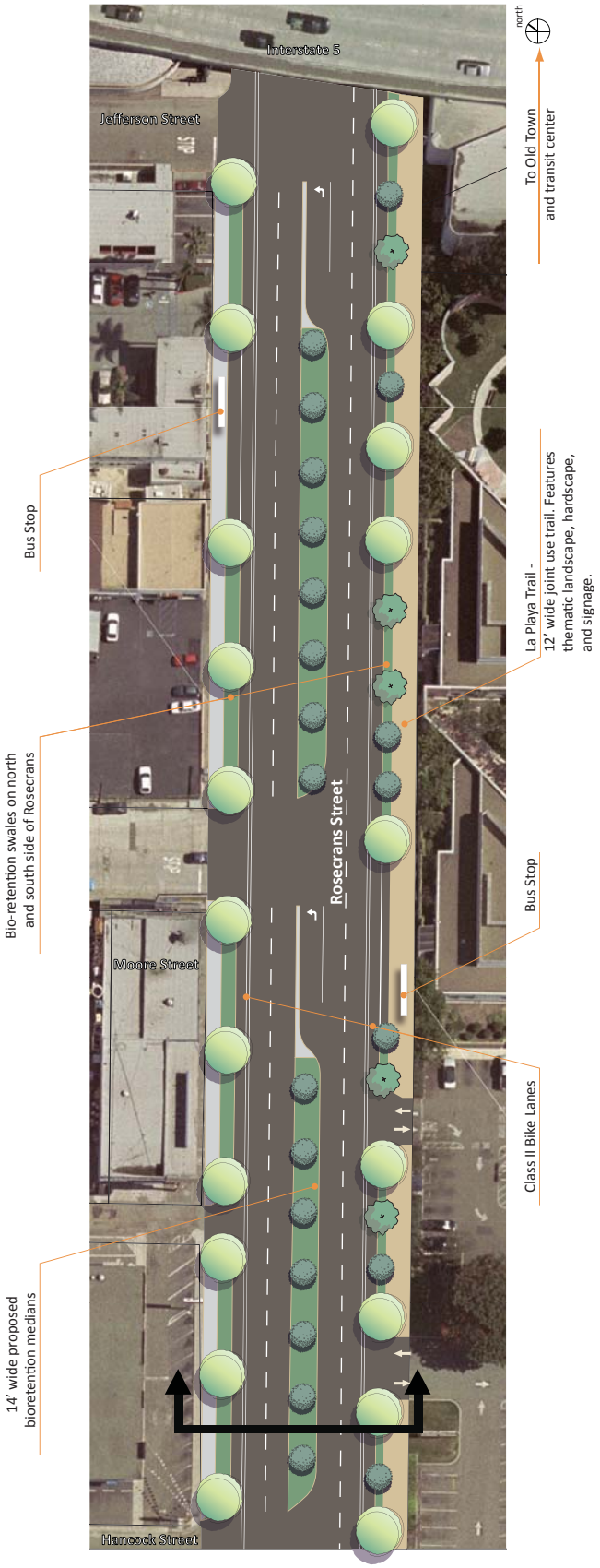
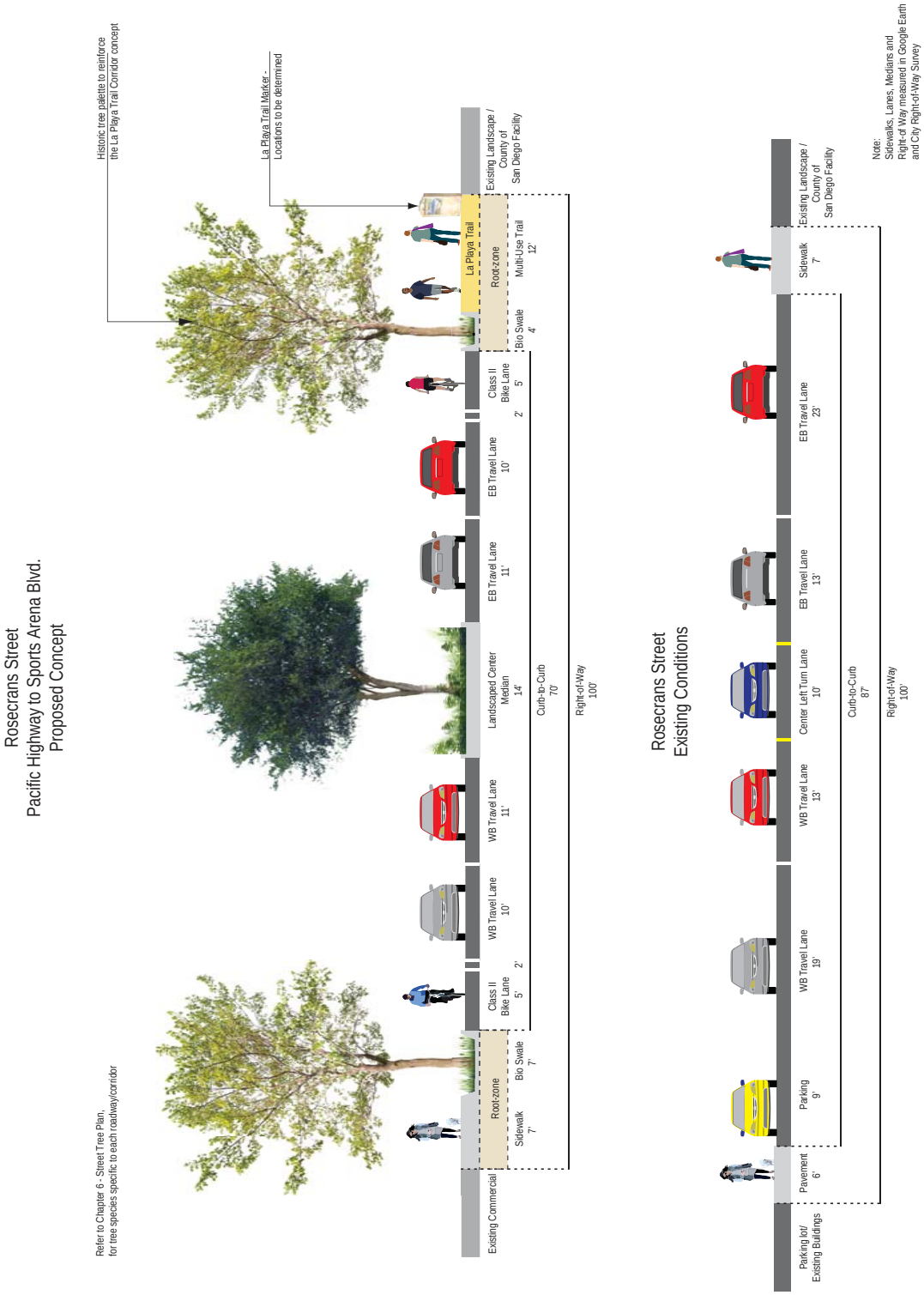


Figure 3.3-11 Street Concept Section Exhibit - Rosecrans St., Pacific Hwy. to Sports Arena Blvd.



Rosecrans Street - Midway Drive to Lytton Street

The western reach of Rosecrans Street from Sports Arena Boulevard to Lytton Street is a 6-lane major street with a right-of-way width of 115'. The western reach connects to and carries the traffic off of Camino del Rio West and Interstate 8, and connects to the Peninsula community as well.

The concept of the La Playa Trail is a significant opportunity to begin addressing the integrated joint-use trail concept in collaboration with the street tree planting program. It is also a feature with historic basis for selecting specific materials, trees and plants, and the development of signage for this important connector from San Diego Bay to Old Town. The street tree proposal includes California native trees and other trees that were brought to California by the Spanish explorers and missionary's when establishing the Presidio and the San Diego Mission.

Oaks, Sycamores, Olives, Pepper Trees and Palms would be the primary tree types for the La Playa Trail on Rosecrans Street. A 12' wide joint use trail on the South side of the road would connect to Old Town, the transit center and Pacific Highway to the west, and would extend the entire length of Rosecrans Street to the western end of the study area at Lytton Street.

Refer to Chapter 5, section 5.4 Plant Palette- Primary Corridors and Trails, and section 5.5 Plant Palette - Districts and Villages/Local Streets, for recommended tree species.

Concept:

To design trail and streetscape features that create the La Playa Trail.

Figure 3.3-12 Street Concept Plan Exhibit - Rosecrans St., Midway Dr. to Lytton St.

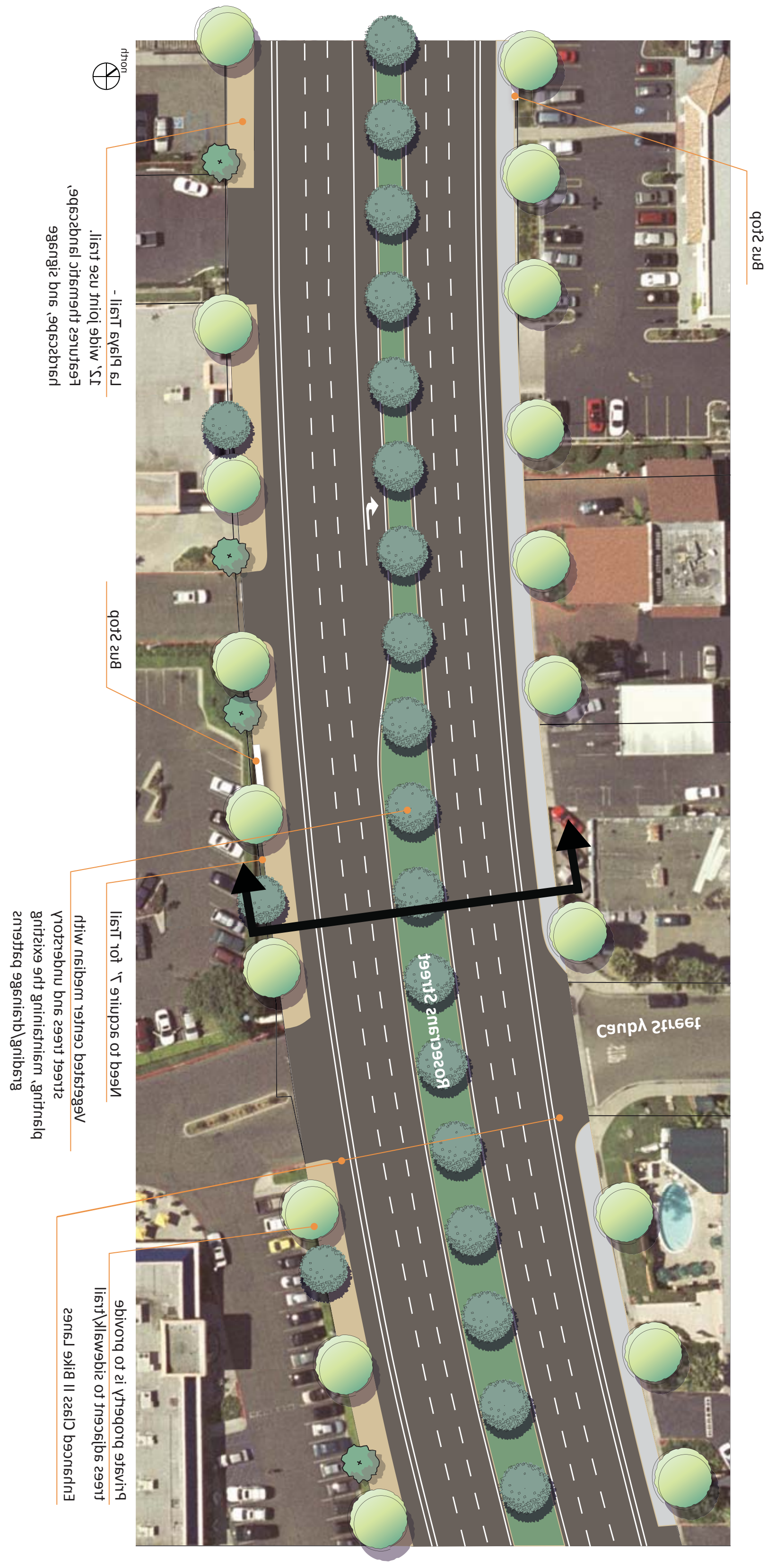
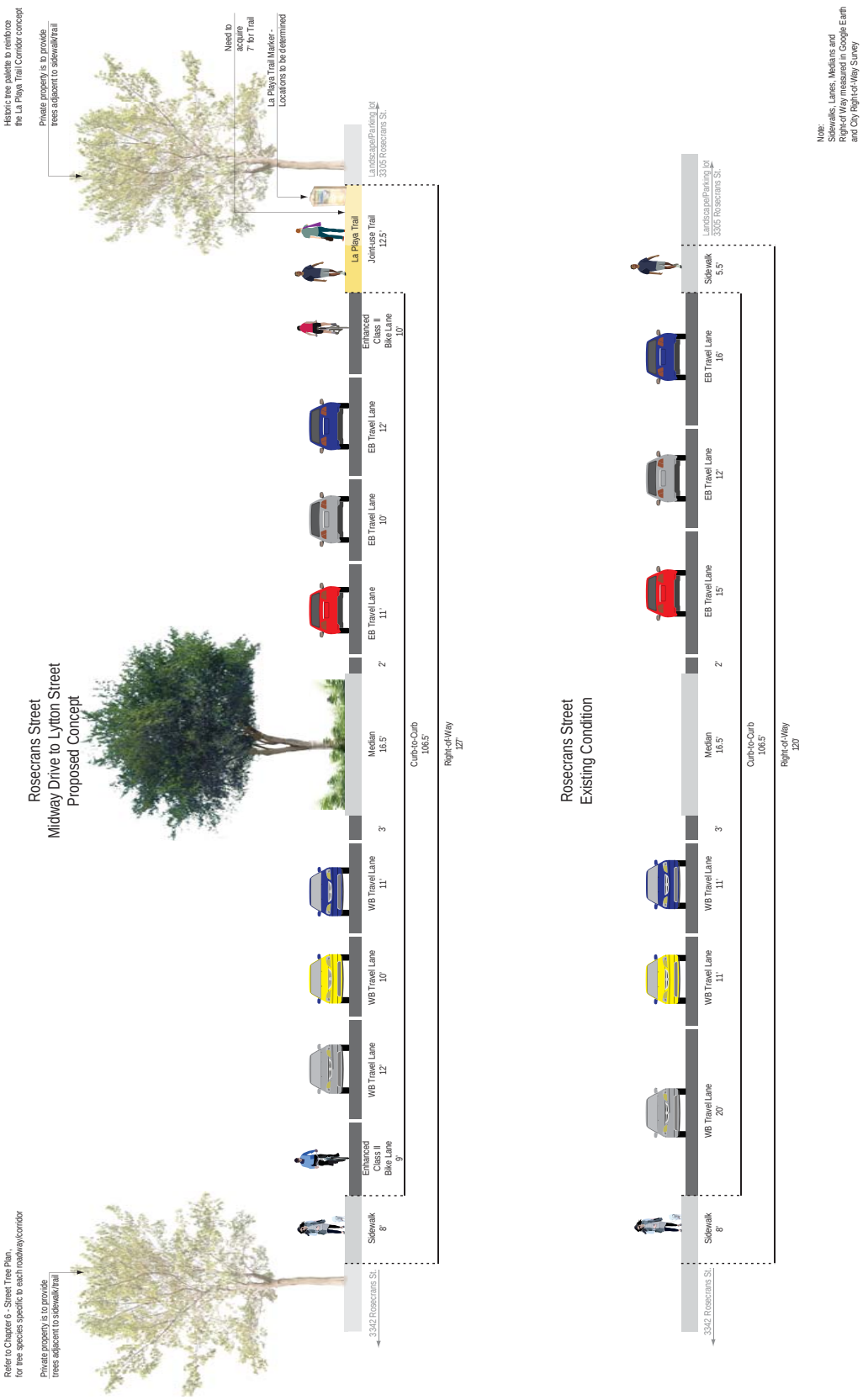


Figure 3.3-13 Street Concept Section Exhibit - Rosecrans St., Midway Dr. to Lytton St.



MIDWAY DRIVE - MIDWAY TRAIL

Midway Drive is located at the heart of the Midway-Pacific Highway community, and connects the northern Midway area to the Pacific Highway corridor. Midway Drive has varying right-of-way conditions for both the northern and southern reaches. The northern reach has right-of-way widths that vary from 69' - 115' . The street corridor features an eclectic mix of land uses that have evolved over the past decades, including sections with older buildings and narrow road widths and sections with wider widths and newer development that provides expanded right-of-way for street improvements. The southern reach of Midway Drive is a 4-lane major street that has right-of-way widths that are relatively consistent, ranging from 70 to 86 feet, with the exception of the expanded street width at the former U.S. Post Office frontage.

Midway Drive is envisioned to become the Midway Trail and to serve as the multi-modal "Main Street" of the community. The Midway Trail will provide a joint-use trail located on the west side of the street that connects with the Bay to Bay Trail on its south end, the La Playa Trail at its midpoint at Rosecrans Street, and again with the Bay to Bay Trail and the San Diego River and Mission Bay at its north end.

CONCEPT:

The creation of a community "Main Street" for pedestrians, bicyclists, and motorists through characteristic streetscape improvements, street trees, andsignage.

MIDWAY TRAIL TREE PALETTE

Pinus Detail

Koelreuteria Detail

Cercis Detail

MIDWAY TRAIL SITE IMPROVEMENTS PALETTE

Pedestrian Directional

Banners

Detailed Flatwork - Patterns and Textures

Midway Drive - Rosecrans Street to W. Point Loma Blvd.

This segment of the Midway Trail is envisioned to have a 12' wide joint use trail located on the west side of the street that makes the connection to the Bay to Bay Trail on the south end, the La Playa Trail in the center, and again to the Bay to Bay Trail, the San Diego River, and Mission Bay at the north end.

Midway Drive has varying right of way conditions. Between Rosecrans Street and West Point Loma Blvd, right of way widths vary from 69' - 115'. Older buildings and narrow road widths are combined with wider road sections and newer development conditions. Implementation of the joint-use trail may happen incrementally with property redevelopment.

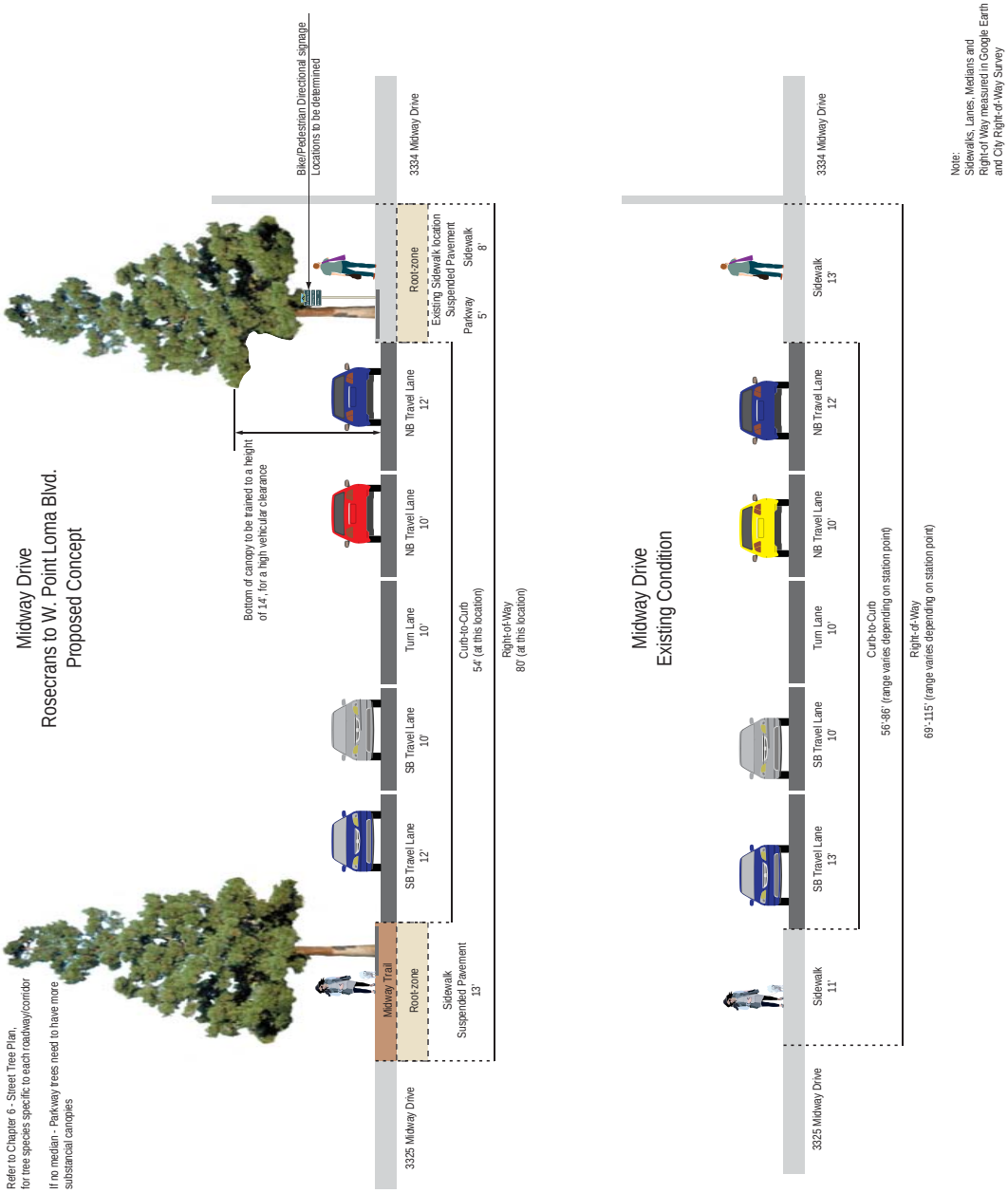
Refer to Chapter 5, Section 5.4 Plant Palette- Primary Corridors and Trails, and Section 5.5 Plant Palette - Districts and Villages/Local Streets, for recommended tree species.

Concept:

To create a community main street similar to Garnet Ave. in Pacific Beach.

Figure 3.3-14 Street Concept Plan Exhibit - Midway Dr., Rosecrans St. to W. Point Loma Blvd.

Figure 3.3-15 Street Concept Section Exhibit - Midway Dr., Rosecrans St. to W. Point Loma Blvd.



Midway Drive - Rosecrans Street to Barnett Avenue

The southern reach of Midway Drive, Rosecrans Street to Barnett Avenue, features right-of-way widths that range from 70' - 86'.

Midway Drive is envisioned to have a 12' wide joint use trail located on the west side of the street that makes the connection to the Bay to Bay Trail on the south end, the La Playa Trail in the center, and the Bay to Bay Trail, the San Diego River, and Mission Bay at the north end. The treatments created for the 'Main Street' concept applied to the northern reach would be utilized on the southern reach as well. The southern reach has many driveways feeding into the commercial centers that should be consolidated as much as possible with property redevelopment. The existing 2-way center left turn lane will remain.

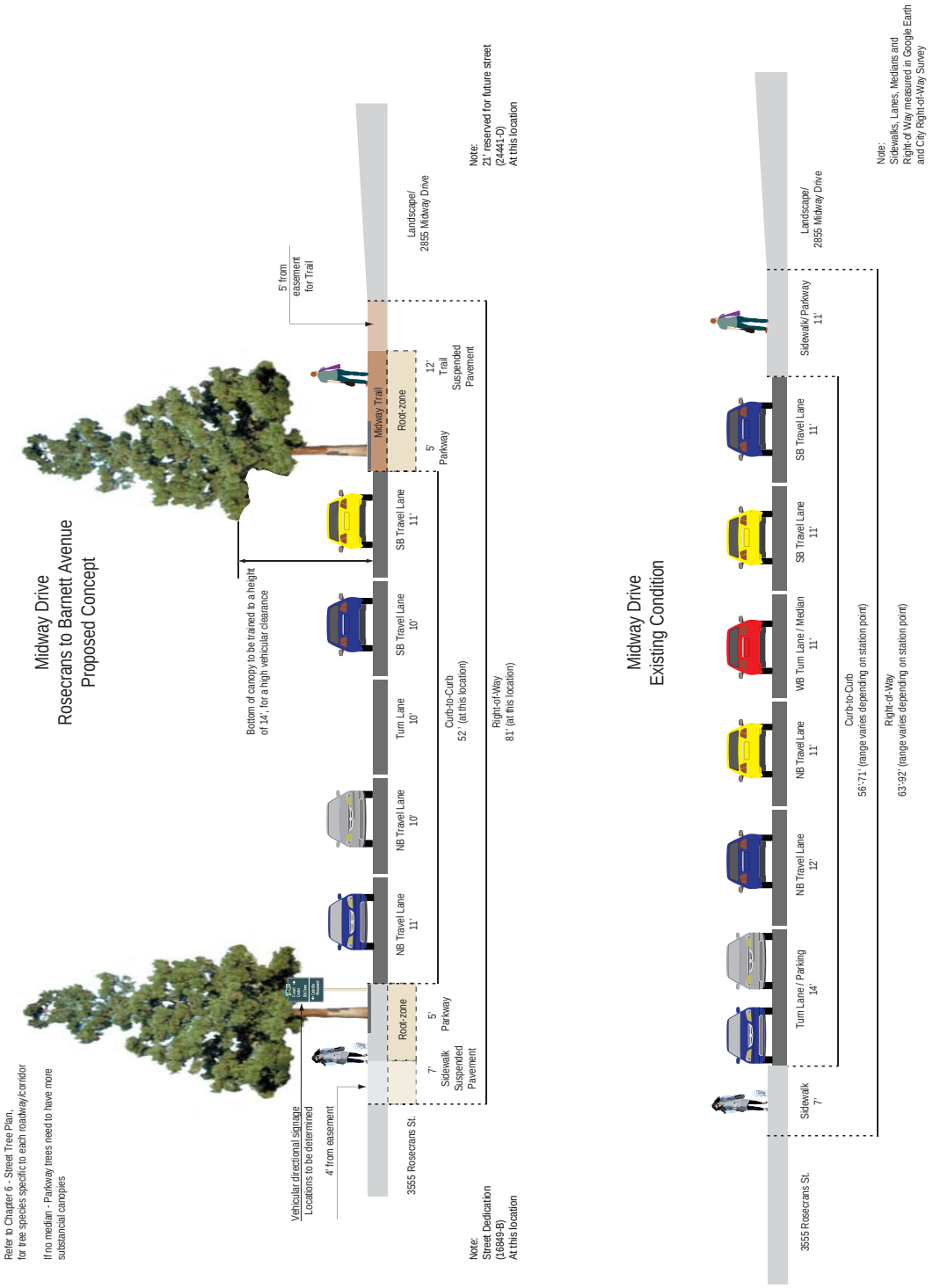
Refer to Chapter 5, section 5.4 Plant Palette- Primary Corridors and Trails, and section 5.5 Plant Palette - Districts and Villages/Local Streets, for recommended tree species.

Concept:

To create a community main street similar to Garnet Ave. in Pacific Beach.

Figure 3.3-16 Street Concept Plan Exhibit - Midway Drive, Rosecrans St. to Barnett Ave.

Figure 3.3-17 Street Concept Section Exhibit - Midway Drive, Rosecrans St. to Barnett Ave.



Pacific Highway - Historic Highway 101

Pacific Highway is a major street with reaches that have up to eight lanes and right-of-way widths that vary from 107' to 159'. With the immense size of the roadway, there is the potential to create a quality Boulevard quality street that provides critical linkages and functions as a key north / south connector as identified in region bicycle plans. There is opportunity to leverage this roadway as a connector from Downtown / San Diego Bay to the Midway-Pacific Highway community and points north, east and west. The proposed design initiates with a 15' wide center median with street trees and understory plantings, maintaining the existing grading / drainage patterns. Traffic lanes are to be narrowed and curbs moved inboard to create opportunities for a linear park on the east side incorporating bio-retention facilities and joint use trails. The west side along MCRD and the San Diego International Airport are proposed to receive a class one bike path and bio-retention facilities and landscape.

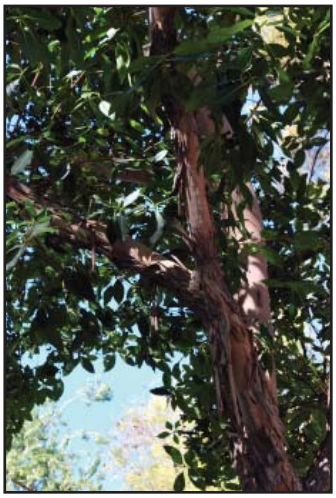
Concept:

Design features, street trees, street lighting and furnishings, gateways and wayfinding signage will all reflect and reinforce the significance of this remnant section of Historic Highway 101.

Historic Highway 101 Tree Palette

Eucalyptus polyanthemos Detail

Eucalyptus ficifolia Detail



Tristania Detail

Historic Highway 101 Site Improvements Palette

Trail Marker Sign

Interpretive Signage

Gateway Concept: Aeronautical Theme

Pacific Highway - Washington Street to Couts Street

Pacific Highway is a major roadway with reaches that have up to eight lanes and right-of-way widths that vary from 85' to 130', reflecting the road's past as part of Highway 101. With the immense size of the roadway, the right of way has the potential to be transformed into a six-lane Boulevard street that provides critical linkages identified in the San Diego Regional Bicycle Plan. Pacific Highway is identified as a key north/south connector and the opportunity to leverage this roadway as a multipurpose trail connector from Downtown/San Diego Bay to the Midway-Pacific Highway community and points north, east and west is strongly recommended. The proposed design has a 14' wide center median with street trees and understory planting, maintaining the existing grading/drainage patterns. Traffic lanes are to be narrowed inboard to create opportunities for a 30' wide greenbelt with an enhanced trail on the east side between Witherby Street and Washington Street, incorporating bio-retention facilities. The west side, along MCRD and San Diego International Airport property are proposed to receive a class one bike path and bio-retention swales and landscape.

Design features, site lighting, furnishings, gateways and wayfinding signage, will all reflect and reinforce the significance of this section of historic Highway 101.

Refer to Chapter 5, section 5.4 Plant Palette- Primary Corridors and Trails, and section 5.5 Plant Palette - Districts and Village/Local Streets, for recommended tree species.

Concept:

Pacific Highway incorporates the historic aspects of Highway 101 – the rows of tall Eucalyptus and native California trees, materials and site components that maintain the look and feel of the 1930s – 1950s roadway. Included in this re-visioning is a robust urban greening concept that incorporates the latest bio-remediation components for the parkways and median, and the bicycle and pedestrian paths to facilitate

Figure 3.3-18 Street Concept Plan Exhibit - Pacific Highway, Washington St. to Couts St.

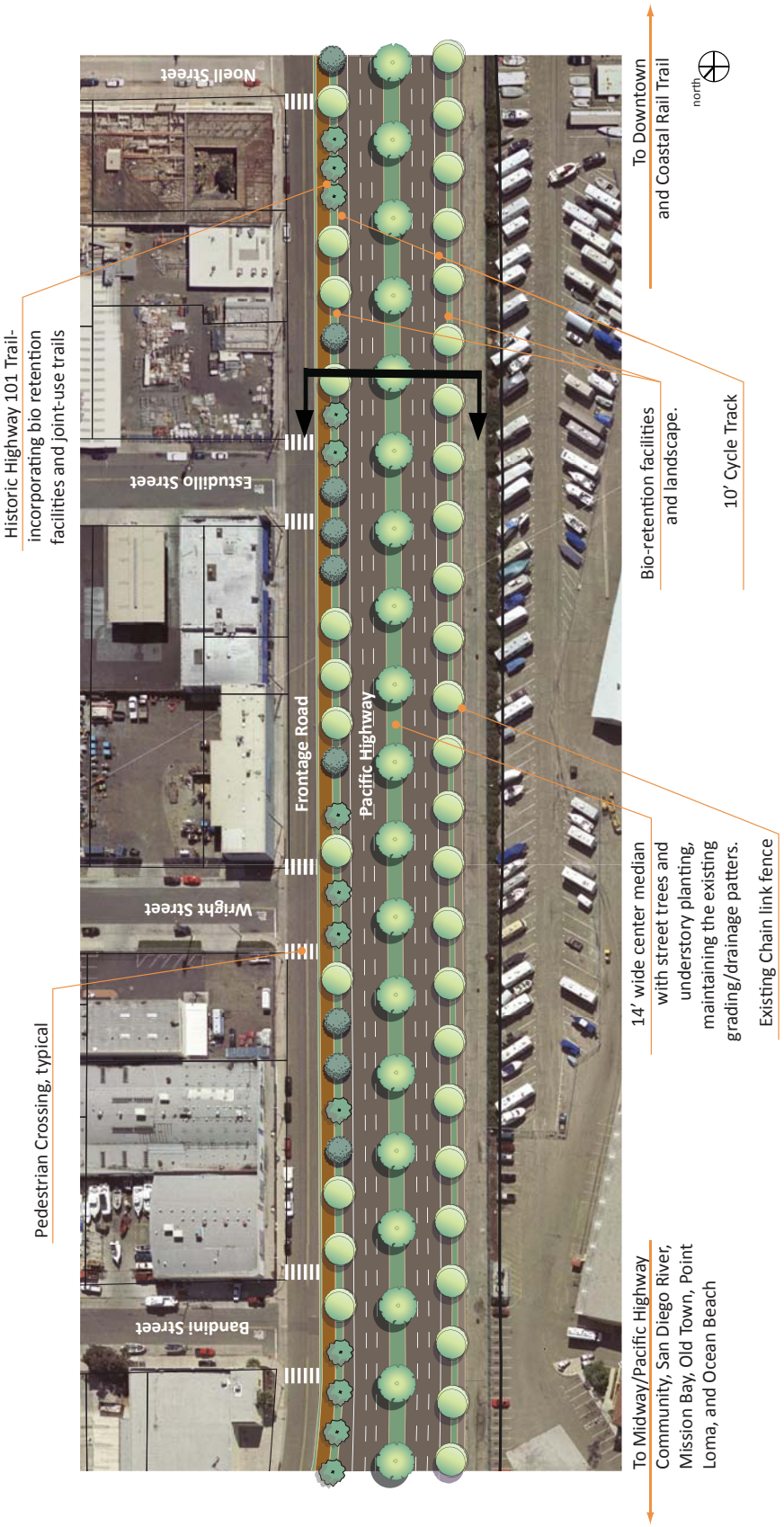
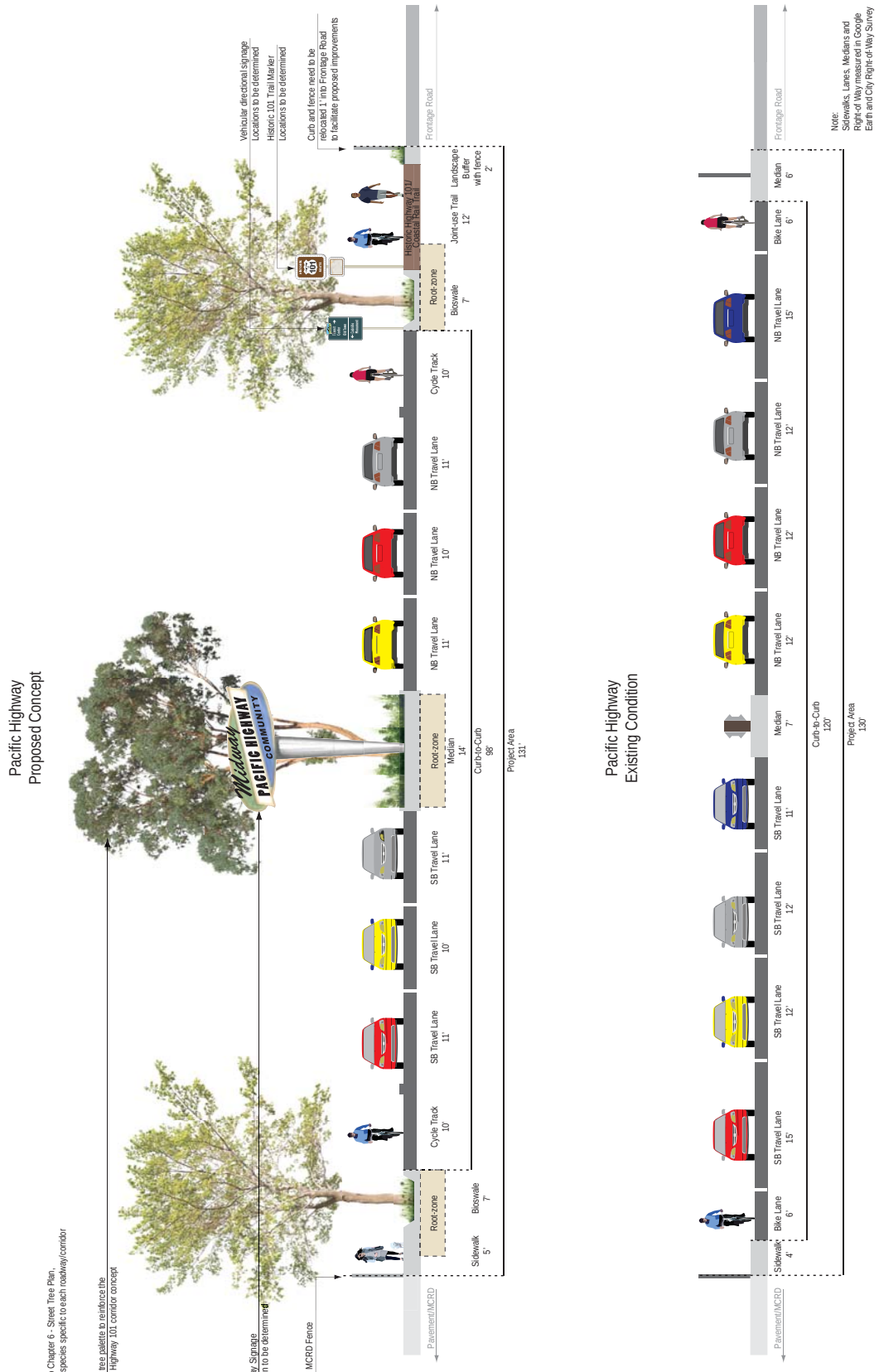


Figure 3.3-19 Street Concept Section Exhibit - Pacific Highway, Washington St. to Couts St.



Barnett Avenue/Lytton Street - Bay to Bay Trail

The proposal for Barnett Avenue and Lytton Street is to use the existing right-of-way width of 93' to provide the Bay to Bay Trail, locating it on the south side of the road along with a center median and street trees. Lane widths will be narrowed to 11' to provide bio-retention swales on both the north and south sides of the street frontage to incorporate a new street tree program and to provide a 10' wide joint-use trail on the south side. The south side alignment provides a logical connection to the entrance at Liberty Station/Navy Boating Channel pathways and a direct linkage to the proposed trail for Pacific Highway on the east side of the roadway.

The existing right-of-way is the most constrained on Lytton Street, although future redevelopment may provide opportunities for improvements on this segment of the Bay to Bay Trail. On Barnett Avenue, the existing median is to be retained, hardscape is to be removed and landscape and trees are to be implemented. The Bay to Bay Trail starts at Lytton Street and Rosecrans Street, and runs along the west side of Lytton Street, adjacent to the golf course. This allows for a connection to the boat channel on Lytton Street, allowing further connectivity to the Urban Loops network. The Bay to Bay Trail continues on the south side of Barnett Avenue, adjacent to MCRD. The curb moves inward to provide for additional width for an 8 foot wide trail, which extends east towards Pacific Highway and Midway Drive.

Bay to Bay Trail Tree Palette

Cassia Detail

Brachychiton Detail

Pinus Detail

Bay to Bay Trail Site Improvements Palette

Bench Theme

Bicycle Rack Theme

Interpretive Medallions - Historical

Barnett Avenue/Lytton Street - Rosecrans Street to Pacific Highway

Consistent with the proposal for a trail to demarcate the previously proposed Bay to Bay channel connecting the Navy Boating Channel in Liberty Station to the San Diego River Channel and Mission Bay, the Bay to Bay trail is proposed along Lytton Street and Barnett Avenue to serve pedestrian and bicycle users.
The proposal for Barnett Avenue is to work within the existing right of way width of 93' to provide the Bay to Bay Trail, locating the 10' wide joint use trail on the south side of the road. Additionally, a center median with street trees will be installed and the lane widths will be narrowed to 11' to provide bio-retention swales on both the north and south sides of the street to incorporate new street tree program and the joint-use trail.

The intersection at Barnett Avenue and Midway Drive is proposed to be modified to provide an additional crossing on the west side for a direct link to the Midway Trail and to utilize the existing curbed and striped medians as landscape areas. This intersection and the continuation to Pacific Highway is identified as a 'gateway' into the Midway-Pacific Highway community. This will be identified through the implementation of monument and direction signage, thematic tree and plant palette, paving types and colors and selected street lights and site furnishings.

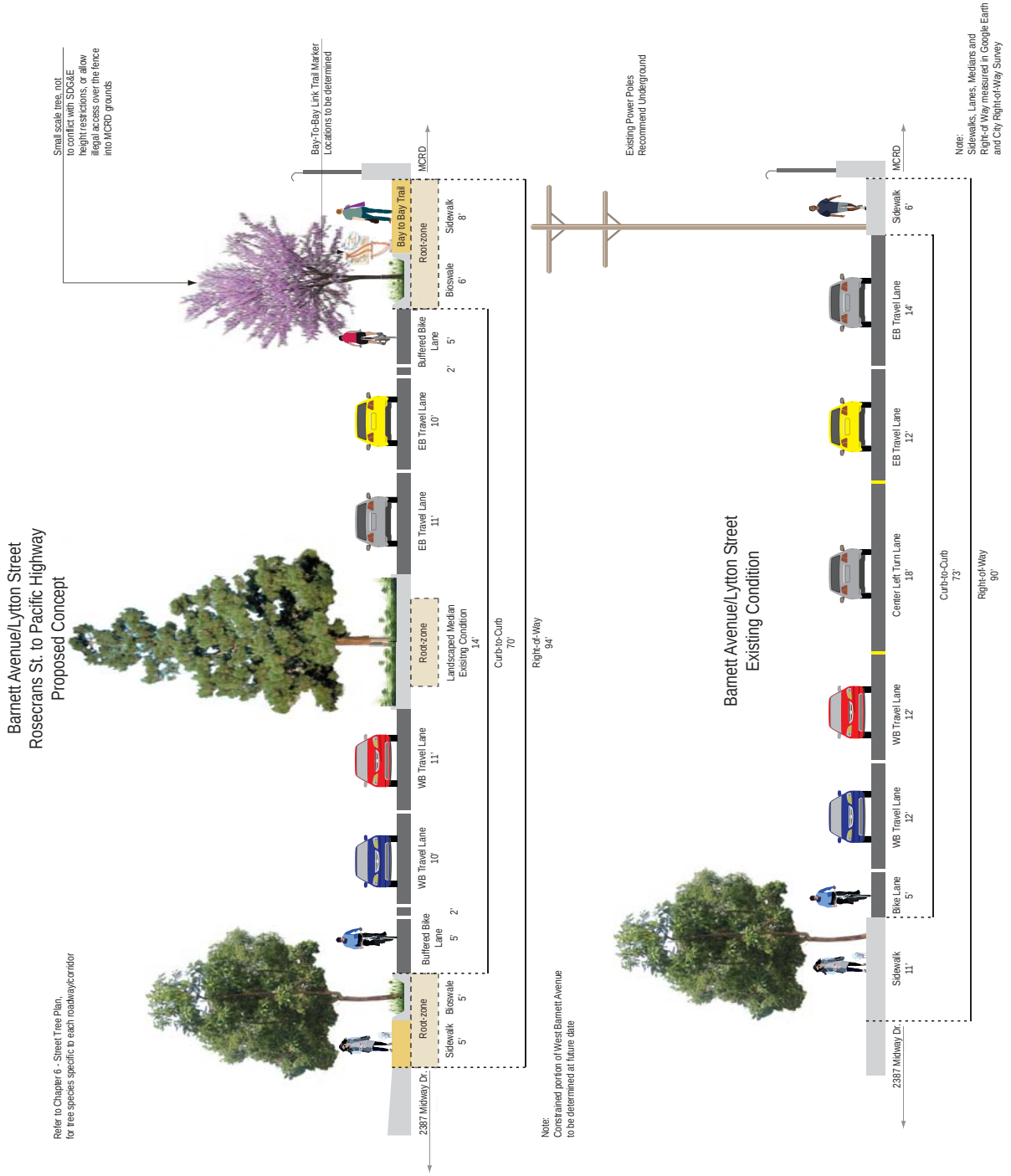
Refer to Chapter 5, section 5.4 Plant Palette- Primary Corridors and Trails, and section 5.5 Plant Palette - Districts and Villages/Local Streets, for recommended tree species.

Concept:

To create a conceptual identity, and design the right-of-way improvements and landscape, to achieve the Bay to Bay Trail concept proposed by the draft community plan.

Figure 3.3-20 Street Concept Plan Exhibit - Barnett Ave./Lytton St. - Rosecrans St. to Pacific Hwy.

Figure 3.3-21 Street Concept Section Exhibit - Barnett Ave./Lytton St. - Rosecrans St. to Pacific Hwy.



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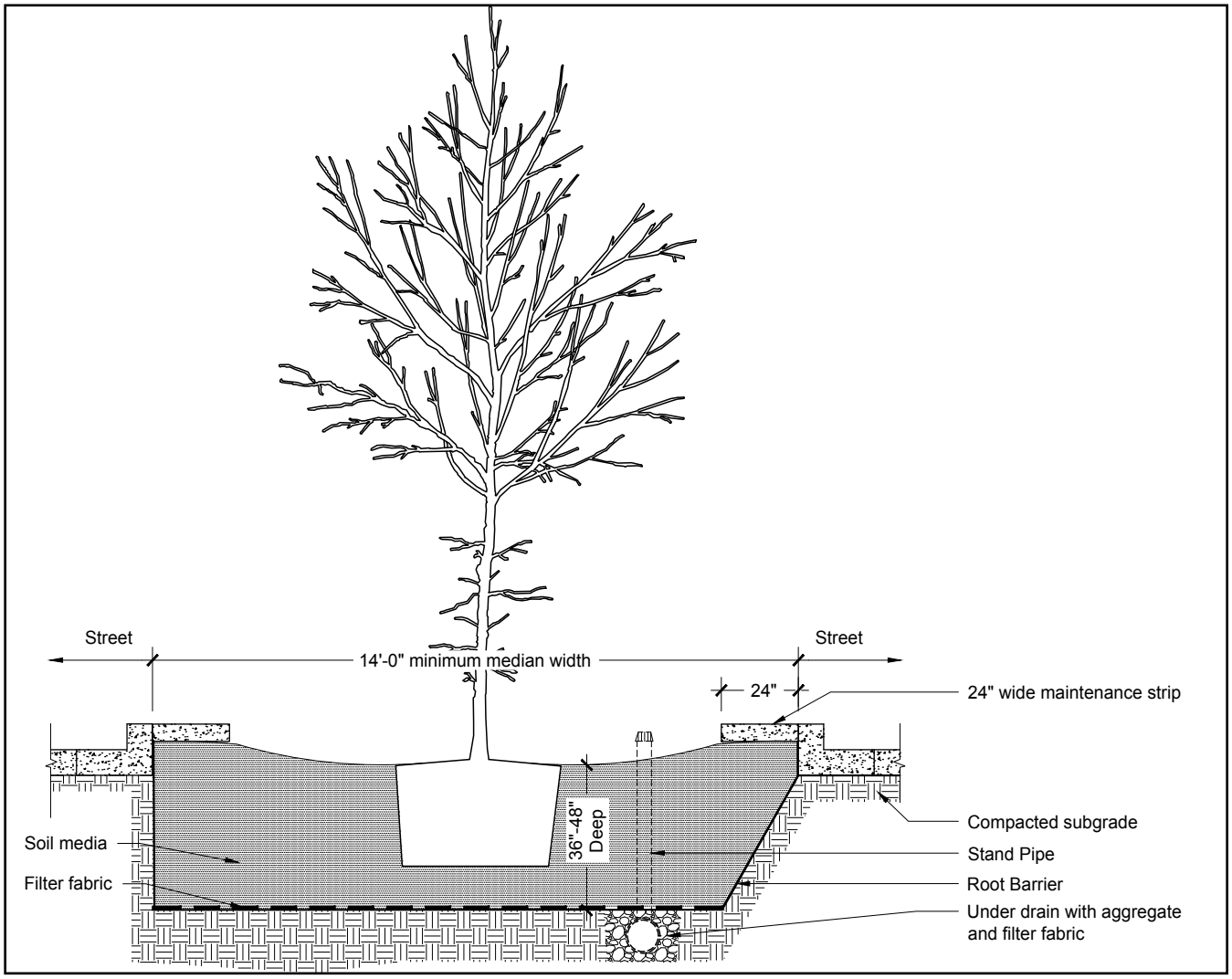
4 Street Design Toolbox

4.1 STREET TREES/STREETSCAPE

The creation of specific tree planting criteria and the recommendation of a minimum soil volume area for new tree plantings is one of the most important components of this Urban Greening Plan and the Green Street Toolbox. How to integrate multiple improvements - tree planting, storm water management / infiltration, pedestrian and alternative transportation along with typical right-of-way improvements and components into the same three dimensional run of roadway is the challenge that this community faces. This section addresses the tree planting and soil volume aspects of the green street needs.

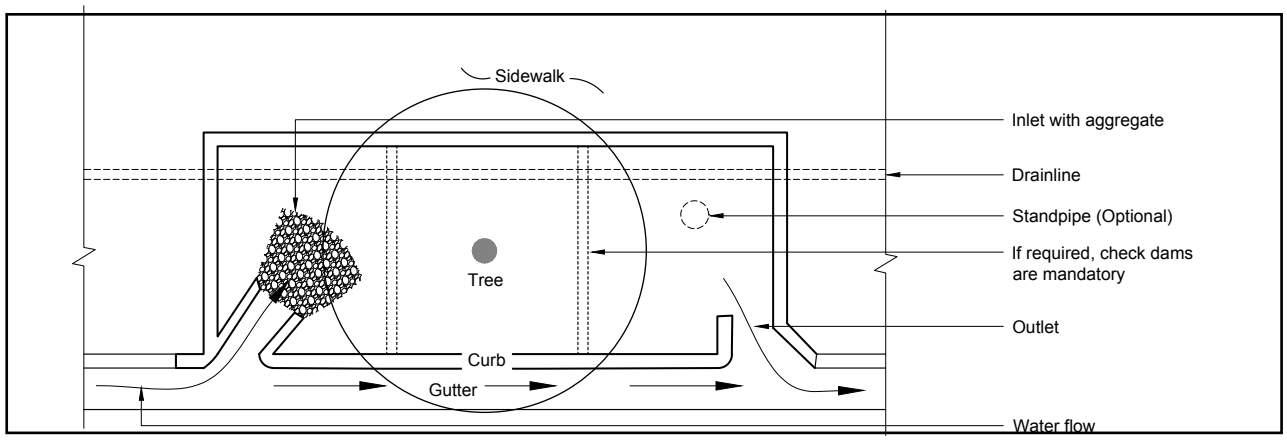
Tree Planting Details

MEDIANS

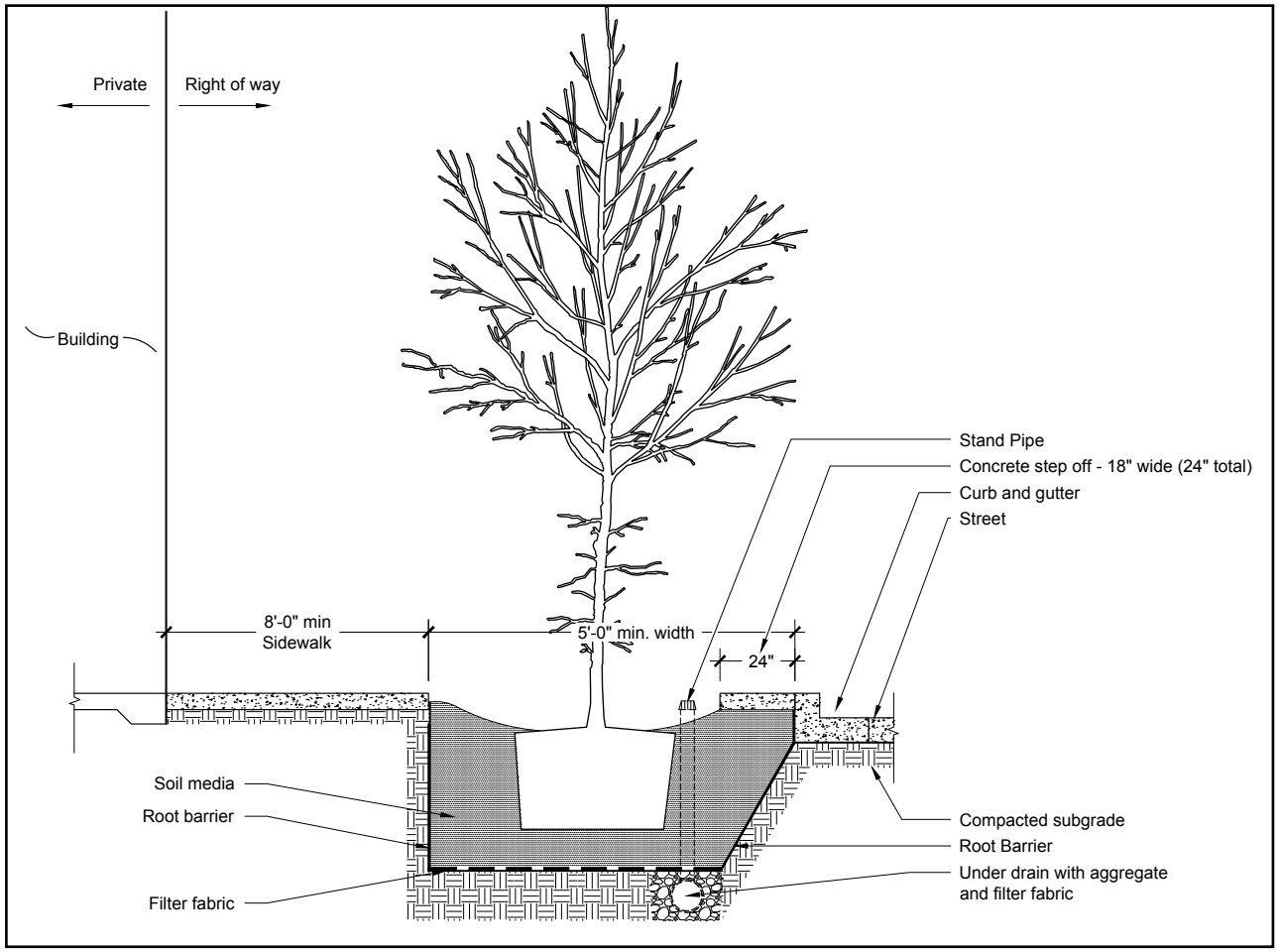


Tree Planting Detail - Median

PARKWAY(S)/ BIO-SWALE(S)

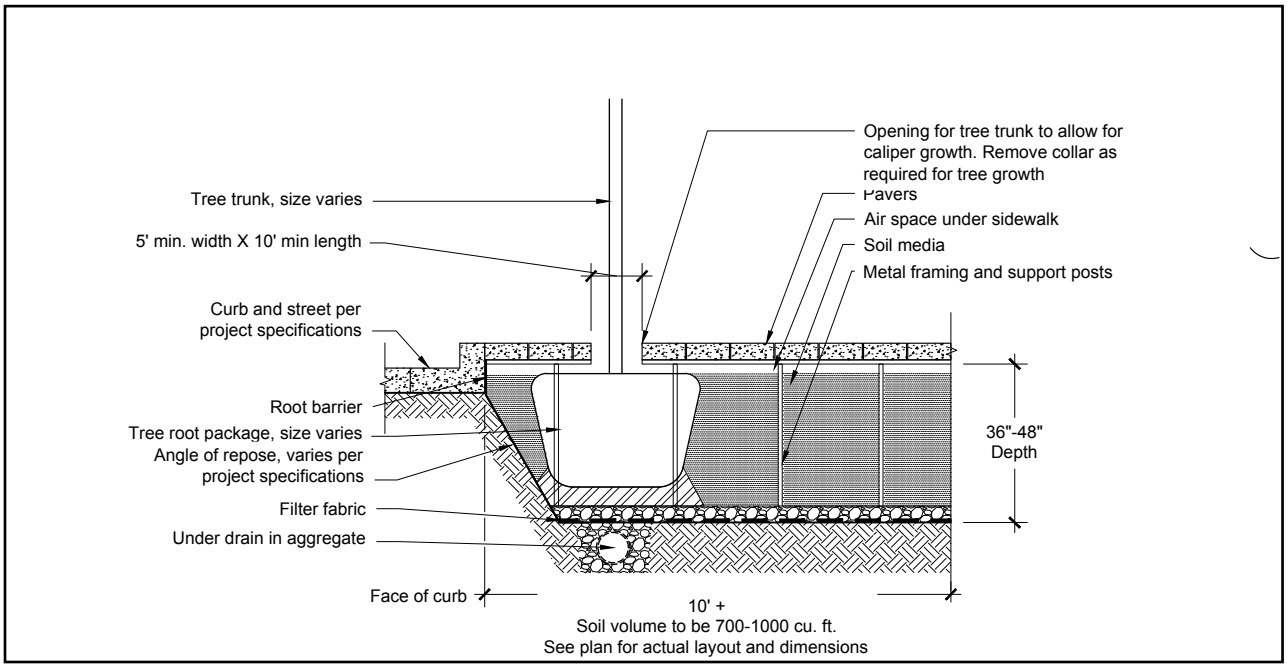


Plan View - Inlet/Outlet

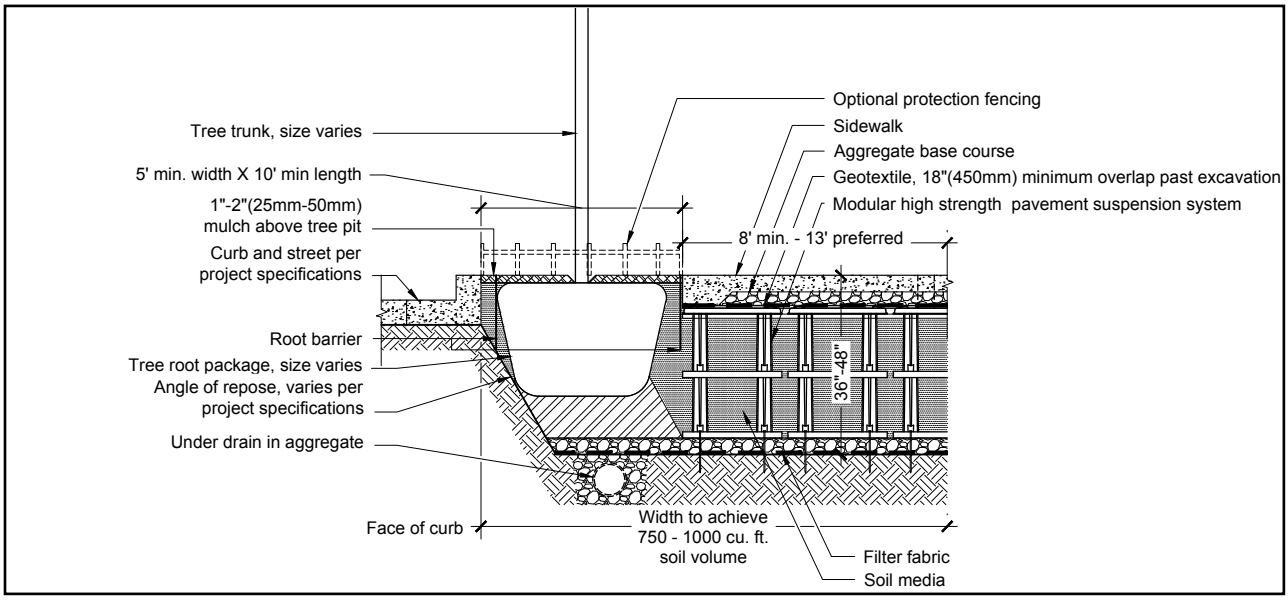


Tree Planting Detail - Parkway/Bio-Swale

SUSPENDED PAVEMENT



Tree Planting Detail - Suspended Pavers



Tree Planting Detail - Suspended Pavement

STREET TREES/LANDSCAPE/SOIL

The intent of the Midway-Pacific Highway Urban Greening Plan is to recommend right-of-way design specifics, tree species, and plant materials for the Midway-Pacific Highway community. The primary focus is on the creation of a street tree palette and themes for the five (5) primary green streets in the community and conceptual designs have been prepared for each of these roadways.

- Sports Arena Boulevard.
- Rosecrans Street
- Midway Drive
- Pacific Highway
- Barnett Avenue/Lytton Street

See exhibits - 3.3-2 through 3.3-21 are conceptual designs for each of these roadways. Additionally, a Street Tree list for the eleven (11) specific Districts and Villages as identified in the Community Plan is contained in Chapter 5.

4.2 BIO-RETENTION FACILITY OPTIONS

STORM WATER FACILITIES

The following toolbox of storm water facilities is intended to provide a menu of possible LID features that can be incorporated in the project area as appropriate. As such, these concepts are general in nature, and should be further refined based on site conditions when implemented on a specific project. Current storm water standards should also be applied. The following documents can provide additional guidance in storm water facility selection, design, operation, and maintenance:

- City of San Diego Storm Water Standards, January 2012
- San Diego Low Impact Development Design Manual, July 2011
- County of San Diego Low Impact Development Handbook, July 2014

PARKWAY BIOFILTRATION

Applications:
Bio-filtration swales can be located in the parkway adjacent to roads and streets. The swales can be located directly behind the curb, or behind the sidewalk when a sidewalk underdrain is provided. Breaks in the swale can be provided at driveways and street intersections. If infiltration is not feasible or desirable, a sub-drain and liner can be provided to prevent water from entering the soil below or migrating to the side.

Benefits:
Bio-filtration swales incorporate bio-filtration, which provides a high level of treatment for a wide variety of pollutants. Reduction in runoff volume will also be achieved through retention in the soil of the swale, along with limited infiltration through the bottom of the swale.

Design:
Runoff will enter the bio-filtration swale through curb openings. Proper energy dissipation, such as a gravel splash pad, should be provided at the entrance to the swale. A hydraulic restriction layer shall be provided below the curb to prevent damage to the adjacent pavement. Where feasible, the surface area of the bio-filtration swale should be sized based on current BMP sizing standards (currently 4% of the weighted tributary area). Where the longitudinal slope of the swale exceeds 2.5%, check dams shall be provided. Bioretention soil media (BSM) depth shall correspond to the minimum recommended for the tree species and pollutants of concern. Below the BSM, an 18" gravel layer of washed #57 stone shall be provided. Runoff from larger storm events shall exit the swale either through a storm drain inlet or via a curb outlet so that excess runoff can enter the gutter and continue towards the storm drain system.

Inverted Infiltration Parkway

Curb Extension Bio-Filtration Basin

Applications:
Bio-filtration basins can be incorporated into curb extensions, whether located mid-block or at intersections. A curb extension bio-filtration basin can easily be retrofitted into an existing street by replacing parallel parking space.

Benefits:
Bio-filtration basins incorporate bio-filtration, which provides a high level of treatment for a wide variety of pollutants. Reduction in runoff volume will also be achieved through retention in the soil of the basin, along with limited infiltration through the bottom of the basin where infiltration is allowable.

Design:
Runoff will enter the curb extension bio-filtration basin through curb openings. Proper energy dissipation, such as a gravel splash pad, should be provided at the entrance to the basin. Where soil conditions allow for infiltration, a hydraulic restriction layer can be provided only along the curb side of the basin. If infiltration is not recommended, a hydraulic restriction layer should be provided along all the sides and bottom of the basin. Where feasible, the surface area of the bio-filtration basin should be sized based on current BMP sizing standards (currently 4% of the weighted tributary area). Where the longitudinal slope of the street exceeds 2.5%, check dams shall be provided. Bioretention soils media (BSM) depth shall correspond to the minimum recommended for the tree species and pollutants of concern. Below the BSM, an 18" gravel layer of washed #57 stone shall be provided, along with a sub-drain if the basin is lined. The sub-drain must either connect to a storm drain system or daylight to the surface. Runoff from larger storm events shall exit the basin either through a storm drain inlet or via a curb outlet so that excess runoff can enter the gutter and continue towards the storm drain system.

Curb pop-out

MEDIAN BIORETENTION BASIN

Applications:
Where streets have an inverted crown (sloped towards the center of the street) or are superelevated (sloping towards one side of the street), bio-filtration can be incorporated into the median.

Benefits:
Bio-filtration basins incorporate bio-filtration, which provides a high level of treatment for a wide variety of pollutants. Reduction in runoff volume will also be achieved through retention in the soil of the basin, along with limited infiltration through the bottom of the basin where infiltration is allowable.

Design:
Runoff will enter the median bio-filtration basin through curb openings. Proper energy dissipation, such as a gravel splash pad, should be provided at the entrance to the basin. Where soil conditions allow for infiltration, a hydraulic restriction layer can be provided only along the curb sides of the basin. If infiltration is not recommended, a hydraulic restriction layer should be provided along all the sides and bottom of the basin. Where feasible, the surface area of the bio-filtration basin should be sized based on current BMP sizing standards (currently of 4% the weighted tributary area). Where the longitudinal slope of the street exceeds 2.5%, check dams shall be provided. Bioretention soils media (BSM) depth shall correspond to the minimum recommended for the tree species and pollutants of concern. Below the BSM, an 18" gravel layer of washed #57 stone shall be provided, along with a sub-drain if the basin is lined. The sub-drain must either connect to a storm drain system or daylight to the surface. Runoff from larger storm events shall exit the basin either through a storm drain inlet or via a curb outlet so that excess runoff can enter the gutter and continue towards the storm drain system.

Median Bio-filtration

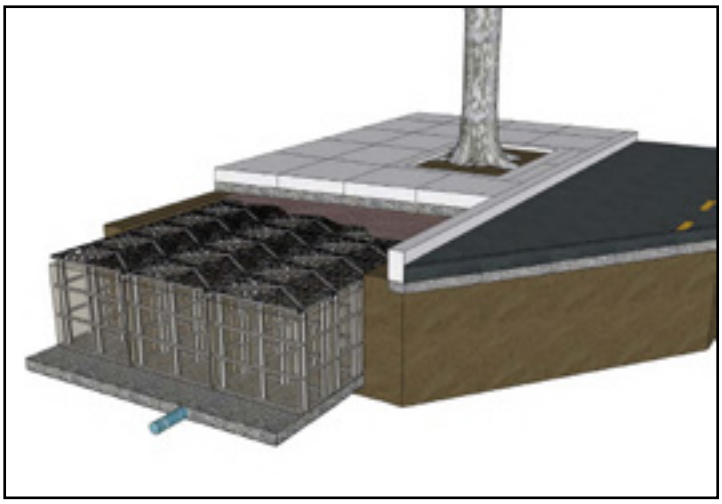
Suspended Pavement

Applications:
Where sufficient surface area is not available for bioretention swales or basins, suspended pavement provides street tree installations adequate root-zone soil volume for the proposed street trees and storm water capture/treatment.

Benefits:
The soils within the tree well and suspended pavement will provide bio-filtration to remove pollutants from the storm water runoff. Reduction in runoff volume will also be achieved through retention in the soil in the tree well and under the suspended pavement, along with limited infiltration. Suspended pavement can be combined with permeable sidewalk pavements to allow for additional interception of storm water.

Design:
Runoff will enter the tree wells through curb openings where it will be absorbed into the soil media. Proper energy dissipation, such as a gravel splash pad, should be provided at the curb opening. A hydraulic restriction layer shall be provided below the curb. The area and depth of the suspended pavement should be sufficient to provide adequate root-zone soil volume for the street tree species being planted. Suspended pavement systems shall be designed in compliance with manufacturer's recommendations. Depending on soil conditions, a sub-drain may be required. Runoff from larger storm events shall exit the tree well either through a storm drain inlet or via a curb outlet so that excess runoff can enter the gutter and continue towards the storm drain system.

Please refer to the Street Tree Planting Details, Section 4.1, for further information on suspended pavements.



Silva Cell units under suspended pavement

PERMEABLE PAVEMENTS

Applications:
Where soil conditions allow for infiltration, permeable pavements can be used to capture and infiltrate rainfall. Permeable pavements such as pervious pavers, pervious concrete, and porous asphalt are best suited to low-traffic areas, such as alleyways and parking areas. Permeable pavements provide an opportunity to implement LID storm water management in areas where no landscaping is feasible.

Benefits:
By allowing rainfall to percolate through the pavement material and into the soil below, pollutants that would otherwise be caught up in runoff are not conveyed to the storm drain system. Runoff volume is also greatly reduced, since the natural infiltration into the subsurface soils is preserved.

Design:
Permeable pavements should be located in areas that will support infiltration both in terms of the native soil's infiltration rate and separation to groundwater. If conditions are not favorable, a sub-drain and/or liner can be used, but that reduces the water quality and runoff volume benefits. Design of permeable pavements should be coordinated closely with the geotechnical engineer and, if a proprietary system is used, the manufacturer. If the permeable pavement is receiving run-on from adjacent impervious surfaces, the base layer can often be deepened to store and infiltrate the additional runoff volume. In sloped areas, the bottom of the base layer can be graded flat with buried check dams to take up the grade as shown in the illustration below, which will promote infiltration into the underlying soil.

Permeable pavers

5 Street Tree Plan- Green Streets/ Districts & Villages

5.1 INTRODUCTION

The initial identification, protection and retention of existing trees in the community is a very important component of the community's street tree program. The existing trees are valuable infrastructure and efforts should be made to preserve existing trees to maximize the benefits of an established tree which cannot be replaced by a new planting.

The addition of street trees into the community will be based on the specific locations available including; spacing, size, scale and form for roadways and green spaces. In developing the community's street tree program, considerations where taken to understand the existing tree species and then selecting a variety of trees with a goal of adding to the volume and diversity of the urban forest. The existing trees in the community have been field verified and quantified. Roadway specific tree recommendations that are outlined in the tree palette are consistent with the community goals in the Midway / Pacific Highway Community Plan and the City of San Diego Draft Urban Forest Management Action Plan.

This Plan developed multi-modal themed concepts for the major corridors within the community. Following the development of the concepts, specific tree and plant palettes were developed to support the themes and to create the desired vision as outlined in the Community Plan.

Existing Eucalyptus on Sports Arena Boulevard

La Playa Trail Tree Palette, along Rosecrans Street is based off historic trees brought by settlers; some species include Olives, Oaks, and Peppers

EXISTING TREES

A primary focus of this Plan is the preservation and integration of the existing trees to the greatest extent possible when making changes to the right-of-way. Methods should be used to protect trees from root and limb damage when upgrading the surrounding infrastructure. The City of San Diego developed an Urban Forest Protection document in 2006 identifying basic methods and procedures to modify curbs, gutters and sidewalks to protect existing trees that developed surface rooting and infrastructure damage over the years. To retain existing trees and the canopy cover of the urban forest, preservation methods should be given consideration before the removal of established trees in the community.

PROPOSED TREES

An extensive list of proposed trees for each of the specific thematic districts, major corridors, and thematic trails has been developed. Tree selections are based on what is currently existing in the community, what tree would match or complement those existing trees based on area available, size, form, scale and desired aesthetic and functional affect for the specific street and location. Of significant importance are the specifics of location, tree selection based on form, size and scale, and the ability to meet or exceed the root zone requirements for the trees being considered.

For the success of all trees and the urban forest, the requirement to provide adequate root zone area, soil volume and initial / mid / long term maintenance is mandatory to the success of all tree planting recommendations included in this Plan.

5.2 PRIMARY CORRIDORS AND TRAILS

The Midway Pacific Highway Community has five (5) primary corridors / roadways that traverse the community that carry the majority of the traffic and have the opportunity to implement the urban greening principles and improve the community (See Figure 6-1). Street types include Boulevards, Green Streets and Main Streets

Pacific Highway	Historic Highway 101
Rosecrans Street	La Playa Trail
Barnett Avenue	Bay-to-Bay Trail
Midway Drive	Main Street
Sports Arena Blvd.	Bay-to-Bay Trail

5.3 DISTRICTS AND VILLAGES / LOCAL STREETS

The Midway/Pacific Highway project area has eleven (11) identified Districts and Villages identified in the Community Plan Update (See Figure 5.3-1). The assessment of what is existing in each and determination of opportunity locations in consideration of the proposed improvements and minimum planting standards are some of the factors in the selection process of trees for the Urban Forest in the community.

Figure 5.3-1 Primary Corridors and Trails and Districts and Villages

5.4 PLANT PALETTE - PRIMARY CORRIDORS AND TRAILS

LEGEND/ABBREVIATIONS

D Deciduous
EV Evergreen
EX Existing
FA Flowering Accent
N Native
P Palm
SD Semi-Deciduous
* Not currently on City of San Diego Street Tree Selection Worksheet. Existing trees should be retained, future plantings should be consistent with the Street Tree Selection Worksheet.

PACIFIC-HIGHWAY/HISTORIC HIGHWAY 101

EXISTING TREES

BOTANICAL NAME	COMMON NAME	TYPE
*Afrocarpus gracilior	Fern Pine	EX, EV
Arecastrum romanzoffianum	Queen Palm	EX, P
*Cupaniopsis anacardioides	Carrotwood	EX, EV
*Ficus microcarpa nitida	Indian Laurel Fig	EX, EV
*Phoenix canariensis	Canary Island Date Palm	EX, EV
Schinus molle	California Pepper	EX, EV
Tristania conferta	Brisbane Box	EX, EV
Ulmus parviflora	Chinese Elm	EX, SD
*Washingtonia robusta	Mexican Fan Palm	EX, P

PROPOSED TREES

BOTANICAL NAME	COMMON NAME	TYPE
MEDIAN/HISTORIC		
Eucalyptus polyanthemos	Silver Dollar Gum	EV
Eucalyptus ficifolia	Coral Gum	EV, FA
Pinus torreyana	Torrey Pine	EV
GREEN BELT		
Cercis canadensis 'Forest Pansy'	Purple-leaved Eastern Redbud	D, N
Cercis occidentalis	Western Red Bud	D, N
*Cupressus arizonica 'Ice Blue'	Ice Blue' Arizona Cypress	EV
Jacaranda mimosifolia	Jacaranda	SD, FA
Koelreuteria bipinnata	Chinese Flame Tree	D, FA
Metrosideros excelsa	New Zealand Christmas Tree	EV, FA
Platanus racemosa	California Sycamore	D, N
*Populus fremontii	Fremont Cottonwood	D, N
Quercus ilex	Holly Oak	E

Rosecrans Street/La Playa Trail

Existing Trees

Botanical Name	Common Name	Type
Jacaranda mimosifolia	Jacaranda	EX, SD, FA
*Pyrus kawakamii	Evergreen Pear	EX, D, FA
*Washingtonia robusta	Mexican Fan Palm	EX, P

Proposed Trees

Botanical Name	Common Name	Type
Historic		
Cupressus forbesii	Tecate Cypress	EV, N
Olea europaea 'Swan Hill'	Swan Hill Fruitless Olive	EV
Platanus racemosa	California Sycamore	D, N
* Populus fremontii	Fremont Cottonwood	D, N
Quercus suber	Cork Oak	EV
Schinus molle	California Pepper	EV
* Washingtonia robusta	Mexican Fan Palm	P

Barnett Avenue/Bay to Bay Trail

Existing Trees

Botanical Name	Common Name	Type
* Arecastrum romanzoffianum	Queen Palm	EX, P
Cupaniopsis anacardioides	Carrotwood	EX, EV
Pinus canariensis	Canary Island Pine	EX, EV
Tristania conferta	Brisbane Box	EX, EV
* Washingtonia robusta	Mexican Fan Palm	P

Proposed Trees

Botanical Name	Common Name	Type
Thematic		
Brachychiton discolor	Flame Tree	SD
Pinus canariensis	Canary Island Pine	EV
Tristania conferta	Brisbane Box	EV
Accent		
Cassia leptophylla	Gold Medallion Tree	D, FA
Jacaranda mimosifolia	Jacaranda	SD, FA

Botanical Name	Common Name	Type
Bio-Swale		
Cercis canadensis 'Forest Pansy'	Purple-leaved Eastern Redbud	D, N
Cercis occidentalis	Western Red Bud	D, N
Platanus racemosa	California Sycamore	D, N
* Populus fremontii	Fremont Cottonwood	D, N
Skyline		
* Araucaria heterophylla	Star Pine	E,V
* Washingtonia robusta	Mexican Fan Palm	P

Midway Drive/Community Center

Existing Trees

Botanical Name	Common Name	Type
Jacaranda mimosifolia	Jacaranda	
Phoenix dactylifera 'Medjool'	Date Palm	
Pinus canariensis	Canary Island Pine	
Pistache chinensis	California Pistache	
Platanus racemosa	California Sycamore	
*Pyrus kawakamii	Evergreen Pear	
*Washingtonia filifera	California Fan Palm	

Proposed Trees

Botanical Name	Common Name	Type
Thematic		
Koelreuteria bipinnata	Chinese Flame Tree	D, FA
Metrosideros excelsa	New Zealand Christmas Tree	EV, FA
Pinus canariensis	Canary Island Pine	EV
Bio-Swale		
Cercis canadensis 'Forest Pansy'	Purple-leaved Eastern Redbud	D, N
Cercis occidentalis	Western Red Bud	D, N
Platanus racemosa	California Sycamore	D, N
*Populus fremontii	Fremont Cottonwood	D, N

Sports Arena Boulevard/Bay to Bay Trail

Existing Trees

Botanical Name	Common Name	Type
Cassia leptophylla	Gold Medallion Tree	
Cupaniopsis anacardioides	Carrotwood	EX, EV
*Eucalyptus deglupta	Mindanao Gum	EX, EV
Eucalyptus polyanthemos	Silver Dollar Gum	EX, EV
Jacaranda mimosifolia	Jacaranda	EX, SD, FA
Tristania conferta	Brisbane Box	EX, EV
* Washingtonia robusta	Mexican Fan Palm	EX, P

5.5 Plant Palette - Districts and Villages / Local Streets

Legend/Abbreviations

D Deciduous
EV Evergreen
EX Existing
FA Flowering Accent
N Native
P Palm
SD Semi-Deciduous

* Not currently on the City of San Diego's Street Tree Selection Worksheet. Existing trees should be retained, future plantings should be consistent with the Street Tree Selection Worksheet

Channel District

Existing Trees

Botanical Name	Common Name	Type
Cupaniopsis anacardioides	Carrotwood	EX, EV
Eucalyptus polyanthemos	Silver Dollar Gum	EX, EV
Melaleuca quinquenervia	Cajeput Tree	EX, EV
Tristania conferta	Brisbane Box	EX, EV

Proposed Trees

Botanical Name	Common Name	Type
Evergreen		
Arbutus 'Marina'	Madrone	EV, FA
Metrosideros excelsa	New Zealand Christmas Tree	EV, FA
Olea europaea 'Swan Hill' Fruitless	Swan Hill Olive	EV
Pinus canariensis	Canary Island Pine	EV
Quercus ilex	Holly Oak	EV
Flowering Accent		
Jacaranda mimosifolia	Jacaranda	FA, SD
Koelreuteria bipinnata	Chinese Flame Tree	FA, D

Sports Areana Villagge

Existing Trees

Botanical Name	Common Name	Type
Cupaniopsis anacardioides	Carrotwood	EX, EV
* Eucalyptus deglupta	Mindanao Gum	EX, EV
*Washingtonia robusta	Mexican Fan Palm	EX, P

Proposed Trees

Botanical Name	Common Name	Type
Evergreen		
Eucalyptus polyanthemos	Silver Dollar Gum	EV
Metrosideros excelsa	New Zealand Christmas Tree	EV, FA
Olea europaea 'Swan Hill' Fruitless	Swan Hill Olive	EV
Pinus canariensis	Canary Island Pine	EV
Quercus ilex	Holly Oak	EV
Schinus molle	California Pepper	EV
Flowering Accent		
Brachychiton discolor	Flame Tree	FA, SD
* Jacaranda acutifolia	Jacaranda	FA, SD
Koelreuteria bipinnata	Chinese Flame Tree	FA, D
Pyrus calleryana 'Bradford'	Bradford Pear	FA, D
Native		
Platanus racemosa	California Sycamore	N, D
Lyonothamnus floribundus ssp. Asplenifolius	Catalina Ironwood	N, EV
Pinus torreyana	Torrey Pine	N, EV
Quercus agrifolia	Coast Live Oak	N, EV

Camino Del Rio District

Existing Trees

Botanical Name	Common Name	Type
* Arecastrum romanzoffianum	Queen Palm	EX, P
Pinus canariensis	Canary Island Pine	EX, EV
Trachycarpus fortunei	Windmill Fan Palm	EX, P
* Washingtonia robusta	Mexican Fan Palm	EX, P

Proposed Trees

Botanical Name	Common Name	Type
Evergreen		
Acacia stenophylla	Shoestring Acacia	EV
* Arbutus 'Marina'	Madrone	EV, FA
Callistemon viminalis	Weeping Bottlebrush	EV, FA
* Cupressus arizonica 'Ice Blue'	Ice Blue Arizona Cypress	EV
Eucalyptus nicholii	Willow Leafed Peppermint	EV
Geijera parviflora	Australian Willow	EV
Metrosideros excelsa	New Zealand Christmas Tree	EV, FA
Olea europaea 'Swan Hill' Fruitless	Swan Hill Olive	EV
Flowering Accent		
* Jacaranda mimosifolia	Jacaranda	FA, SD
Pyrus calleryana 'Bradford'	Bradford Pear	FA, D

Hancock Transit Corridor

Existing & Proposed Trees

Botanical Name	Common Name	Type
* Arecastrum romanzoffianum	Queen Palm	EX, P
Cupaniopsis anacardioides	Carrotwood	EX, EV
Eucalyptus citriodora	Lemon Scented Gum	EX, P
* Eucalyptus cladocalyx	Sugar Gum	EX, EV
* Ficus microcarpa nitida	Indian Laurel Fig	EX, EV
Ficus rubiginosa	Rusty Leaf Fig	EX, EV
Geijera parviflora	Australian Willow	EX, EV
Jacaranda mimosifolia	Jacaranda	EX, SD, FA
Liquidambar styraciflua 'Rotundiloba'	Sweetgum	EX, D
Melaleuca quinquenervia	Cajeput Tree	EX, EV
Pinus canariensis	Canary Island Pine	EX, EV
Platanus racemosa	California Sycamore	EX, D, N
* Pyrus kawakamii	Evergreen Pear	EX, D, FA

Botanical Name	Common Name	Type
Schinus molle	California Pepper	EX, EV
* Washingtonia robusta	Mexican Fan Palm	EX, P

Kemper Village

Existing & Proposed Trees

Botanical Name	Common Name	Type
* Afrocarpus gracilior	Fern Pine	EX, EV
Arecastrum romanzoffianum	Queen Palm	EX, P
Brahea edulis	Guadalupe Palm	EX, P
Butia capitata	Pindo Palm	EX, P
Callistemon viminalis	Weeping Bottlebrush	EX, EV
* Chamaerops humilis	Mediterranean Fan Palm	EX, P
Chorisia speciosa	Floss Silk Tree	EX, EV
Cupaniopsis anacardioides	Carrotwood	EX, EV
* Eucalyptus citriodora	Lemon Scented Gum	EX, EV
Ficus microcarpa nitida	Indian Laurel Fig	EX, EV
Ficus rubiginosa	Rusty Leaf Fig	EX, EV
Geijera parviflora	Australian Willow	EX, EV
Hymenosporum flavum	Sweet Shade	EX, D, FA
Jacaranda mimosifolia	Jacaranda	EX, SD, FA
Liquidambar styraciflua 'Rotundiloba'	Sweetgum	EX, D
Melaleuca quinquenervia	Cajeput Tree	EX, EV
Pinus canariensis	Canary Island Pine	EX, EV
Platanus racemosa	California Sycamore	EX, D, N
* Pyrus kawakamii	Evergreen Pear	EX, D, FA
Schinus molle	California Pepper	EX, EV
Schinus terebinthifolius	Brazilian Pepper	EX, EV
Tristania conferta	Brisbane Box	EX, EV
* Washingtonia filifera	California Fan Palm	EX, P
* Washingtonia robusta	Mexican Fan Palm	EX, P

Cauby Village

Existing & Proposed Trees

Botanical Name	Common Name	Type
* Afrocarpus gracilior	Fern Pine	EX, EV
Arecastrum romanzoffianum	Queen Palm	EX, P
* Cupaniopsis anacardioides	Carrotwood	EX, EV
Ficus microcarpa nitida	Indian Laurel Fig	EX, EV
Ficus rubiginosa	Rusty Leaf Fig	EX, EV
Melaleuca quinquenervia	Cajeput Tree	EX, EV
Pinus canariensis	Canary Island Pine	EX, EV
Platanus racemosa	California Sycamore	EX, D, N
* Pyrus Kawakamii	Evergreen Pear	EX, D, FA
Tristania conferta	Brisbane Box	EX, EV
* Washingtonia robusta	Mexican Fan Palm	EX, P

Lytton District

Existing & Proposed Trees

Botanical Name	Common Name	Type
* Arecastrum romanzoffianum	Queen Palm	EX, P
* Cedrus deodara	Deodar Cedar	EX, EV
Cinnamomum camphora	Camphor Tree	EX, EV
Geijera parviflora	Australian Willow	EX, EV
Koelreuteria bipinnata	Chinese Flame Tree	EX, D, FA
* Pyrus calleryana ‘Bradford’	Bradford Pear	EX, D, FA
Tristania conferta	Brisbane Box	EX, EV
* Washingtonia robusta	Mexican Fan Palm	EX, P

Dutch Flats Village

Existing & Proposed Trees

Botanical Name	Common Name	Type
* Arecastrum romanzoffianum	Queen Palm	EX, P
Cupaniopsis anacardioides	Carrotwood	EX, EV
Liquidambar styraciflua 'Rotundiloba'	Sweet Gum	EX, D
*Phoenix canariensis	Canary Island Date Palm	EX, P
Phoenix dactylifera 'Medjool'	Date Palm	EX, P
Pinus canariensis	Canary Island Pine	EX, EV
Pistacia chinensis	Chinese Pistache	EX, D
*Pyrus kawakamii	Evergreen Pear	EX, D
* Washingtonia robusta	Mexican Fan Palm	EX, P

Kurtz District

Existing & Proposed Trees

Botanical Name	Common Name	Type
* Arecastrum romanzoffianum	Queen Palm	EX, P
Jacaranda mimosifolia	Jacaranda	EX, SD, FA
Pinus canariensis	Canary Island Pine	EX, EV
Platanus racemosa	California Sycamore	EX, D, N
Schinus molle	California Pepper	EX, EV
Tristania conferta	Brisbane Box	EX, EV
* Washingtonia filifera	California Fan Palm	EX, P
*Washingtonia robusta	Mexican Fan Palm	EX, P

Rosecrans District

Existing Trees

Botanical Name	Common Name	Type
* Arecastrum romanzoffianum	Queen Palm	EX, P
Cupaniopsis anacardioides	Carrotwood	EX, EV
* Ficus microcarpa nitida	Indian Laurel Fig	EX, EV
Pinus canariensis	Canary Island Pine	EX, EV
Platanus racemosa	California Sycamore	EX, D, N
* Pyrus kawakamii	Evergreen Pear	EX, D, FA
Tristania conferta	Brisbane Box	EX, EV

Proposed Trees

Botanical Name	Common Name	Type
Evergreen		
Eucalyptus ficifolia	Coral Gum	EV, FA
Eucalyptus polyanthemos	Silver Dollar Gum	EV, FA
Metrosideros excelsa	New Zealand Christmas Tree	EV, FA
Olea europaea 'Swan Hill' Fruitless	Swan Hill Olive	EV, FA
Quercus ilex	Holly Oak	EV, FA
Quercus suber	Cork Oak	EV, FA
Schinus molle	California Pepper	EV, FA
Flowering Accent		
Cercis canadensis 'Forest Pansy'	Purple-leaved Eastern Redbud	D, N
Cassia leptophylla	Gold Medallion Tree	FA, D
Chionanthus retusus	Chinese Fringe Tree	FA, D
Pistacia chinensis	Chinese Pistache	FA, D
Native		
Cercis occidentalis	Western Red Bud	N, D
Lyonothamnus floribundus ssp. Asplenifolius	Catalina Ironwood	N, EV
Pinus torreyana	Torrey Pine	N, EV
Prunus lyonii	Catalina Cherry	N, EV
Quercus agrifolia	Coast Live Oak	N, EV

Kettner District

Existing Trees

Botanical Name	Common Name	Type
* Afrocarpus gracilior	Fern Pine	EX, EV
* Arecastrum romanzoffianum	Queen Palm	EX, P
* Ficus benjamina	Weeping Chinese Banyan	EX, EV
* Ficus microcarpa nitida	Indian Laurel Fig	EX, EV
Phoenix canariensis	Canary Island Date Palm	EX, P
* Washingtonia robusta	Mexican Fan Palm	EX, P
* Washingtonia robusta	Mexican Fan Palm	EX, P

Proposed Trees

Botanical Name	Common Name	Type
Evergreen		
Arbutus 'Marina'	Madrone	EV, FA
Metrosideros excelsa	New Zealand Christmas Tree	EV, FA
Olea europaea 'Swan Hill' Fruitless	Swan Hill Olive	EV
Pinus canariensis	Canary Island Pine	EV
Quercus ilex	Holly Oak	EV
Flowering Accent		
Jacaranda mimosifolia	Jacaranda	FA, SD
Koelreuteria bipinnata	Chinese Flame Tree	FA, D

5.6 RECOMMENDED STREET TREE SPECIES

The following tree information packet is a list of trees that are existing on site, recommended by the 2015 CFAB committee, have historical significance to the Midway/Pacific Highway project site, and have been thoughtfully identified in recognition that the larger species will be in appropriately sized planting areas and ideal growing conditions.

* Not currently on the City of San Diego's Street Tree Selection Worksheet. Existing trees should be retained, future plantings should be consistent with the Street Tree Selection Worksheet

Existing Trees in Project Area

	Botanical Name	**Common Name**	Height	Canopy Spread	Parkway Size	Type	Water needs Coastal	Water Needs Inland	Native to CA	Suitable under Utility Lines	Bio-swale
*	Arecastrum romanzoffianum	Queen Palm	25'-30'	10'-15'	2 to 4	P	Moderate	Moderate	No	No	No
*	Cedrus deodara	Deodar Cedar	80'	40'	10+	E	Moderate	Moderate	No	No	No
*	Chorisia speciosa	Floss Silk Tree	30'-60'	20'-40'	4 to 6	D/F	Low	Low	No	No	No
*	Eucalyptus cladocalyx	Sugar Gum	25'-45'	25'-45'	10+	E	Low	Low	No	No	No
*	Eucalyptus deglupta	Rainbow Gum	65'	20'-40'	10+	E	Moderate	Moderate	No	No	No
*	Ficus benjamina	Weeping Chinese Banya	50'	30'	10+	E	Moderate	Moderate	No	No	No
*	Ficus microcarpa nitida	Indian Laurel Fig	40'-60'	40'-60'	10+	E	Moderate	Moderate	No	No	No
*	Phoenix canariensis	Canary Island Date Palm	40'-60'	20'-25'	6 to 10	P	Moderate	Moderate	No	No	No
*	Pyrus kawakamii	Evergreen Pear	15'-30'	10'-15'	4 to 6	E/F	Moderate	Moderate	No	No	No
*	Schinus terebinthifolius	Brazilian Pepper	30'-40'	40'	10+	E	Low	Low	No	No	No
*	Washingtonia filifera	California Fan Palm	60'	15'	4 to 6	P	Moderate	Moderate	No	No	No
*	Washingtonia robusta	Mexican Fan Palm	100'	15'-20'	4 to 6	P	Moderate	Moderate	No	No	No

Proposed Trees in Project Area

	Botanical Name	Common Name	Height	Canopy Spread	Parkway/ Median Size	Type	Water needs Coastal	Water Needs Inland	Native to CA	Suitable under Utility Lines	Bio-swale
	Acacia stenophylla	Shoestring Acacia	20'-30'	10'-30'	2 to 4	E	Low	Low	No	Yes	No
	Afrocarpus gracilior	Fern Pine	50'-65'	50'-60'	6 to 10	E	Moderate	Moderate	No	No	No
*	Araucaria heterophylla	Norfolk Island Pine	100'	60'	10+	E	Moderate	Moderate	No	No	No
	Arbutus 'Marina'	Marina Strawberry Tree	40'-50'	40'	4 to 6	E/F	Low	Moderate	No	No	No
	Brachychiton discolor	Pink Flame Tree	40'-65	30'	6 to 10	SD/F	Low	Moderate	No	No	No
	Brahea edulis	Guadalupe Palm	35'	15'	2 to 4	P	Low	Low	No	No	No
	Butia capitata	Pindo Palm	15'-25'	10'-15'	4 to 6	P	Low	Low	No	Yes	No
	Callistemon viminalis	Weeping Bottlebrush	25'	15'	4 to 6	E/F	Low	Moderate	No	Yes	No
	Cassia leptophylla	Gold Medallion Tree	25'	20'-25'	4 to 6	D/F	Moderate	Moderate	No	Yes	No
	Cercis canadensis 'Forest Pansy'	Purple-leaved Easter Redbud	25'	20'-25'	2 to 4	D/F	Moderate	Moderate	No	Yes	Yes
	Cercis occidentalis	Western Redbud	25'	15'-25'	2 to 4	D/F	Low	Low	Yes	Yes	Yes
	Chamaerops humilis	Mediterranean Fan Palm	20'	10'-20'	2 to 4	P	Low	Low	No	Yes	No
	Chionanthus retusus	Chinese Fringe Tree	20'	10'-15'	2 to 4	D/F	Moderate	Moderate	No	Yes	Yes
	Cinnamomum camphora	Camphor Tree	65'	65'-70'	10+	E	Moderate	Moderate	No	No	No
	Cupaniopsis anacardioides	Carrotwood	40'	30'	6 to 10	E	Low	Low	No	No	No
*	Cupressus arizonica 'Ice Blue'	Ice Blue Arizona Cypress	40'	20'	6 to 10	E	Very Low	Low	No	No	No
	Cupressus forbesii	Tecate Cypress	25'	20'	6 to 10	E	Very Low	Very Low	Yes	No	No
	Eucalyptus citriodora	Lemon Scented Gum	80'-160'	50'-100'	10+	E	Low	Moderate	No	No	No
	Eucalyptus ficifolia	Red Flowering Gum	35'	15'-60'	6 to 10	E/F	Low	Moderate	No	No	No
*	Eucalyptus nicholii	Willow Leafed Peppermint	25'-40'	20'-30'	6 to 10	E	Low	Low	No	No	No
	Eucayptus polyanthemos	Silver Dollar Gum	65'	15'-45'	6 to 10	E	Low	Low	No	No	No
	Ficus rubiginosa	Rusty Leaf Fig	50'	30'-50'	10+	E	Moderate	Moderate	No	No	No
	Geijera parviflora	Australian Willow	30'	20'	4 to 6	E/F	Low	Moderate	No	Yes	No
	Hymenosporum flavum	Sweetshade	20'-35'	15'-20'	2 to 4	E/F	Moderate	Moderate	No	No	No
	Jacaranda mimosifolia	Jacaranda	50'	35'-60'	4 to 6	D/F	Moderate	Moderate	No	No	No
	Koelreuteria bipinnata	Chinese Flame Tree	35'	35'	6 to 10	D/F	Moderate	Moderate	No	No	No
	Liquidambar styraciflua 'Rotundiloba'	Sweet Gum	65'	20'-25'	10+	D	Moderate	Moderate	No	No	No
	Lyonothamnus floribundus var. 'Asplenifolius'	Catalina Ironwood	50'-60'	40'	2 to 4	E/F	Low	Low	Yes	No	No
	Melaleuca quinquenervia	Cajeput Tree	35'	20'	4 to 6	E/F	Low	Moderate	No	No	No
	Metrosideros excelsa	New Zealand Christmas Tree	35'	35'	4 to 6	E/F	Moderate	Moderate	No	No	No
	Olea europaea 'Swan Hill Fruitless'	Swan Hill Olive	35'	60'	6 to 10	E	Low	Low	No	No	No
	Phoenix dactylifera 'Medjool'	Date Palm	65'	20'-25'	4 to 6	P	Low	Low	No	No	No
	Pinus canariensis	Canary Island Pine	50'-80'	20'-35'	6 to 10	E	Low	Moderate	No	No	No
	Pinus torreyana	Torrey Pine	60'	30'-50'	10+	E	Low	Moderate	Yes	No	Yes
	Pistacia chinensis	Chinese Pistache	65'	40'	4 to 6	D	Moderate	Moderate	No	No	No
	Platanus racemosa	California Sycamore	30'-80'	20'-50'	6 to 10	D	Moderate	Moderate	Yes	No	Yes
*	Populus fremontii	Fremont Cottonwood	40'-60'	30'	10+	D	Moderate	Moderate	Yes	No	Yes
	Prunus lyonii	Catalina Cherry	25'	15'-25'	4 to 6	E	Very Low	Very Low	Yes	No	No
*	Pyrus calleryana 'Bradford'	Bradford Pear	20'-25'	10'-15'	6 to 10	E/F	Moderate	Moderate	No	No	No
	Quercus agrifolia	Coast Live Oak	65'	65'+	10+	E	Very Low	Low	Yes	No	No
	Quercus ilex	Holly Oak	65'	65'	4 to 6	E	Low	Low	No	Yes	No
	Quercus suber	Cork Oak	70'	70'	6 to 10	E	Low	Low	No	No	No
	Schinus molle	California Pepper	25'-50'	25'-40'	10+	E	Very Low	Low	No	No	No
	Trachycarpus fortunei	Windmill Fan Palm	35'	6'-10'	2 to 4	P	Moderate	Low	No	No	No
	Tristania conferta	Brisbane Box	50'	40'	4 to 6	E	Moderate	Moderate	No	No	No
	Ulmus parvifolia	Chinese Elm	65'	70'	6 to 10	E	Moderate	Low	No	No	No

Acacia stenophylla (Shoestring Acacia)

Botanical Name
Acacia stenophylla

Common Name
Shoestring Acacia

Considerations:
Popular desert landscape tree. Columnar (upright growth) structure and evergreen foliage. Canopy has a transparent, lacy quality that produces filtered shade. Requires limited pruning and to date have no reported serious insect or disease pests.

Locations in Street Tree Palette:
Camino Del Rio District

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
20'-30'	10'-30'	2 to 4	E	L	L	No	Yes	No

Afrocarpus gracilior (Fern Pine)

Botanical Name
Afrocarpus gracilior

Common Name
Fern Pine

Considerations:
Glossy greenish blue leaves create a dense canopy on this evergreen tree. It's extremely hardy and is resistant to disease and pests.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Greenbelt Tree
Kemper Village: Street Tree
Cauby Village: Street Tree
Kettner District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
50'-65'	50'-60'	6 to 10	E	M	M	No	No	No

*Araucaria heterophylla (Norfolk Island Pine)

Botanical Name
Araucaria heterophylla

Common Name
Norfolk Island Pine

Considerations:
Distinctive silhouette with a pyramidal outline and whorled, horizontal branching. Prefers full sun, and tolerates all types of soil, as well as limited space/ container planting. Is long lived in proper growing conditions. Has a high drought tolerance.

Locations in Street Tree Palette:
Sports Arena Blvd/Bay to Bay Trail: Skyline Tree
Barnett Avenue/Bay to Bay Trail: Skyline Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
100′	60′	10+	E	M	M	No	No	No

Arbutus ‘Marina’ (Marina Strawberry Tree)

Botanical Name
Arbutus ‘Marina’

Common Name
Marina Strawberry Tree

Considerations:
Medium-sized evergreen tree with attractive shiny red pealing bark. It produces pink clusters of flowers that produce showy red fruit in fall and spring. Prefers full sun, is drought tolerant, and has shown dependable performance in any number of climates and conditions.

Locations in Street Tree Palette:
Camino Del Rio District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
40′-50′	40′	4 to 6	E/F	L	M	No	No	No

Brachychiton discolor (Pink Flame Tree)

Botanical Name
Brachychiton discolor

Common Name
Pink Flame Tree

Considerations:
Spectacular show of deep pink bell shaped flowers on bare branches for weeks. Has a stout and tapering trunk, with a compact root system making it an excellent street tree. It's drought tolerant, disease and pest free, good in containers, and not particular about soil type.

Locations in Street Tree Palette:
Sports Arena Village: Street Tree
Barnett Avenue/Bay to Bay Trail: Thematic Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
40'-65'	30'	6 to 10	SD/F	L	M	No	No	No

Callistemon viminalis (Weeping Bottlebrush)

Botanical Name
Callistemon viminalis

Common Name
Weeping Bottlebrush

Considerations:
Multi-trunk, pendulous growth habit, with a prolific display of red bottlebrush flowers in spring through fall. Plant in full sun to part shade in most soils. Requires occasional to infrequent irrigation, and is drought tolerant once established.

Locations in Street Tree Palette:
Camino Del Rio District: Street Tree
Kemper Village: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
25'	15'	4 to 6	E/F	L	M	No	Yes	No

Cassia leptophylla (Gold Medallion Tree)

Botanical Name
Cassia leptophylla

Common Name
Gold Medallion Tree

Considerations:
Fast growing tree with a graceful crown. Large clusters of yellow flowers in July and August, followed by large pods. Prefers full sun, endures a wide variety of soil types, and loves heat.

Locations in Street Tree Palette:
Sports Arena Boulevard/Bay to Bay Trail: Existing Tree
Barnett Avenue/Bay to Bay Trail: Thematic Tree
Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
25′	20′-25′	4 to 6	D/F	M	M	No	Yes	No

*Cedrus deodara (Deodar Cedar)

Botanical Name
Cedrus deodara

Common Name
Deodar Cedar

Considerations:
Large attractive evergreen with gray/green foliage on arching branches. Heat and drought tolerant when established.

Locations in Street Tree Palette:
Lytton District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
80′	40′	10+	E	M	M	No	No	No

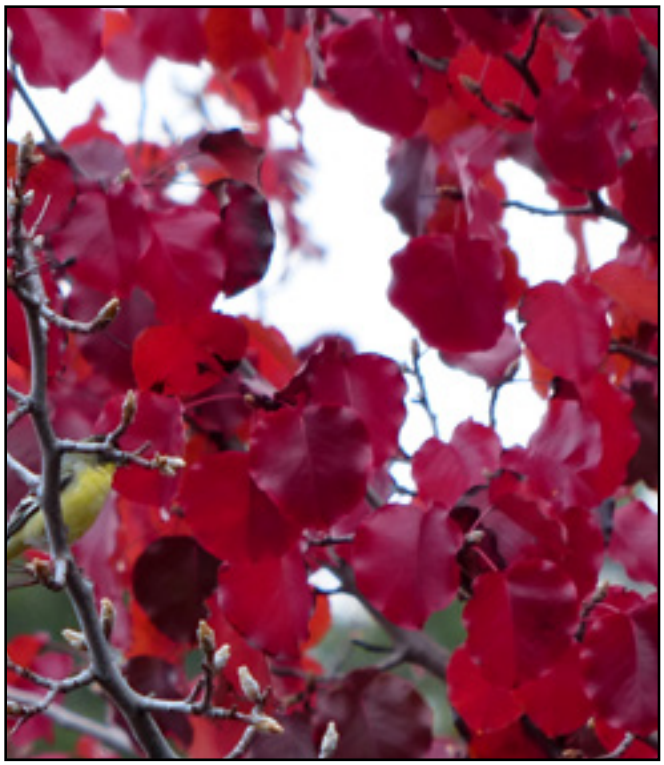
Cercis canadensis 'Forest Pansy' (Purple-leaved Eastern Redbud)

Botanical Name
Cercis canadensis 'Forest Pansy'

Common Name
Purple-leaved Eastern Redbud

Considerations:
Valued for its deep purple foliage. It also displays pink flowers on bare branches in early spring, and showy yellow fall color. It adapts well to a variety of soils including sandy, clay, alkaline or acidic.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Green Belt Tree
Barnett Avenue/Bay to Bay Trail: Bioswale Tree
Midway Drive/Community Center: Bioswale Tree
Rosecrans District: Street Tree



Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
25'	20'-25'	2 to 4	D/F	M	M	No	Yes	Yes

Cercis occidentalis (Western Redbud)

Botanical Name
Cercis occidentalis

Common Name
Western Redbud

Considerations:
Fast growing accent tree with attractive foliage that turns yellow in the fall and displays showy pink flowers on bare branches in late winter. Tolerates clay soils and is drought tolerant.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Green Belt Tree
Barnett Avenue/Bay to Bay Trail: Bioswale Tree
Midway Drive/Community Center: Bioswale Tree
Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
25'	15'-20'	2 to 4	D/F	L	L	Yes	Yes	Yes

Chionanthus retusus (Chinese Fringe Tree)

Botanical Name
Chionanthus retusus

Common Name
Chinese Fringe Tree

Considerations:
Deciduous accent tree with dark green foliage turning into golden yellow in the Fall. It has abundant fragrant white fringelike flowers in spring. It does best in fertile well drained soils with ample water, in full sun or part shade.

Locations in Street Tree Palette:
Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
20'	10'-15'	2 to 4	D/F	M	M	No	Yes	Yes

*Chorisia speciosa (Floss Silk Tree)

Botanical Name
Chorisia speciosa

Common Name
Floss Silk Tree

Considerations:
Deciduous statement tree that boasts large showy pale-pink colored flowers from summer into fall. Has a unique green tapered trunk with large studded thorns. Does best in full sun with well-draining soil and irrigated occasionally to very little.

Locations in Street Tree Palette:
Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
30'-60'	20'-40'	4 to 6	D/F	L	L	No	No	No

Cinnamomum camphora (Camphor Tree)

Botanical Name
Cinnamomum camphora

Common Name
Camphor Tree

Considerations:
Robust evergreen with shiny, glossy foliage. It has white blooms in late winter/early spring, and likes full sun to part shade. It has been known to cause skin irritation or allergic reactions when handling, and seeds are poisonous if ingested.

Locations in Street Tree Palette:
Lytton District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
65′	65′-70′	10+	E	M	M	No	No	No

Cupaniopsis anacardioides (Carrotwood)

Botanical Name
Cupaniopsis anacardioides

Common Name
Carrotwood

Considerations:
Tough tree that does well with coastal exposure, heat, wind, and parking lot/street conditions. In spring, it bears yellow flowers followed by showy orange seed pods in summer.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Existing Tree
Sports Arena Boulevard/Bay to Bay Trail: Existing Tree
Barnett Avenue/Bay to Bay Trail: Existing Tree
Channel District: Street Tree, Sports Arena Village: Street Tree, Rosecrans District: Street Tree, Kemper Village: Street Tree, Cauby Village: Street Tree, Dutch Flats Village: Street Tree, Hancock Transit Corridor: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
40′	30′	6 to 10	E	L	L	No	No	No

*Cupressus arizonica 'Ice Blue' ('Ice Blue' Arizona Cypress)

Botanical Name
Cupressus arizonica

Common Name
Arizona Cypress

Considerations:
A dense, tall, stately tree with foliage to the ground. A fast growing evergreen used as a wind-break, noise buffer or accent tree. It's quite adaptable and tolerates drought well, once established.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Green Belt Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
40'	20'	6 to 10	E	VL	L	No	No	No

Cupressus forbesii (Tecate Cypress)

Botanical Name
Cupressus forbesii

Common Name
Tecate Cypress

Considerations:
Native California evergreen which tolerates clay soils, and needs no water after established.

Locations in Street Tree Palette:
Rosecrans Boulevard/La Playa Trail: Historic Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
25'	20'	6 to 10	E	VL	VL	Yes	No	No

Eucalyptus citriodora (Lemon Scented Gum)

Botanical Name
Eucalyptus citriodora

Common Name
Lemon Scented Gum

Considerations:
Stands out with its unique smooth, pale bark. Extremely drought tolerant and suitable for xeriscaping. Has a high canopy of narrow leaves that smell strongly of lemons.

Locations in Street Tree Palette:
Kemper Village: Street Tree
Hancock Transit Corridor: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
80'-160'	50'-100'	10+	E	L	M	No	No	No

*Eucalyptus cladocalyx (Sugar Gum)

Botanical Name
Eucalyptus cladocalyx

Common Name
Sugar Gum

Considerations:
A medium sized tree, notable for its colorful yellow to orange bark. It's quite suitable as a specimen in a boulevard or parking strip.

Locations in Street Tree Palette:
Hancock Transit Corridor: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
25'-45'	25'-45'	10+	E	L	L	No	No	No

*Eucalyptus deglupta (Rainbow Gum)

Botanical Name
Eucalyptus deglupta

Common Name
Rainbow Gum

Considerations:
Best noted for its smooth orange-tinted trunk bark which peels in summer to reveal a multi-colored array.

Locations in Street Tree Palette:
Sports Arena Boulevard/Bay to Bay Trail: Parkway Tree/Existing Tree
Sports Arena Village: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
65'	20'-40'	10+	E	M	M	No	No	No

Eucalyptus ficifolia (Red Flowering Gum) aka Corymbia ficifolia

Botanical Name
Eucalyptus ficifolia aka Corymbia ficifolia

Common Name
Red Flowering Gum

Considerations:
Medium sized accent tree perfect for street or courtyard tree. Popular for its red, orange, pink, or white flower clusters that bloom sporadically throughout the year. It is seaside and drought tolerant.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Median Tree
Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
35'	15'-60'	6 to 10	E/F	L	M	No	No	No

*Eucalyptus nicholii (Willow leafed Peppermint)

Botanical Name
Eucalyptus nicholii

Common Name
Willow leafed Peppermint

Considerations:
Elegant tree with fine, feathery foliage and a weeping habit, has the added bonus of a peppermint scent. The bark is yellow, which sheds to reveal an underlying layer of dramatic reddish brown. It's a good choice as a garden specimen and grows well in a container, and responds well to pruning. It is heat and drought tolerant, once established.

Locations in Street Tree Palette:
Camino Del Rio District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
25'-40'	20'-30'	6 to 10	E	L	L	No	No	No

Eucalyptus polyanthemos (Silver Dollar Gum)

Botanical Name
Eucalyptus polyanthemos

Common Name
Silver Dollar Gum

Considerations:
Often used as an ornamental tree for street and park planting, this tough tree is noted for its canopy of greyish foliage and drought tolerance.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Median Tree
Sports Arena Boulevard/Bay to Bay Trail: Parkway/ Existing Tree
Channel District: Street Tree
Sports Arena Village: Street Tree
Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
65'	15'-45'	6 to 10	E	L	L	No	No	No

*Ficus benjamina (Weeping Chinese Banya)

Botanical Name
Ficus benjamina

Common Name
Weeping Chinese Banya

Considerations:
Makes a very large and stately tree for parks and other urban situations. Its glossy green leaves are evergreen and create a dense canopy, that highlight its light grey trunk and branches

Locations in Street Tree Palette:
Kettner District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
50′	30′	10+	E	M	M	No	No	No

*Ficus microcarpa nitida (Indian Laurel Fig)

Botanical Name
Ficus microcarpa nitida

Common Name
Indian Laurel Fig

Considerations:
A lush and very popular evergreen tree that makes a powerful statement. It has a dense rounded canopy with new foliage that is bright green, and smooth grayish white bark. It does well in seacoast conditions and can grow in sun or shade.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Existing Tree
Rosecrans District: Street Tree, Kemper Village: Street Tree, Cauby Village: Street Tree
Hancock Transit Corridor: Street Tree
Kettner District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
40′-60′	40′-60′	10+	E	M	M	No	No	No

Ficus rubiginosa (Rusty Leaf Fig)

Botanical Name
Ficus rubiginosa

Common Name
Rusty Leaf Fig

Considerations:
A densely spreading evergreen shade tree for parks and public spaces. Drought tolerant and suitable for xeriscaping.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Existing Tree
Rosecrans District: Street Tree
Kemper Village: Street Tree
Cauby Village: Street Tree
Hancock Transit Corridor: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
50′	30′-50′	10+	E	M	M	No	No	No

Geijera parviflora (Australian Willow)

Botanical Name
Geijera parviflora

Common Name
Australian Willow

Considerations:
This tree is a perfect choice for large or small parking lot islands. It has a weeping habit, but the branches are strong and wind-resistant. Its foliage is narrow, olive green and aromatic. It does best in full sun, with occasional to little irrigation.

Locations in Street Tree Palette:
Sports Arena Boulevard/Bay to Bay Trail: Parkway Tree, Camino Del Rio District: Street Tree
Kemper Village: Street Tree
Lytton District: Street Tree
Hancock Transit Corridor: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
30′	20′	4 to 6	E/F	L	M	No	Yes	No

Hymenosporum flavum (Sweetshade)

Botanical Name
Hymenosporum flavum
Common Name
Sweetshade

Considerations:
A slender upright tree that is often used for narrow spaces. This evergreen tree has fragrant yellow blooms in early summer. It grows best in full sun to light shade with deep but infrequent watering.

Locations in Street Tree Palette:
Kemper Village: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
20'-35'	15'-20'	2 to 4	E/F	M	M	No	No	No

Jacaranda mimosifolia (Jacaranda)

Botanical Name
Jacaranda mimosifolia

Common Name
Jacaranda

Considerations:
Beautiful tree that is widely used throughout Southern California. It's a deciduous to semi-evergreen tree, with lacy foliage and perfuse trumpet shaped flower clusters in late spring and summer. Does best in full sun with occasional deep summer watering and well-drained soil.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Green Belt Tree, Rosecrans Boulevard/La Playa Trail: Existing Tree, Sports Arena Boulevard/Bay to Bay Trail: Parkway/Existing Tree, Barnett Avenue/Bay to Bay Trail: Accent Tree, Midway Drive/Community Center: Existing Tree
Sports Arena Village: Street Tree, Camino Del Rio District: Street Tree, Kemper Village: Street Tree, Kurtz District: Street Tree, Hancock Transit Corridor: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
50'	35'-60'	4 to 6	D/F	M	M	No	No	No

Koelreuteria bipinnata (Chinese Flame Tree)

Botanical Name
Koelreuteria bipinnata

Common Name
Chinese Flame Tree

Considerations:
Fairly fast growing, Chinese Flame Tree has beautiful panicles of small yellow flowers late summer through October, followed by persistent papery red capsules. It needs regular watering and more in extreme heat, but drought tolerant once established.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Green Belt Tree
Midway Drive/Community Center: Thematic Tree
Sports Arena Village: Street Tree
Lytton District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
35′	35′	6 to 10	D/F	M	M	No	No	No

Liquidambar styraciflua ‘Rotundiloba’ (Sweet Gum)

Botanical Name
Liquidambar styraciflua ‘Rotundiloba’

Common Name
Sweetgum

Considerations:
The Sweet gum is a low maintenance deciduous tree. It has spectacular fall colors of yellows, oranges, purples and reds.

Locations in Street Tree Palette:
Kemper Village: Street Tree
Dutch Flats Village: Street Tree
Hancock Transit Corridor: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
65′	20′-25′	10+	D	M	M	No	No	No

Lyonothamnus floribundus var 'Asplenifolius' (Catalina Ironwood)

Botanical Name
Lyonothamnus floribundus ssp. asplenifolius

Common Name
Catalina Ironwood

Considerations:
This California native evergreen tree is fairly quick growing. It has interesting shredding bark that exposes a rich reddish brown layer. Plant in full sun to light shade and irrigate infrequently, but deep, and never in the summer. Once established trees are drought tolerant.

Locations in Street Tree Palette:
Sports Arena Village: Street Tree
Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
50'-60'	40'	2' to 4'	E/F	L	L	Yes	No	No

Melaleuca quinquenervia (Cajeput Tree)

Botanical Name
Melaleuca quinquenervia

Common Name
Cajeput Tree

Considerations:
Fast growing and hardy tree. Has interesting white bark that is spongy and peels in layers.

Locations in Street Tree Palette:
Channel District: Street Tree
Kemper Village: Street Tree
Cauby Village: Street Tree
Hancock Transit Corridor: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
35'	20'	4 to 6	E/F	L	M	No	No	No

Metrosideros excelsa (New Zealand Christmas Tree)

Botanical Name
Metrosideros excelsa

Common Name
New Zealand Christmas Tree

Considerations:
Narrow upright evergreen with bright red flowers that appear in spring through summer. It prefers full sun, tolerates wind, sandy soils and salt spray, and is drought tolerant.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Green Belt Tree, Sports Arena Boulevard/Bay to Bay Trail: Parkway Tree, Midway Drive/Community Center: Thematic Tree, Sports Arena Village: Street Tree, Camino Del Rio District: Street Tree, Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
35'	35'	4 to 6	E/F	M	M	No	No	No

Olea europaea 'Swan Hill Fruitless' (Swan Hill Olive)

Botanical Name
Olea europaea 'Swan Hill Fruitless'

Common Name
Swan Hill Olive

Considerations:
Has a graceful form and wispy gray/green foliage. It develops an interesting gnarled trunk with age. It's a fast grower with a long life. It bears no fruit, has limited pollen, and is resistant to verticillium wilt. It's drought, heat, and wind tolerant once established.

Locations in Street Tree Palette:
Rosecrans Boulevard/La Playa Trail: Historic Tree
Sports Arena Village: Stree Tree
Camino Del Rio District: Street Tree
Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
35'	60'	6 to 10	E	L	L	No	No	No

Pinus canariensis (Canary Island Pine)

Botanical Name
Pinus canariensis

Common Name
Canary Island Pine

Considerations:
The Canary Island Pine makes a wonderful street tree. It has a light airy canopy that allows light to filter through. It's very hardy and can tolerate a wide range of soil types.

Locations in Street Tree Palette:
Barnett Avenue/Bay to Bay Trail: Thematic/Existing Tree, Midway Drive/Community Center: Thematic/ Existing Tree, Sports Arena Village: Street Tree, Camino Del Rio District: Street Tree, Rosecrans District: Street Tree, Kemper Village: Street Tree, Cauby Village: Street Tree, Kurtz District: Street Tree, Hancock Transit Corridor: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
50'-80'	20'-35'	6 to 10	E	L	M	No	No	No

Pinus torreyana (Torrey Pine)

Botanical Name
Pinus torreyana

Common Name
Torrey Pine

Considerations:
A California native evergreen that withstands sandy soil, is drought tolerant, and requires little care.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Median Tree
Sports Arena Village: Street Tree
Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
60'	30'-50'	10+	E	L	M	Yes	No	Yes

Pistacia chinensis (Chinese Pistache)

Botanical Name
Pistacia chinensis

Common Name
Chinese Pistache

Considerations:
Chinese Pistache is a reliable street tree that tolerates drought and alkalinity. Its rounded canopy has a brilliant display of red in the fall.

Locations in Street Tree Palette:
Midway Drive/Community Center: Existing Tree, Rosecrans District: Street Tree, Dutch Flats Village: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
65′	40′	4 to 6	D	M	M	No	No	No

Platanus racemosa (California Sycamore)

Botanical Name
Platanus racemosa

Common Name
California Sycamore

Considerations:
Stately, fast growing, and long lived native has wise spreading branches that are twisted and unique. Its bark is reddish brown and peeling, which exposes white wood underneath. It tolerates heat and smoggy urban conditions, but requires deep yet infrequent watering.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Greenbelt Tree, Rosecrans Boulevard/La Playa Trail: Historic Tree, Barnett Avenue/Bay to Bay Trail: Bioswale Tree, Midway Drive/ Community Center: Bioswale/Existing Tree, Sports Arena Village: Street Tree, Rosecrans District: Street Tree, Kemper Village: Street Tree, Cauby Village: Street Tree, Kurtz District: Street Tree, Hancock Transit Corridor: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
30′-80′	20′-50′	6 to 10	D	M	M	Yes	No	Yes

*Populus fremontii (Fremont Cottonwood)

Botanical Name
Populus fremontii

Common Name
Fremont Cottonwood

Considerations:
This California native tolerates san, clay and seasonal flooding. It's very fast growing with regular water. Its large, open crown, is full of shiny bright green leaves.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Greenbelt Tree
Rosecrans Boulevard/La Playa Trail: Historic Tree
Barnett Avenue/Bay to Bay Trail: Bioswale Tree
Midway Drive/Community Center: Bioswale Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
40'-60'	30'	10+	D	M	M	Yes	No	Yes

Prunus lyonii (Catalina Cherry)

Botanical Name
Prunus lyonii

Common Name
Catalina Cherry

Considerations:
This small evergreen tree has glossy green leaves, plumes of white flowers in spring and edible fruit in fall. It grows well in sun or shade, tolerates heat and wind and is drought tolerant.

Locations in Street Tree Palette:
Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
25'	15'-25'	4 to 6	E	VL	VL	Yes	No	No

*Pyrus calleryana 'Bradford' (Bradford Pear)

Botanical Name
Pyrus calleryana 'Bradford'

Common Name
Bradford Pear

Considerations:
Urban tolerant tree with a gorgeous spring display of white blossoms, and a brilliant display of red and orange fall color.

Locations in Street Tree Palette:
Sports Arena Village: Street Tree
Camino Del Rio District: Street Tree
Lytton District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
20'-25'	10'-15'	6 to 10	E/F	M	M	No	No	No

*Pyrus kawakamii (Evergreen Pear)

Botanical Name
Pyrus kawakamii

Common Name
Evergreen Pear

Considerations:
Semi-evergreen tree with glossy leaves that turn bright red in fall. Spectacular clusters of fragrant white flowers cover the tree in spring.

Locations in Street Tree Palette:
Rosecrans Boulevard/La Playa Trail: Existing Tree
Midway Drive/Community Center: Existing Tree
Rosecrans District: Street Tree
Kemper Village: Street Tree
Cauby Village: Street Tree
Dutch Flats Village: Street Tree
Hancock Transit Corridor: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
15'-30'	10'-15'	4 to 6	E/F	M	M	No	No	No

Quercus agrifolia (Coast Live Oak)

Botanical Name
Quercus agrifolia

Common Name
Coast Live Oak

Considerations:
Stately, long lived California native that, with age, develops architectural character with a ridged and furrowed trunk and branches. It's drought resistant and requires no summer water.

Locations in Street Tree Palette:
Sports Arena Village: Street Tree
Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
65'	65'+	10+	E	VL	L	Yes	No	No

Quercus ilex (Holly Oak)

Botanical Name
Quercus ilex

Common Name
Holly Oak

Considerations:
Hardy evergreen tree that does well with inland heat, wind, and coastal conditions, once established, and with sufficient watering.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Greenbelt Tree
Sports Arena Village: Street Tree
Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
65'	65'	4 to 6	E	L	L	No	Yes	No

Quercus suber (Cork Oak)

Botanical Name
Quercus suber

Common Name
Cork Oak

Considerations:
An attractive oak forming thick bark and a unique twisted look with age. It has leathery evergreen leaves, tolerates many soils, and is drought and heat tolerant.

Locations in Street Tree Palette:
Rosecrans Boulevard/La Playa Trail: Historic Tree
Rosecrans District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
70′	70′	6 to 10	E	L	L	No	No	No

Schinus molle (California Pepper)

Botanical Name
Schinus molle

Common Name
California Pepper

Considerations:
Extremely hardy evergreen tree that tolerates many adverse conditions such as poor soil, smog, wind, and drought. With age it forms twisted, dark brown bark, and a wide, but airy, canopy.

Locations in Street Tree Palette:
Pacific Highway/Historic Highway 101: Existing Tree
Rosecrans Boulevard/La Playa Trail: Historic Tree
Sports Arena Village: Street Tree
Rosecrans District: Street Tree
Kemper Village: Street Tree
Kurtz District: Street Tree
Hancock Transit Corridor: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
25′-50′	25′-40′	10+	E	VL	L	No	No	No

*Schinus terebinthifolius (Brazilian Pepper)

Botanical Name
Schinus terebinthifolius

Common Name
Brazilian Pepper

Considerations:
Extremely hardy tree that thrives in all kinds of conditions, from sandy soils to swamps.

Locations in Street Tree Palette:
Kemper Village: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
30'-40'	40'	10+	E	L	L	No	No	No

Tristania conferta (Brisbane Box)

Botanical Name
*Tristania conferta

Common Name
Brisbane Box

Considerations:
Makes a great street tree with its ability to tolerate smog, drought, and poor drainage while also resisting pests and disease. It's a fast grower with decorative peeling red bark, and cream colored flowers in spring and summer.

Locations in Street Tree Palette:
Pacific Highway/ Historic Highway 101: Median Tree, Sports Arena Boulevard/ Bay to Bay Trail: Existing Tree, Barnett Avenue/ Bay to Bay Trail: Thematic/Existing Tree, Channel District: Street Tree, Rosecrans District: Street Tree, Kemper Village: Street Tree, Cauby Village: Street Tree, Lytton District: Street Tree, Kurtz District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
50'	40'	4 to 6	E	M	M	No	No	No

Ulmus parvifolia (Chinese Elm)

Botanical Name
*Ulmus parvifolia

Common Name
Chinese Elm

Considerations:
Excellent street tree that is tolerant of drought, clay soil and air pollution. Has beautiful arching branches and multi-colored bark that flakes off to reveal an orange and white trunk. It has good resistance to Dutch elm disease and beetles.

Locations in Street Tree Palette:
Pacific Highway/ Historic Highway 101: Existing Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
65′	70′	6 to 10	E	M	L	No	No	No

Palms

*Arecastrum romanzoffianum (Queen Palm)

Botanical Name
Arecastrum romanzoffianum

Common Name
Queen Palm

Considerations:
Tall statement specimen, the Queen Palm has a sturdy, straight trunk and full feathery fronds, giving it a wonderful tropical look.

Locations in Street Tree Palette:
Pacific Highway/ Historic Highway 101: Existing Tree
Barnett Avenue/ Bay to Bay Trail: Existing Tree
Camino Del Rio District: Street Tree
Rosecrans District: Street Tree
Kemper Village: Street Tree
Cauby Village: Street Tree
Lytton District: Street Tree
Dutch Flats Village: Street Tree
Kurtz District: Street Tree
Hancock Transit Corridor: Street Tree
Kettner District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
25'-30'	10'-15'	2 to 4	P	M	M	No	No	No

Brahea edulis (Guadalupe Palm)

Botanical Name
Brahea edulis

Common Name
Guadalupe Palm

Considerations:
Sturdy trunk with a full canopy of fan shaped fronds that are bluish-green. It prefers full sun and tolerates heat, drought, and wind.

Locations in Street Tree Palette:
Kemper Village: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
35'	15'	2 to 4	P	L	L	No	No	No

Butia capitata (Pindo Palm)

Botanical Name
Butia capitata

Common Name
Pindo Palm

Considerations:
One of the hardiest feather palms, the Pindo Palm has long graceful gray-green fronds and a sturdy straight trunk.

Location in Street Tree Palette:
Kemper Village: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
15'-25'	10'-15'	4 to 6	P	L	L	No	Yes	No

Chamaerops humilis (Mediterranean Fan Palm)

Botanical Name
Chamaerops humilis

Common Name
Mediterranean Fan Palm

Considerations:
Extremely hardy palm that grows in a wide range of conditions and tolerates temperature and water fluctuations. It has a beautiful compact silver crown that grows on its multi-trunked base.

Location in Street Tree Palette:
Kemper Village: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
20'	10'-20'	2 to 4	P	L	L	No	Yes	No

*Phoenix canariensis (Canary Island Date Palm)

Botanical Name
Phoenix canariensis

Common Name
Canary Island Date Palm

Considerations:
Large, stately palm that boasts long stiff leaves atop an attractive large trunk with diamond-shaped scars. It grows well in urban areas, tolerating pollution, poor drainage, compacted soil and drought.

Locations in Street Tree Palette:
Pacific Highway/ Historic Highway 101: Existing Tree
Dutch Flats Village: Street Tree
Kettner District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
40'-60'	20'-25'	6 to 10	P	M	M	No	No	No

Phoenix dactylifera 'Medjool' (Date Palm)

Botanical Name
Phoenix dactylifera 'Medjool'

Common Name
Date Palm

Considerations:
Has an attractive broad gray trunk with diamond-shaped leaf scars and a thick green/blue/gray canopy.

Locations in Street Tree Palette:
Midway Drive/ Community Center: Existing Tree
Dutch Flats Village: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
65'	20'-25'	4 to 6	P	L	L	No	No	No

Trachycarpus fortunei (Windmill Fan Palm)

Botanical Name
Trachycarpus fortunei

Common Name
Windmill Fan Palm

Considerations:
Extremely hardy, fast growing palm that tolerates the urban landscape if watered regularly. It has a distinctive black fibrous trunk and attractive compact crown.

Locations in Street Tree Palette:
Camino Del Rio District: Stree Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
35′	6′-10′	2 to 4	P	M	L	No	No	No

*Washingtonia filifera (California Fan Palm)

Botanical Name
Washingtonia filifera
Common Name
California Fan Palm

Considerations:
Stately palm that boasts a very dense canopy of fan shaped fronds. It thrives in a wide range of soils, even alkaline, and once established is drought and salt tolerant.

Locations in Street Tree Palette:
Kemper Village: Street Tree
Midway Drive/ Community Center: Existing Tree
Kurtz District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
60′	15′	4 to 6	P	M	M	No	No	No

*Washingtonia robusta (Mexican Fan Palm)

Botanical Name
Washingtonia robusta

Common Name
Mexican Fan Palm

Considerations:
Iconic skyline tree with large fan shaped fronds and a tall grey slender trunk. It's fast growing and hardy, and once established is resistant to salt and drought conditions.

Locations in Street Tree Palette:
Pacific Highway/ Historic Highway 101: Existing Tree
Rosecrans Boulevard/ La Playa Trail: Historic/ Existing Tree
Sports Arena Boulevard/ Bay to Bay Trail: Skyline/ Existing Tree
Barnett Avenue/ Bay to Bay Trail: Skyline Tree
Midway Drive/ Community Center: Existing Tree
Sports Arena Village: Street Tree
Camino Del Rio District: Street Tree
Rosecrans District: Street Tree
Kemper Village: Street Tree
Cauby Village: Street Tree
Lytton District: Street Tree
Dutch Flats Village: Street Tree
Kurtz District: Street Tree
Hancock Transit Corridor: Street Tree
Kettner District: Street Tree

Height Range	Canopy Spread	Parkway Size (ft)	Type	Water Needs coastal	Water Needs Inland	Native to California	Suitable Under Utility Lines	Bioswale
100'	15'-20'	4 to 6	P	M	M	No	No	No

6 Demonstration Project

Pacific Highway - Existing Conditions

6.1 PRIORITIZATION PROCESS

Prioritization scoring was applied to twelve project area segments along five main study corridors (Pacific Highway, Sports Arena Boulevard, Midway Drive, Rosecrans Street, and Barnett Avenue/Lytton Street) in the study area. The study area segments were defined by changes in the roadway design characteristics occurring along the five study area corridors. Figure 6.1-1 shows the five study corridors in the community, and Figure 6.1-2 shows the project segmentation along the study corridors.

The prioritization process utilized seven key criteria – three are need-based and four criteria are based on project-readiness. The former consist of traffic collisions per mile, pedestrian and bicycle demand, and average daily vehicular traffic volumes, while the latter include curb impacts, right-of-way impacts, right-of-way potential for stormwater and greening improvements, and potential utility relocation.

NEEDS-BASED PRIORITIZATION

Table 6-1 describes the need-based prioritization criteria and associated point assignments. The need-based prioritization criteria are generally indicative of high levels of use and conflict among multiple transportation modes. As shown, the traffic collisions per mile criteria received a maximum of six points, making it the highest weighted of the need-based criteria. These inputs capture demand from automobile, pedestrian and bicyclist use.

Table 6-2 shows the need-based points earned from each criteria for the project segments. Sports Arena Boulevard, from Interstate 8 to West Point Loma Boulevard, has the highest need-based score, receiving 13 out of a possible 14 points for the need-based criteria.

Figure 6.1-1 Study Corridors

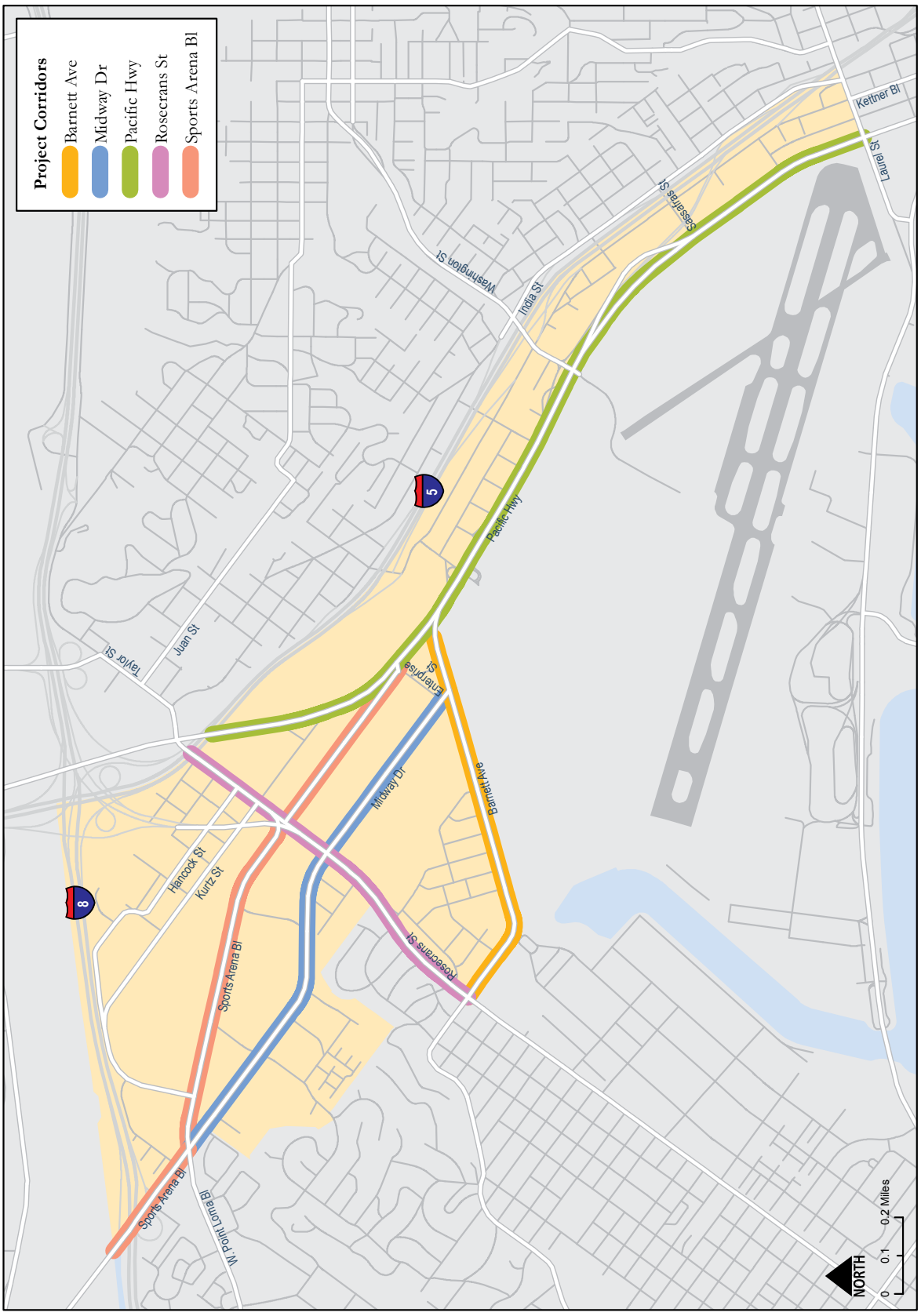


Figure 6.1-2 Study Corridor Segments

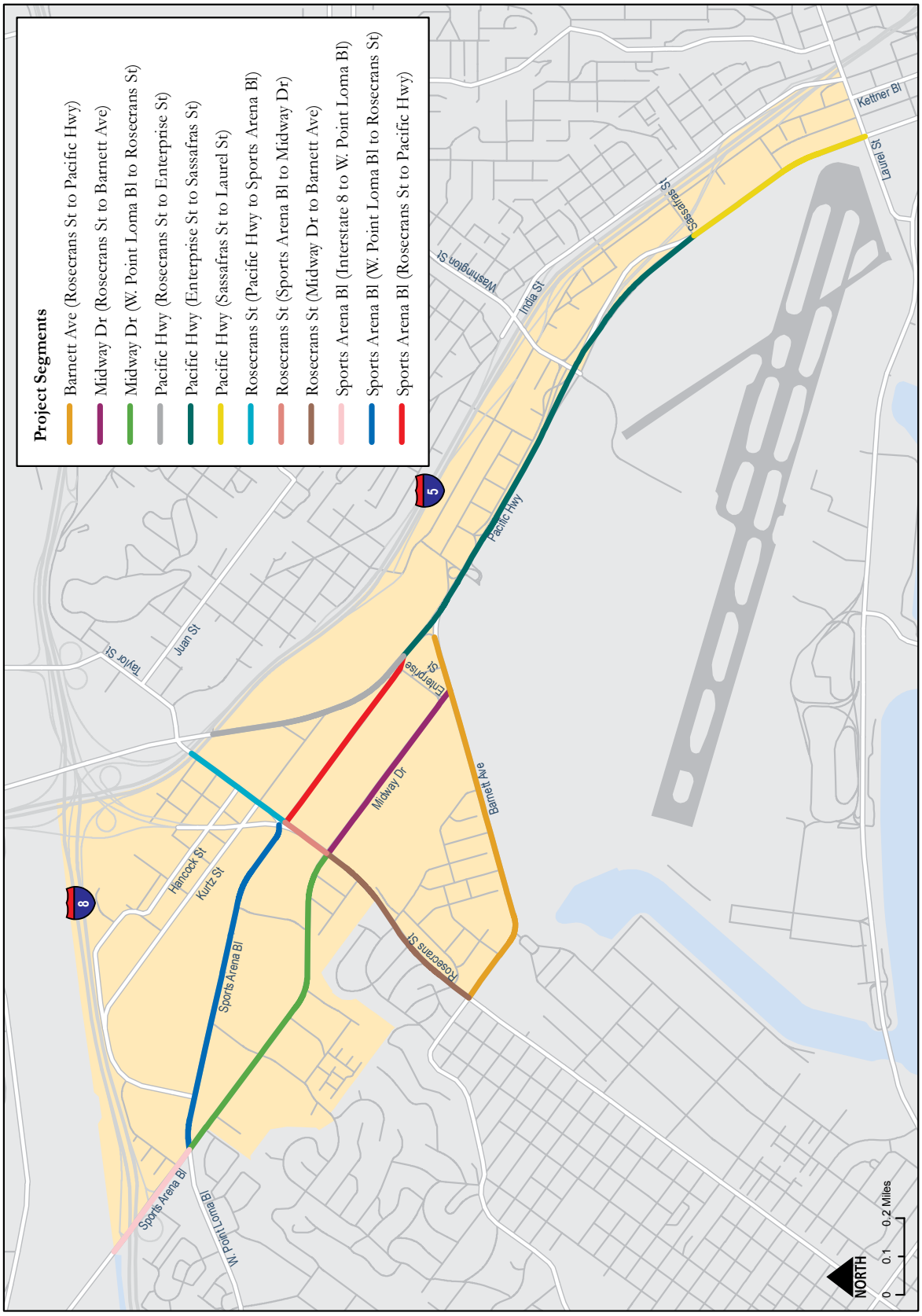


Table 6-1 Need-Based Prioritization Criteria and Associated Points

Traffic Collisions per Mile	Highest Traffic Collisions per Mile along Project Segment	Category	Prioritization Points
All traffic collisions in the Community Planning Area, including vehicular-vehicular, vehicular-bicyclist, vehicular-pedestrian collisions, between 2008 and 2013 were summarized by project segment. Project segment length was used to determine collisions per mile. More points were awarded to project corridors with higher collisions per mile. Collision records were obtained from City of San Diego.	300 per mile or greater	Very High	6
	250-299 per mile	High	5
	200-249 per mile	Medium-High	4
	150-199 per mile	Medium	3
	100-149 per mile	Medium-Low	2
	50-99 per mile	Low	1
	Less than 50 per mile	Very Low	0
Pedestrian and Bicycle Demand	**Average Weighted Pedestrian and Bicycle Demand Model Score along Project Segment**	**Category**	**Prioritization Points**
This input is a composite of the Pedestrian Priority Model from the City's Pedestrian Master Plan and the Inter- and Intra-Community Demand Model from the City's Bicycle Master Plan. For each project segment, an average weighted score was calculated along the extent of the project segment. The six ranges were determined by the natural breaks of the average weighted scores of all the projects.	65 points or greater	Very High	5
	54-65 points	High	4
	48-53 points	Medium-High	3
	31-47 points	Medium-Low	2
	22-30 points	Low	1
	Less than 22 points	Very Low	0
Average Daily Vehicular Traffic Volumes	**Highest Average Daily Traffic (ADT) Volumes along Project Segment**	**Category**	**Prioritization Points**
Points were awarded based on the highest average daily vehicular traffic (ADT) volume along a project segment. Higher vehicular traffic volumes are indicative of being more stressful facilities for non-motorized users. ADTs were obtained from SANDAG's regional traffic count database (2010).	50,000 ADT or greater	Very High	3
	25,000-50,000 ADT	High	2
	5,000-24,999 ADT	Medium	1
	Less than 5,000 ADT	Low	0

Source: Chen Ryan Associates, October 2015

Table 6-2 Need-Based Prioritization Points

Project Segment	From	To	Traffic Collisions per Mile Points	Average Pedestrian and Bicycle Demand Points	Average Daily Traffic Volumes Points	Need-Based Prioritization Points
Sports Arena Bl	Interstate 8	W. Point Loma Bl	6	4	3	**13**
Rosecrans St	Sports Arena Bl	Midway Dr	6	3	3	**12**
Rosecrans St	Pacific Hwy	Sports Arena Bl	3	5	1	**9**
Midway Dr	W. Point Loma Bl	Rosecrans St	3	3	2	**8**
Rosecrans St	Midway Dr	Barnett Ave	2	3	3	**8**
Pacific Hwy	Rosecrans St	Enterprise St	1	3	3	**7**
Pacific Hwy	Enterprise St	Sassafras St	0	4	3	**7**
Sports Arena Bl	W. Point Loma Bl	Rosecrans St	1	4	2	**7**
Pacific Hwy	Sassasfras St	Laurel St	0	5	1	**6**
Midway Dr	Rosecrans St	Barnett Ave	2	2	1	**5**
Barnett Ave	Rosecrans St	Pacific Hwy	1	1	2	**4**
Sports Arena Bl	Rosecrans St	Pacific Hwy	1	0	0	**1**

Source: Chen Ryan Associates, October 2015

PROJECT-READINESS-BASED PRIORITIZATION

Table 6-3 describes the project-readiness-based prioritization criteria and associated point assignment. Project-readiness-based prioritization considers right-of-way impacts, curb line reconfiguration impacts, right-of-way potential for high quality stormwater/greening improvements, and utility conflicts. There are a total possible 16 project-readiness-based prioritization points.

Table 6-3 Project-Readiness Prioritization Inputs and Associated Points

Right-of-Way Impact	Category		Prioritization Points
The dimension of the proposed project was compared to the available right-of-way to determine the potential need for right-of-way acquisition.	No Impact – Right-of-way is sufficient to construct proposed project		4
	Impact – Right-of-way will need to be acquired		0
Curb Impact	**Category**		**Prioritization Points**
The dimension of the proposed project was compared to the existing curb lines to determine the potential need for curb line reconfiguration.	No Impact – No curb line reconfiguration required		4
	Impact – Curb line reconfiguration is required		0
Right-of-Way Potential for Stormwater/Greening Improvements	**Category**		**Prioritization Points**
The right-of-way availability along the proposed project provides ample enough room to construct stormwater/greening treatments without sidewalk reconstruction	Right-of-way available		4
	Right-of-way not available		0
Utility Conflict	**Utility Items per Mile**	**Characteristic**	**Prioritization Points**
The following utilities were surveyed along the project segments: ▪ Traffic Lights ▪ Street Lights ▪ Transformers ▪ Vaults ▪ Storm Drains ▪ Fire Hydrants ▪ Cable/Phone Risers ▪ Bus Stops ▪ Water Meters ▪ Power Poles Fewer potential utility conflicts per mile were assigned higher prioritization points.	Less than 90 per mile	Low Conflict	4
	90-99 per mile	Medium-Low Conflict	3
	100-109 per mile	Medium Conflict	2
	110-139 per mile	Medium-High Conflict	1
	140 per mile or Greater	High Conflict	0

Source: Chen Ryan Associates, October 2015

Prioritization points are assigned if the proposed project dimensions do not exceed the right-of-way width of the roadway. Likewise, prioritization points are assigned if projects have no curb reconfiguration impacts, meaning the project does not differ from the existing curb-to-curb width or result in the removal or construction of a median. Points were also awarded if a project corridor has enough right-of-way to construct stormwater/ greening treatments without requiring major reconstruction of the sidewalk, such as would be required with the construction of suspended paving systems. The presence of utilities along the project segments was included in the prioritization process to capture ease of implementation. More utilities in the project segment would likely be associated with higher implementation costs. Utilities were surveyed and tabulated along the five main project corridors (Rosecrans Street, Midway Drive, Pacific Highway, Barnett Avenue/Lytton Street, and Sports Arena Boulevard).

The following types of utilities and infrastructure were surveyed:

- Traffic Lights
- Street Lights
- Transformers
- Vaults
- Storm Drains
- Fire Hydrants
- Cable/Phone Risers
- Bus Stops
- Water Meters
- Power Poles

Table 6-4 shows the project-readiness-based points assigned to each of the project segments.

Table 6-4 Project-Readiness Prioritization Points

Project Segment	From	To	Right-of-Way Impacts	Curb Impacts	Right-of-Way Potential for Stormwater/Greening Improvements	Utility Conflict	Project-Readiness Prioritization Points
Pacific Hwy	Enterprise St	Sassafras St	4	0	4	4	**12**
Pacific Hwy	Rosecrans St	Enterprise St	4	0	4	4	**12**
Pacific Hwy	Sassafras St	Laurel St	4	0	4	4	**12**
Barnett Ave	Rosecrans St	Pacific Hwy	0	4	4	3	**11**
Sports Arena Bl	Interstate 8	W. Point Loma Bl	4	0	0	3	**7**
Rosecrans St	Pacific Hwy	Sports Arena Bl	4	0	0	1	**5**
Rosecrans St	Sports Arena Bl	Midway Dr	4	0	0	1	**5**
Rosecrans St	Midway Dr	Barnett Ave	4	0	0	1	**5**
Midway Dr	W. Point Loma Bl	Rosecrans St	4	0	0	0	**4**
Midway Dr	Rosecrans St	Barnett Ave	4	0	0	0	**4**
Sports Arena Bl	W. Point Loma Bl	Rosecrans St	0	0	0	3	**3**
Sports Arena Bl	Rosecrans St	Pacific Hwy	0	0	0	3	**3**

Source: Chen Ryan Associates, October 2015

COMBINED NEED-BASED AND PROJECT-READINESS-BASED PRIORITIZATION POINTS

Table 6-5 presents the combined need and project-readiness-based prioritization scoring by project segment. The four highest scoring projects were ranked as "high" (18 to 20 points), the middle four scoring projects as "medium" (13 to 16 points), and the four lowest scoring projects as "low" (4 to 12 points).

Figure 6-3 displays the final prioritization results for the 12 project segments across the Midway community. As shown, the following four segments were ranked in the highest ranking category:

- Sports Arena Boulevard, from Interstate 8 to W. Point Loma Boulevard (20 points)
- Pacific Highway, from Enterprise Street to Sassafras Street (19 points)
- Pacific Highway, from Rosecrans Street to Enterprise Street (19 points)
- Pacific Highway, from Sassafras Street to Laurel Street (18 points)

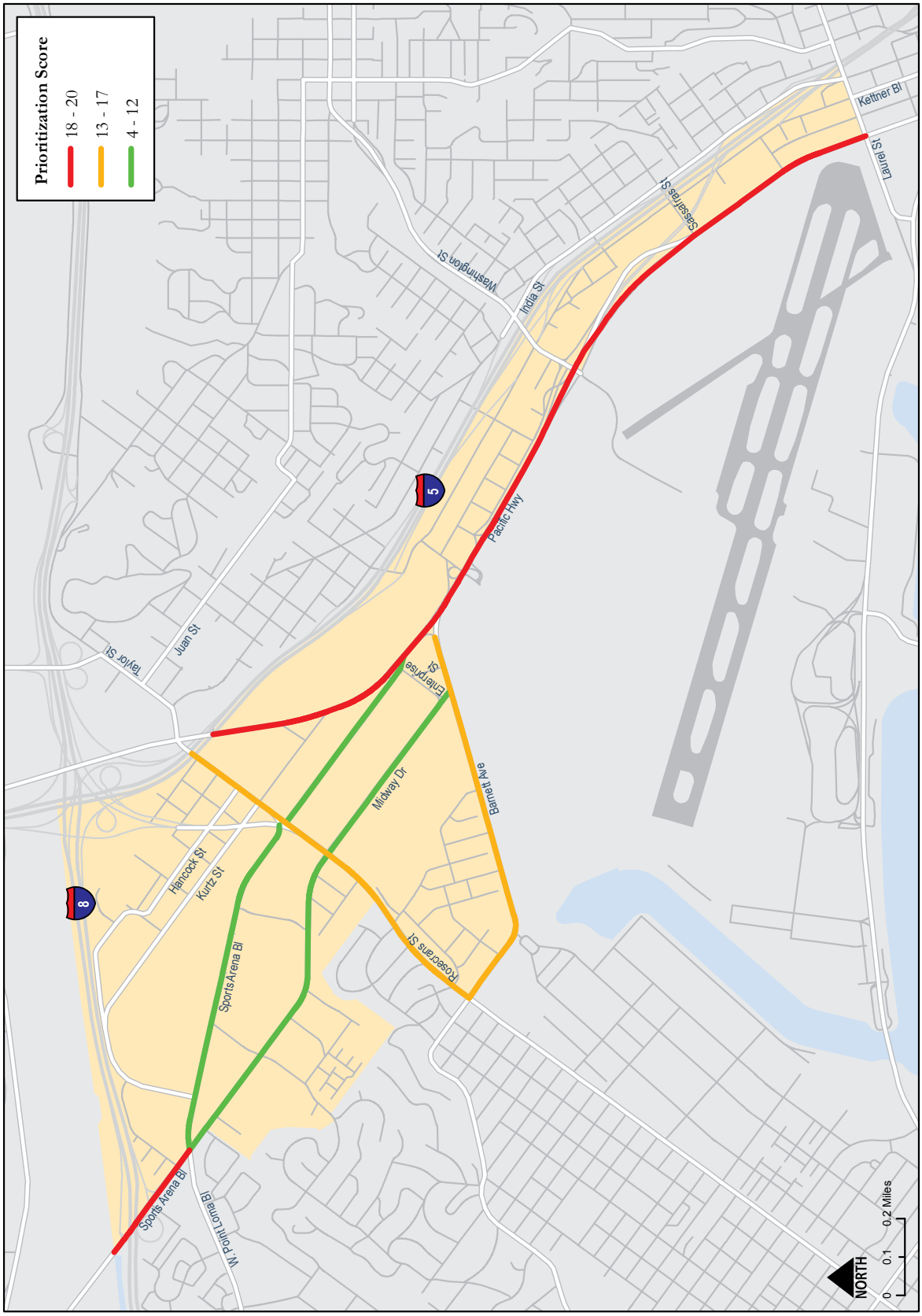
All three Pacific Highway segments scored in the highest category, highlighting both the need and readiness of improvements along the full extent of the Pacific Highway corridor within the Midway Community. These segments combined provide for both inter- and intra-community travel, with access points to the Old Town Community at the northerly part of the corridor and the Little Italy neighborhood of Downtown San Diego in the southerly part of the corridor. The Pacific Highway project segments are also components of the Coastal Rail Trail Regional Bicycle Corridor as identified in the San Diego Regional Bicycle Plan (2010), emphasizing the regional importance of this facility. The high ranking Sports Arena Boulevard segment also provides connections to neighboring communities, however, the adjacent project segments along Sports Arena Boulevard and Midway Drive ranked in the low and medium categories, respectively.

Table 6-5 Final Prioritization Points

Project Segment	From	To	Need-Based Prioritization Points	Project-Readiness Prioritization Points	Total Prioritization Points	Ranking
Sports Arena Bl	Interstate 8	W. Point Loma Bl	13	7	20	High
Pacific Hwy	Enterprise St	Sassafras St	7	12	19	
Pacific Hwy	Rosecrans St	Enterprise St	7	12	19	
Pacific Hwy	Sassafras St	Laurel St	6	12	18	
Rosecrans St	Sports Arena Bl	Midway Dr	12	5	17	Medium
Barnett Ave	Rosecrans St	Pacific Hwy	4	11	15	
Rosecrans St	Pacific Hwy	Sports Arena Bl	9	5	14	
Rosecrans St	Midway Dr	Barnett Ave	8	5	13	
Midway Dr	W. Point Loma Bl	Rosecrans St	8	4	12	Low
Sports Arena Bl	W. Point Loma Bl	Rosecrans St	7	3	10	
Midway Dr	Rosecrans St	Barnett Ave	5	4	9	
Sports Arena Bl	Rosecrans St	Pacific Hwy	1	3	4	

Source: Chen Ryan Associates, October 2015

Figure 6.1-3 Final Need and Cost-Based Prioritization Scoring for Midway Project Segments



6.2 COST ESTIMATE

The following cost estimate is a 30% design development level effort that identifies the various line items associated with a project of this type for Engineering (demolition, construction, utilities, etc.) Traffic (striping, signage) and Landscape Architecture (soils, irrigation, landscape). These costs will be revised / updated as the project is further refined by either City staff or design consultants retained to continue the design and implementation of this project.

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
Surface Improvements				
6" Curb & Gutter (Type G-2)	5,272	LF	$22.00	$115,984.00
6" Curb & Gutter (Type G-1)	2,334	LF	$16.46	$38,424.88
Median Curb & Gutter (Type B-1)	4,977	LF	$13.20	$65,700.36
8" AC Dikes per G-5, (Type B)	2,879	LF	$15.43	$44,420.50
Curb Ramps per SDG 132 (Type A & B, New C	28	EA	$1,876.00	$52,528.00
4" PCC Sidewalk, per G-7	39,720	SF	$6.40	$254,210.24
Thermoplastic Crosswalk	3,982	SF	$3.00	$11,946.00
			Subtotal	$583,213.98
Demo				
AC Pavement Removal	43,217	SF	3.36	$145,208
Sidewalk Removal and Disposal	14,007	SF	2.01	$28,153
Curb & Gutter Removal	7,521	LF	$3.30	$24,819
Median Curb Removal	4,977	LF	$2.50	$12,443
Guard Rail Removal	2,527	LF	$20.00	$50,534
Street Light Removal	6	EA	$2,000.00	$12,000
Fence Removal	2,331	LF	$15.00	$34,966
Storm Drain Inlet Revmoal	10	EA	$2,500.00	$25,000
			Subtotal	$333,123.15
Treatment Control BMPS				
Biofiltration Swale	32,144	SF	$11.00	$353,584
			Subtotal	$353,584.00
Storm Drain Systems				
Catch Basin (Type G)	11	EA	$4,939.20	$54,331
Cleanouts (Type A)	2	EA	$4,630.50	$9,261
18" RCP Strom Drain	100	LF	$123.50	$12,350
			Subtotal	$75,942.20
Miscellaneous Improvements				
Miscellaneous Utility Relocation				$50,000
Street Light	17	EA	$7,260.00	$123,420
			Subtotal	$173,420.00
Irrigation				
Irrigation - Shrub/Tree Area	67,874	SF	$3.00	$203,622
Controller	1	EA	$10,000.00	$10,000
Point of Connection	1	EA	$10,000.00	$10,000
			Subtotal	$223,622.00

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
Planting				
Soil Preparation & Fine Grading	67,874	SF	$1.00	$67,874
Organic Mulch	660	(3") / CU YD	$50.00	$33,000
Trees - 48" Box	60	EA	$1,500.00	$90,000
Trees - 36" Box	10	EA	$750.00	$7,500
Trees - 24" Box	75	EA	$350.00	$26,250
Signing and Striping				
Detail 12 (4")	10,400	LF	$0.50	$5,200
Detail 25 (4")	5,200	LF	$0.50	$2,600
Detail 27B (6")	5,200	LF	$0.50	$2,600
Detail 39 (6")	11,560	LF	$0.50	$5,780
Detail 39A (6")	800	LF	$0.50	$400
Arrow Legends (Thermo)	300	SF	$5.00	$1,500
Bike Legends (Thermo)	700	SF	$5.00	$3,500
Crosswalk (Thermoplastic)	640	SF	$5.00	$3,200
RPM	866	EA	$5.50	$4,763
Roadside Signs	10	EA	$500.00	$5,000
			Subtotal	$34,543.00
		SUBTOTAL:		$2,348,942.33
	10%	CONTINGENCY:		$234,894.23
		TOTAL:		$2,583,836.56

6.3 DEMONSTRATION PROJECT

The Plan has taken the proposed concepts and recommendations and based on a prioritization analysis matrix, selected a length of Pacific Highway as the highest priority project to apply these concepts. The specific location is Pacific Highway from the centerline of Washington Street northward to the centerline of Couts Street, adjacent to the Veterans Village San Diego complex. The total distance of this initial design effort is approximately 2,777 lineal feet. With this initial effort, the ideas, concepts and features developed and referenced in the Plan are being applied to the Pacific Highway roadway. See Figures 6.3-1 through 6.3-7 for examples of the sheet set.

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6 Demonstration Project

Pacific Highway - Existing Conditions

6.1 PRIORITIZATION PROCESS

Prioritization scoring was applied to twelve project area segments along five main study corridors (Pacific Highway, Sports Arena Boulevard, Midway Drive and Rosecrans Street) in the study area. The project area segments were defined by changes in the roadway laneage characteristics occurring along the five study area corridors. Figure 6.1-1 shows the five study corridors in the Midway community, and Figure 6.1-2 shows the project segmentation along the study corridors.

The prioritization process utilized seven key criteria – three are need-based and four criteria are based on project-readiness. The former consist of traffic collisions per mile, pedestrian and bicycle demand, and average daily vehicular traffic volumes, while the latter include curb impacts, right-of-way impacts, right-of-way potential for stormwater and greening improvements, and potential utility relocation.

NEEDS-BASED PRIORITIZATION

Table 6-1 describes the need-based prioritization criteria and associated point assignments. The need-based prioritization criteria are generally indicative of high levels of use and conflict among multiple transportation modes. As shown, the traffic collisions per mile criteria received a maximum of six points, making it the highest weighted of the need-based criteria. These inputs capture demand from automobile, pedestrian and bicyclist use.

Table 6-2 shows the need-based points earned from each criteria for the project segments. Sports Arena Boulevard, from Interstate 8 to West Point Loma Boulevard, has the highest need-based score, receiving 13 out of a possible 14 points for the need-based criteria.

Figure 6.1-1 Midway Project Corridors

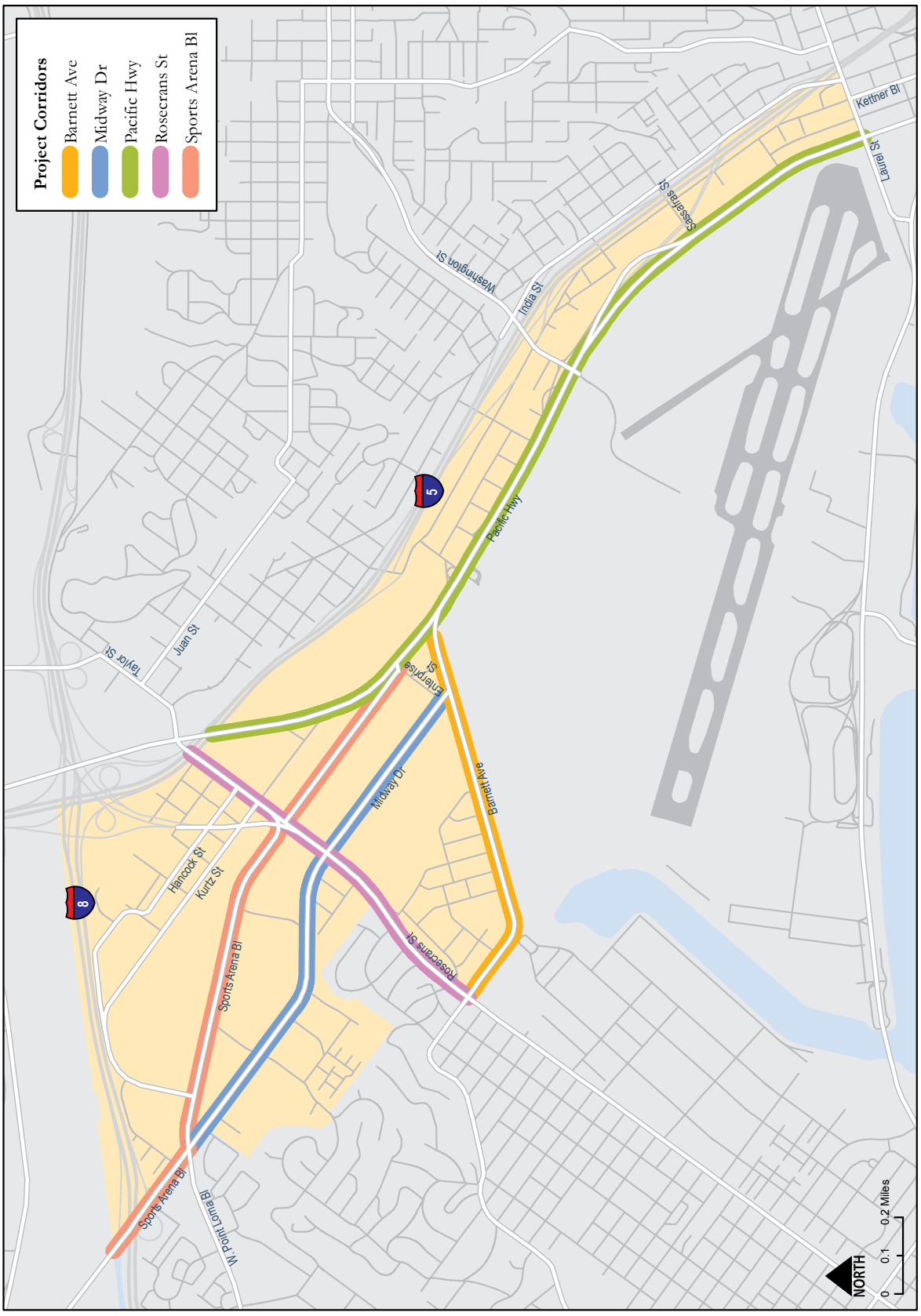


Figure 6.1-2 Midway Project Segments

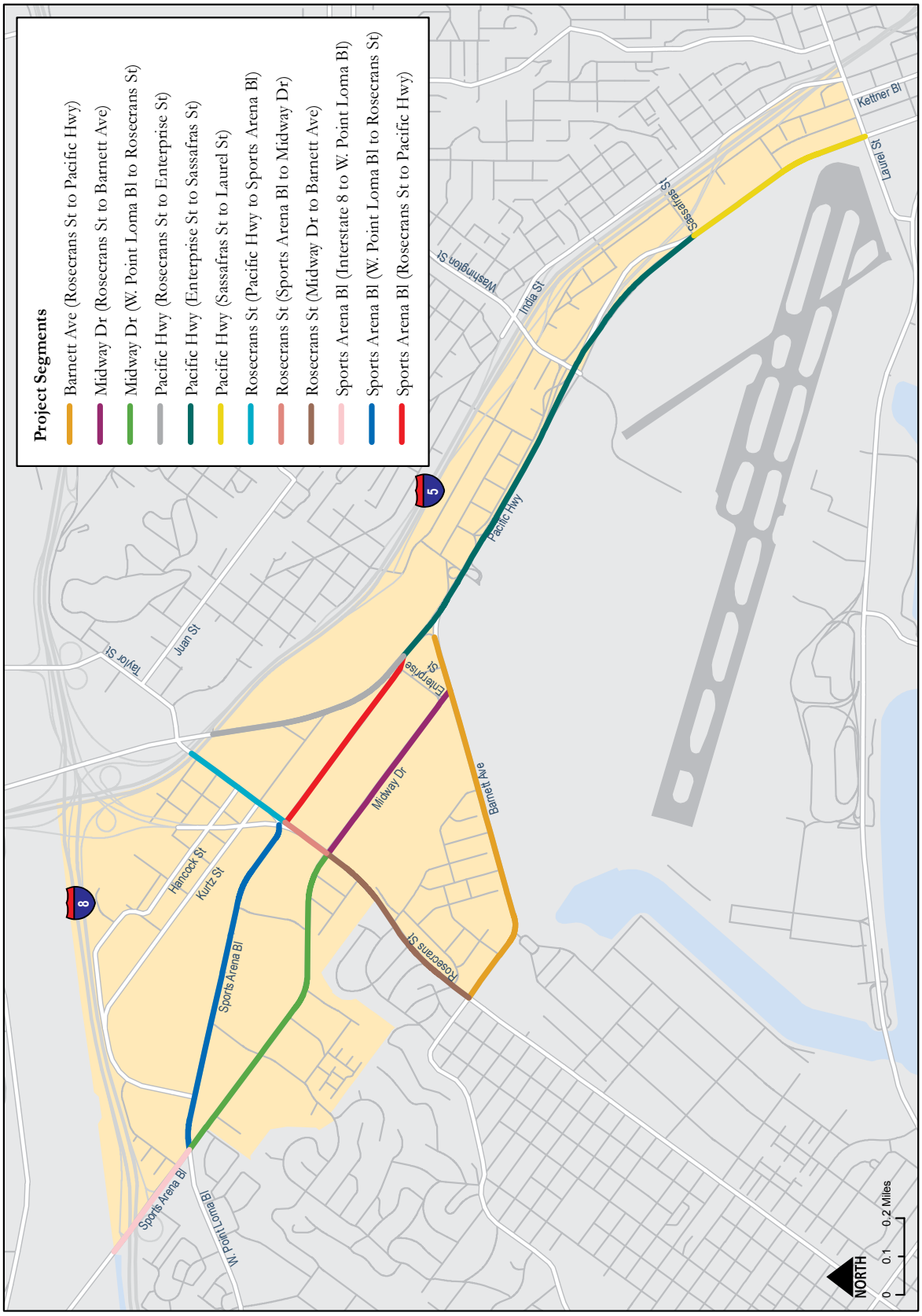


Table 6-1 Need-Based Prioritization Criteria and Associated Points

Traffic Collisions per Mile	Highest Traffic Collisions per Mile along Project Segment	Category	Prioritization Points
All traffic collisions in the Community Planning Area, including vehicular-vehicular, vehicular-bicyclist, vehicular-pedestrian collisions, between 2008 and 2013 were summarized by project segment. Project segment length was used to determine collisions per mile. More points were awarded to project corridors with higher collisions per mile. Collision records were obtained from City of San Diego.	300 per mile or greater	Very High	6
	250-299 per mile	High	5
	200-249 per mile	Medium-High	4
	150-199 per mile	Medium	3
	100-149 per mile	Medium-Low	2
	50-99 per mile	Low	1
	Less than 50 per mile	Very Low	0
Pedestrian and Bicycle Demand	**Average Weighted Pedestrian and Bicycle Demand Model Score along Project Segment**	**Category**	**Prioritization Points**
This input is a composite of the Pedestrian Priority Model from the City's Pedestrian Master Plan and the Inter- and Intra-Community Demand Model from the City's Bicycle Master Plan. For each project segment, an average weighted score was calculated along the extent of the project segment. The six ranges were determined by the natural breaks of the average weighted scores of all the projects.	65 points or greater	Very High	5
	54-65 points	High	4
	48-53 points	Medium-High	3
	31-47 points	Medium-Low	2
	22-30 points	Low	1
	Less than 22 points	Very Low	0
Average Daily Vehicular Traffic Volumes	**Highest Average Daily Traffic (ADT) Volumes along Project Segment**	**Category**	**Prioritization Points**
Points were awarded based on the highest average daily vehicular traffic (ADT) volume along a project segment. Higher vehicular traffic volumes are indicative of being more stressful facilities for non-motorized users. ADTs were obtained from SANDAG's regional traffic count database (2010).	50,000 ADT or greater	Very High	3
	25,000-50,000 ADT	High	2
	5,000-24,999 ADT	Medium	1
	Less than 5,000 ADT	Low	0

Source: Chen Ryan Associates, October 2015

Table 6-2 Need-Based Prioritization Points

Project Segment	From	To	Traffic Collisions per Mile Points	Average Pedestrian and Bicycle Demand Points	Average Daily Traffic Volumes Points	Need-Based Prioritization Points
Sports Arena Bl	Interstate 8	W. Point Loma Bl	6	4	3	**13**
Rosecrans St	Sports Arena Bl	Midway Dr	6	3	3	**12**
Rosecrans St	Pacific Hwy	Sports Arena Bl	3	5	1	**9**
Midway Dr	W. Point Loma Bl	Rosecrans St	3	3	2	**8**
Rosecrans St	Midway Dr	Barnett Ave	2	3	3	**8**
Pacific Hwy	Rosecrans St	Enterprise St	1	3	3	**7**
Pacific Hwy	Enterprise St	Sassafras St	0	4	3	**7**
Sports Arena Bl	W. Point Loma Bl	Rosecrans St	1	4	2	**7**
Pacific Hwy	Sassasfras St	Laurel St	0	5	1	**6**
Midway Dr	Rosecrans St	Barnett Ave	2	2	1	**5**
Barnett Ave	Rosecrans St	Pacific Hwy	1	1	2	**4**
Sports Arena Bl	Rosecrans St	Pacific Hwy	1	0	0	**1**

Source: Chen Ryan Associates, October 2015

PROJECT-READINESS-BASED PRIORITIZATION

Table 6-3 describes the project-readiness-based prioritization criteria and associated point assignment. Project-readiness-based prioritization considers right-of-way impacts, curb line reconfiguration impacts, right-of-way potential for high quality stormwater/greening improvements, and utility conflicts. There are a total possible 16 project-readiness-based prioritization points.

Table 6-3 Project-Readiness Prioritization Inputs and Associated Points

Right-of-Way Impact	Category		Prioritization Points
The dimension of the proposed project was compared to the available right-of-way to determine the potential need for right-of-way acquisition.	No Impact – Right-of-way is sufficient to construct proposed project		4
	Impact – Right-of-way will need to be acquired		0
Curb Impact	**Category**		**Prioritization Points**
The dimension of the proposed project was compared to the existing curb lines to determine the potential need for curb line reconfiguration.	No Impact – No curb line reconfiguration required		4
	Impact – Curb line reconfiguration is required		0
Right-of-Way Potential for Stormwater/Greening Improvements	**Category**		**Prioritization Points**
The right-of-way availability along the proposed project provides ample enough room to construct stormwater/greening treatments without sidewalk reconstruction	Right-of-way available		4
	Right-of-way not available		0
Utility Conflict	**Utility Items per Mile**	**Characteristic**	**Prioritization Points**
The following utilities were surveyed along the project segments: ▪ Traffic Lights ▪ Street Lights ▪ Transformers ▪ Vaults ▪ Storm Drains ▪ Fire Hydrants ▪ Cable/Phone Risers ▪ Bus Stops ▪ Water Meters ▪ Power Poles Fewer potential utility conflicts per mile were assigned higher prioritization points.	Less than 90 per mile	Low Conflict	4
	90-99 per mile	Medium-Low Conflict	3
	100-109 per mile	Medium Conflict	2
	110-139 per mile	Medium-High Conflict	1
	140 per mile or Greater	High Conflict	0

Source: Chen Ryan Associates, October 2015

Prioritization points are assigned if the proposed project dimensions do not exceed the right-of-way width of the roadway. Likewise, prioritization points are assigned if projects have no curb reconfiguration impacts, meaning the project does not differ from the existing curb-to-curb width or result in the removal or construction of a median. Points were also awarded if a project corridor has enough right-of-way to construct stormwater/ greening treatments without requiring major reconstruction of the sidewalk, such as would be required with the construction of suspended paving systems. The presence of utilities along the project segments was included in the prioritization process to capture ease of implementation. More utilities in the project segment would likely be associated with higher implementation costs. Utilities were surveyed and tabulated along the five main project corridors (Rosecrans Street, Midway Drive, Pacific Highway, Barnett Avenue and Sports Arena Boulevard).

The following types of utilities and infrastructure were surveyed:

- Traffic Lights
- Street Lights
- Transformers
- Vaults
- Storm Drains
- Fire Hydrants
- Cable/Phone Risers
- Bus Stops
- Water Meters
- Power Poles

Table 6-4 shows the project-readiness-based points assigned to each of the project segments.

Table 6-4 Project-Readiness Prioritization Points

Project Segment	From	To	Right-of-Way Impacts	Curb Impacts	Right-of-Way Potential for Stormwater/Greening Improvements	Utility Conflict	Project-Readiness Prioritization Points
Pacific Hwy	Enterprise St	Sassafras St	4	0	4	4	**12**
Pacific Hwy	Rosecrans St	Enterprise St	4	0	4	4	**12**
Pacific Hwy	Sassafras St	Laurel St	4	0	4	4	**12**
Barnett Ave	Rosecrans St	Pacific Hwy	0	4	4	3	**11**
Sports Arena Bl	Interstate 8	W. Point Loma Bl	4	0	0	3	**7**
Rosecrans St	Pacific Hwy	Sports Arena Bl	4	0	0	1	**5**
Rosecrans St	Sports Arena Bl	Midway Dr	4	0	0	1	**5**
Rosecrans St	Midway Dr	Barnett Ave	4	0	0	1	**5**
Midway Dr	W. Point Loma Bl	Rosecrans St	4	0	0	0	**4**
Midway Dr	Rosecrans St	Barnett Ave	4	0	0	0	**4**
Sports Arena Bl	W. Point Loma Bl	Rosecrans St	0	0	0	3	**3**
Sports Arena Bl	Rosecrans St	Pacific Hwy	0	0	0	3	**3**

Source: Chen Ryan Associates, October 2015

COMBINED NEED AND PROJECT-READINESS-BASED PRIORITIZATION POINTS

Table 6-5 presents the combined need and project-readiness-based prioritization scoring by project segment. The four highest scoring projects were ranked as "high" (18 to 20 points), the middle four scoring projects as "medium" (13 to 16 points), and the four lowest scoring projects as "low" (4 to 12 points).

Figure 6-3 displays the final prioritization results for the 12 project segments across the Midway community. As shown, the following four segments were ranked in the highest ranking category:

- Sports Arena Boulevard, from Interstate 8 to W. Point Loma Boulevard (20 points)
- Pacific Highway, from Enterprise Street to Sassafras Street (19 points)
- Pacific Highway, from Rosecrans Street to Enterprise Street (19 points)
- Pacific Highway, from Sassafras Street to Laurel Street (18 points)

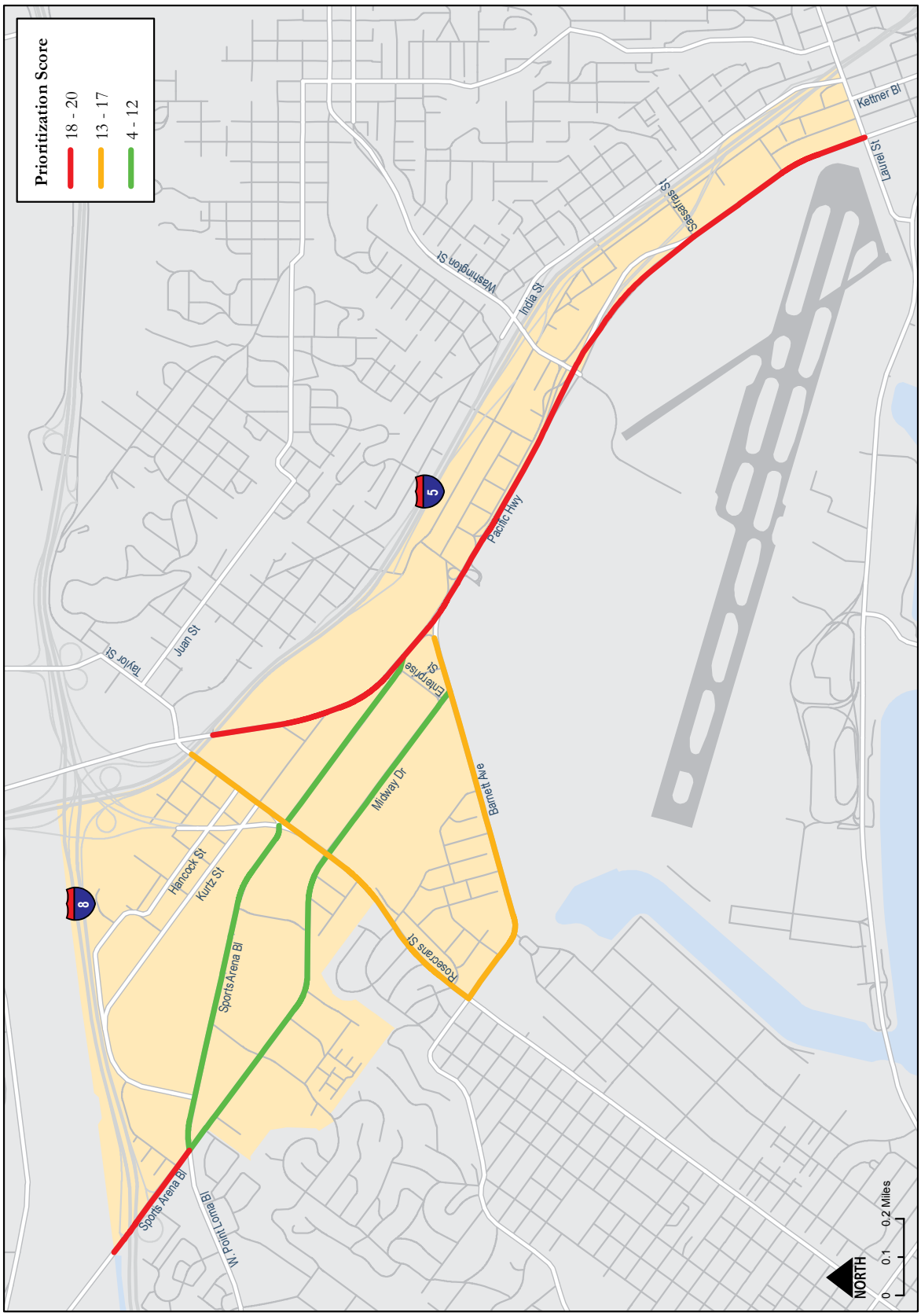
All three Pacific Highway segments scored in the highest category, highlighting both the need and readiness of improvements along the full extent of the Pacific Highway corridor within the Midway Community. These segments combined provide for both inter- and intra-community travel, with access points to the Old Town Community at the northerly part of the corridor and the Little Italy neighborhood of Downtown San Diego in the southerly part of the corridor. The Pacific Highway project segments are also components of the Coastal Rail Trail Regional Bicycle Corridor as identified in the San Diego Regional Bicycle Plan (2010), emphasizing the regional importance of this facility. The high ranking Sports Arena Boulevard segment also provides connections to neighboring communities, however, the adjacent project segments along Sports Arena Boulevard and Midway Drive ranked in the low and medium categories, respectively.

Table 6-5 Final Prioritization Points

Project Segment	From	To	Need-Based Prioritization Points	Project-Readiness Prioritization Points	Total Prioritization Points	Ranking
Sports Arena Bl	Interstate 8	W. Point Loma Bl	13	7	20	High
Pacific Hwy	Enterprise St	Sassafras St	7	12	19	
Pacific Hwy	Rosecrans St	Enterprise St	7	12	19	
Pacific Hwy	Sassafras St	Laurel St	6	12	18	
Rosecrans St	Sports Arena Bl	Midway Dr	12	5	17	Medium
Barnett Ave	Rosecrans St	Pacific Hwy	4	11	15	
Rosecrans St	Pacific Hwy	Sports Arena Bl	9	5	14	
Rosecrans St	Midway Dr	Barnett Ave	8	5	13	
Midway Dr	W. Point Loma Bl	Rosecrans St	8	4	12	Low
Sports Arena Bl	W. Point Loma Bl	Rosecrans St	7	3	10	
Midway Dr	Rosecrans St	Barnett Ave	5	4	9	
Sports Arena Bl	Rosecrans St	Pacific Hwy	1	3	4	

Source: Chen Ryan Associates, October 2015

Figure 6.1-3 Final Need and Cost-Based Prioritization Scoring for Midway Project Segments



6.2 COST ESTIMATE

The following cost estimate is a 30% design development level effort that identifies the various line items associated with a project of this type for Engineering (demolition, construction, utilities, etc.) Traffic (striping, signage) and Landscape Architecture (soils, irrigation, landscape). These costs will be revised / updated as the project is further refined by either City Staff or design consultants retained to continue the design and implementation of this project.

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
Surface Improvements				
6" Curb & Gutter (Type G-2)	5,272	LF	$22.00	$115,984.00
6" Curb & Gutter (Type G-1)	2,334	LF	$16.46	$38,424.88
Median Curb & Gutter (Type B-1)	4,977	LF	$13.20	$65,700.36
8" AC Dikes per G-5, (Type B)	2,879	LF	$15.43	$44,420.50
Curb Ramps per SDG 132 (Type A & B, New C	28	EA	$1,876.00	$52,528.00
4" PCC Sidewalk, per G-7	39,720	SF	$6.40	$254,210.24
Thermoplastic Crosswalk	3,982	SF	$3.00	$11,946.00
			Subtotal	$583,213.98
Demo				
AC Pavement Removal	43,217	SF	3.36	$145,208
Sidewalk Removal and Disposal	14,007	SF	2.01	$28,153
Curb & Gutter Removal	7,521	LF	$3.30	$24,819
Median Curb Removal	4,977	LF	$2.50	$12,443
Guard Rail Removal	2,527	LF	$20.00	$50,534
Street Light Removal	6	EA	$2,000.00	$12,000
Fence Removal	2,331	LF	$15.00	$34,966
Storm Drain Inlet Revmoal	10	EA	$2,500.00	$25,000
			Subtotal	$333,123.15
Treatment Control BMPS				
Biofiltration Swale	32,144	SF	$11.00	$353,584
			Subtotal	$353,584.00
Storm Drain Systems				
Catch Basin (Type G)	11	EA	$4,939.20	$54,331
Cleanouts (Type A)	2	EA	$4,630.50	$9,261
18" RCP Strom Drain	100	LF	$123.50	$12,350
			Subtotal	$75,942.20
Miscellaneous Improvements				
Miscellaneous Utility Relocation				$50,000
Street Light	17	EA	$7,260.00	$123,420
			Subtotal	$173,420.00
Irrigation				
Irrigation - Shrub/Tree Area	67,874	SF	$3.00	$203,622
Controller	1	EA	$10,000.00	$10,000
Point of Connection	1	EA	$10,000.00	$10,000
			Subtotal	$223,622.00

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
Planting				
Soil Preparation & Fine Grading	67,874	SF	$1.00	$67,874
Organic Mulch	660	(3") / CU YD	$50.00	$33,000
Trees - 48" Box	60	EA	$1,500.00	$90,000
Trees - 36" Box	10	EA	$750.00	$7,500
Trees - 24" Box	75	EA	$350.00	$26,250
Signing and Striping				
Detail 12 (4")	10,400	LF	$0.50	$5,200
Detail 25 (4")	5,200	LF	$0.50	$2,600
Detail 27B (6")	5,200	LF	$0.50	$2,600
Detail 39 (6")	11,560	LF	$0.50	$5,780
Detail 39A (6")	800	LF	$0.50	$400
Arrow Legends (Thermo)	300	SF	$5.00	$1,500
Bike Legends (Thermo)	700	SF	$5.00	$3,500
Crosswalk (Thermoplastic)	640	SF	$5.00	$3,200
RPM	866	EA	$5.50	$4,763
Roadside Signs	10	EA	$500.00	$5,000
			Subtotal	$34,543.00
		SUBTOTAL:		$2,348,942.33
	10%	CONTINGENCY:		$234,894.23
		TOTAL:		$2,583,836.56

6.3 DEMONSTRATION PROJECT

The Plan has taken the proposed concepts and recommendations and based on a prioritization analysis matrix, selected a length of Pacific Highway as the highest priority project to apply these concepts to for moving the project forward. The specific location is Pacific Highway from the centerline of Washington Street northward to the centerline of Couts Street, adjacent to the Veterans Village complex. The total distance of this initial design effort is approximately 2777 lineal feet. With this initial effort, the ideas, concepts and features developed and referenced in the Plan are being applied for the City to further refine and complete the plans, to coordinate with other agencies and to locate and secure funding for this project to be implemented for regional review and assessment for the completion of Pacific Highway and for the other streets in the Plan area and other communities in San Diego. See figures 6.3-1 through 6.3-7 for examples of the sheet set.

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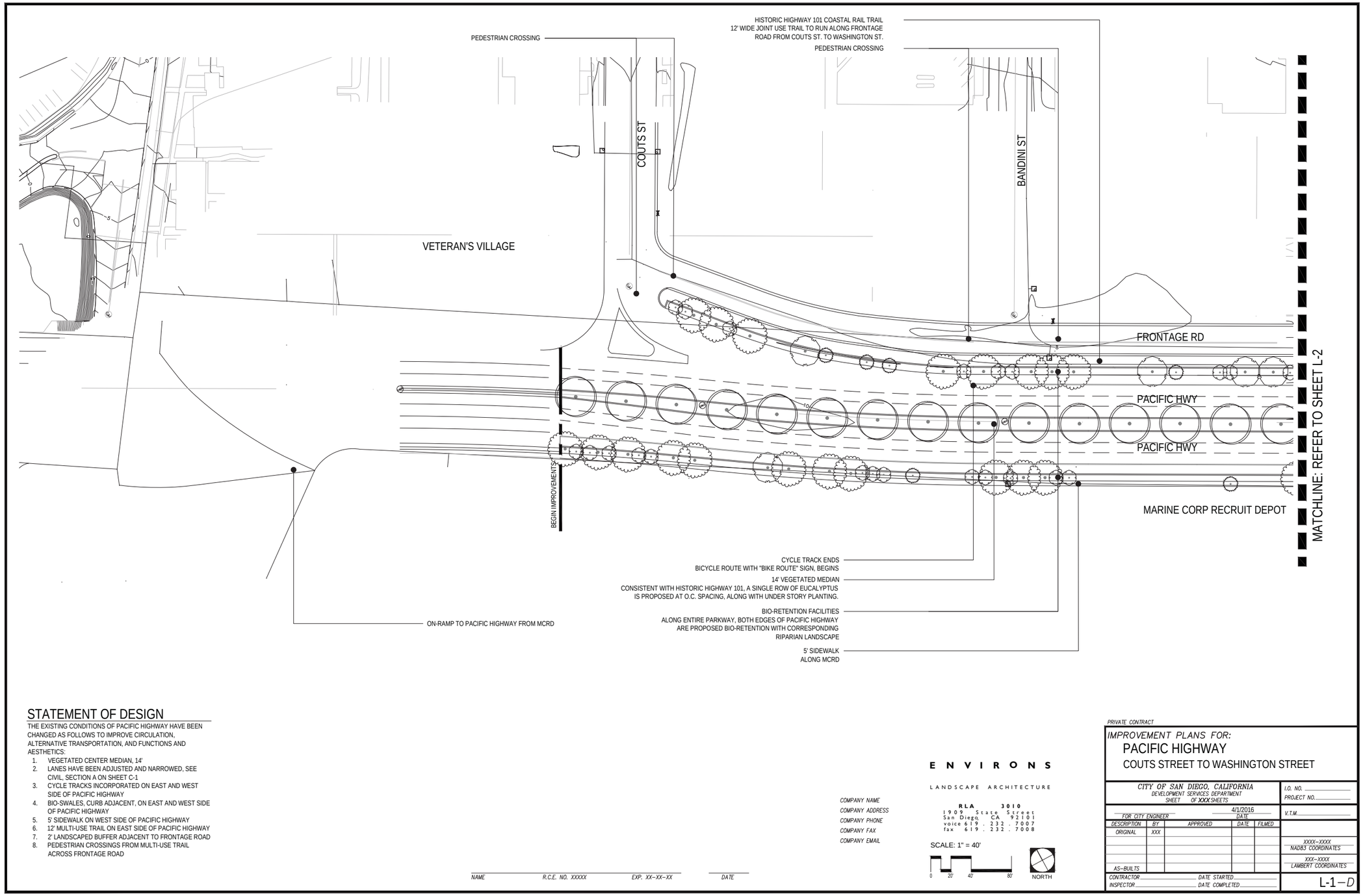
Figure 6.3-1 Planting Plan Sheet L-1



STATEMENT OF DESIGN

THE EXISTING CONDITIONS OF PACIFIC HIGHWAY HAVE BEEN CHANGED AS FOLLOWS TO IMPROVE CIRCULATION, ALTERNATIVE TRANSPORTATION, AND FUNCTIONS AND AESTHETICS:

1. VEGETATED CENTER MEDIAN, 14'
2. LANES HAVE BEEN ADJUSTED AND NARROWED, SEE CIVIL, SECTION A ON SHEET C-1
3. CYCLE TRACKS INCORPORATED ON EAST AND WEST SIDE OF PACIFIC HIGHWAY
4. BIO-SWALES, CURB ADJACENT, ON EAST AND WEST SIDE OF PACIFIC HIGHWAY
5. 5' SIDEWALK ON WEST SIDE OF PACIFIC HIGHWAY
6. 12' MULTI-USE TRAIL ON EAST SIDE OF PACIFIC HIGHWAY
7. 2' LANDSCAPED BUFFER ADJACENT TO FRONTAGE ROAD
8. PEDESTRIAN CROSSINGS FROM MULTI-USE TRAIL ACROSS FRONTAGE ROAD

NAME R.C.E. NO. XXXXX EXP. XX-XX-XX DATE

COMPANY NAME
COMPANY ADDRESS
COMPANY PHONE
COMPANY FAX
COMPANY EMAIL

ENVIRONS
LANDSCAPE ARCHITECTURE
RLA 3010
1909 State Street
San Diego, CA 92101
voice 619.232.7007
fax 619.232.7008

SCALE: 1" = 40'
0 20' 40' 80'
NORTH

PRIVATE CONTRACT

IMPROVEMENT PLANS FOR:
PACIFIC HIGHWAY
COUTS STREET TO WASHINGTON STREET

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
SHEET OF XXX SHEETS

I.O. NO.
PROJECT NO.
V.T.M.

4/1/2016
FOR CITY ENGINEER DATE

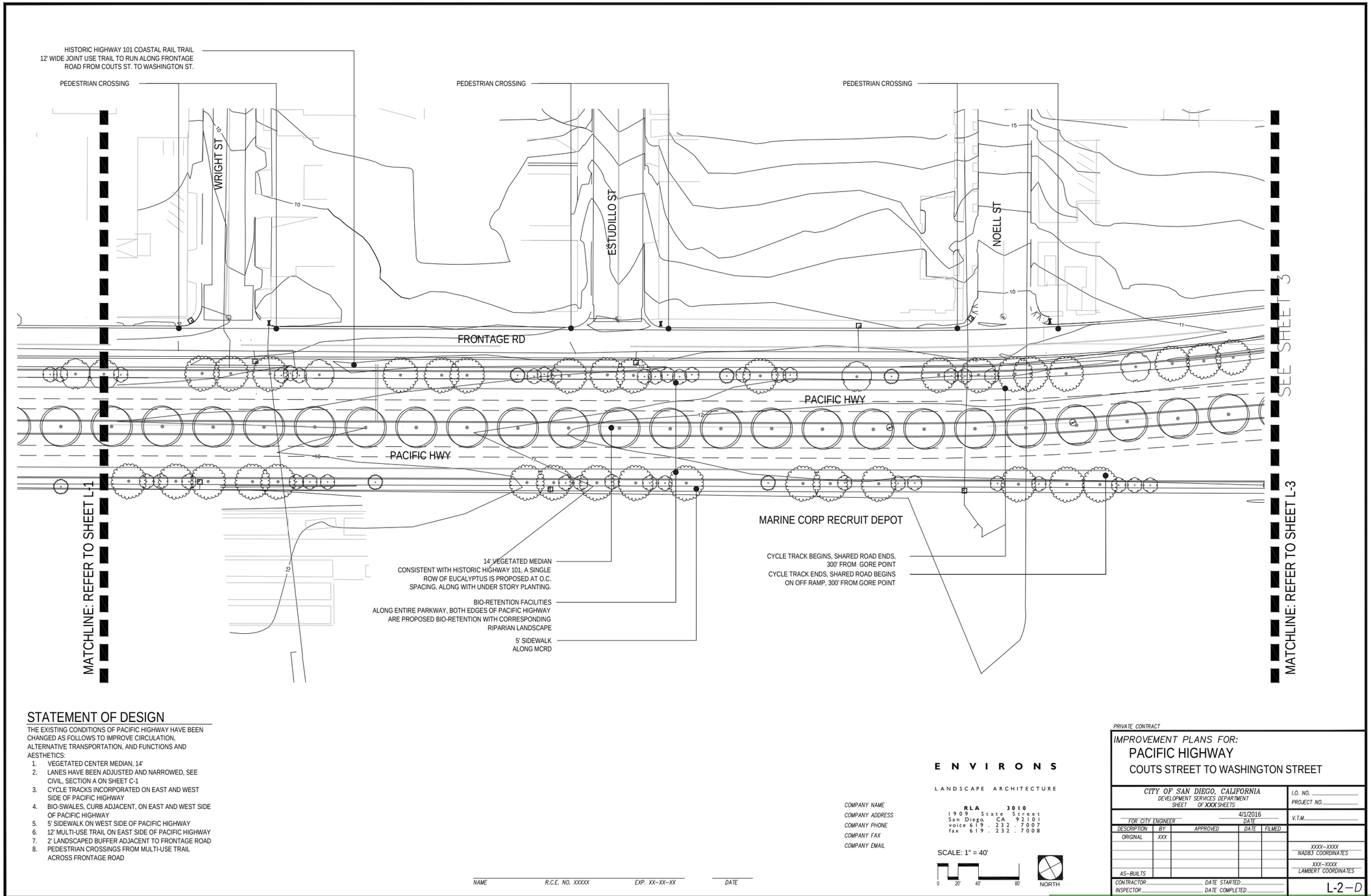
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	XXX			
AS-BUILTS				

XXXX-XXXX NAD83 COORDINATES
XXX-XXXX LAMBERT COORDINATES

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

L-1-D

Figure 6.3-2 Planting Plan Sheet L-2



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ORIGINAL	XXX			
AS-BUILTS				

XXXX-XXXX NAD83 COORDINATES

XXX-XXXX LAMBERT COORDINATES

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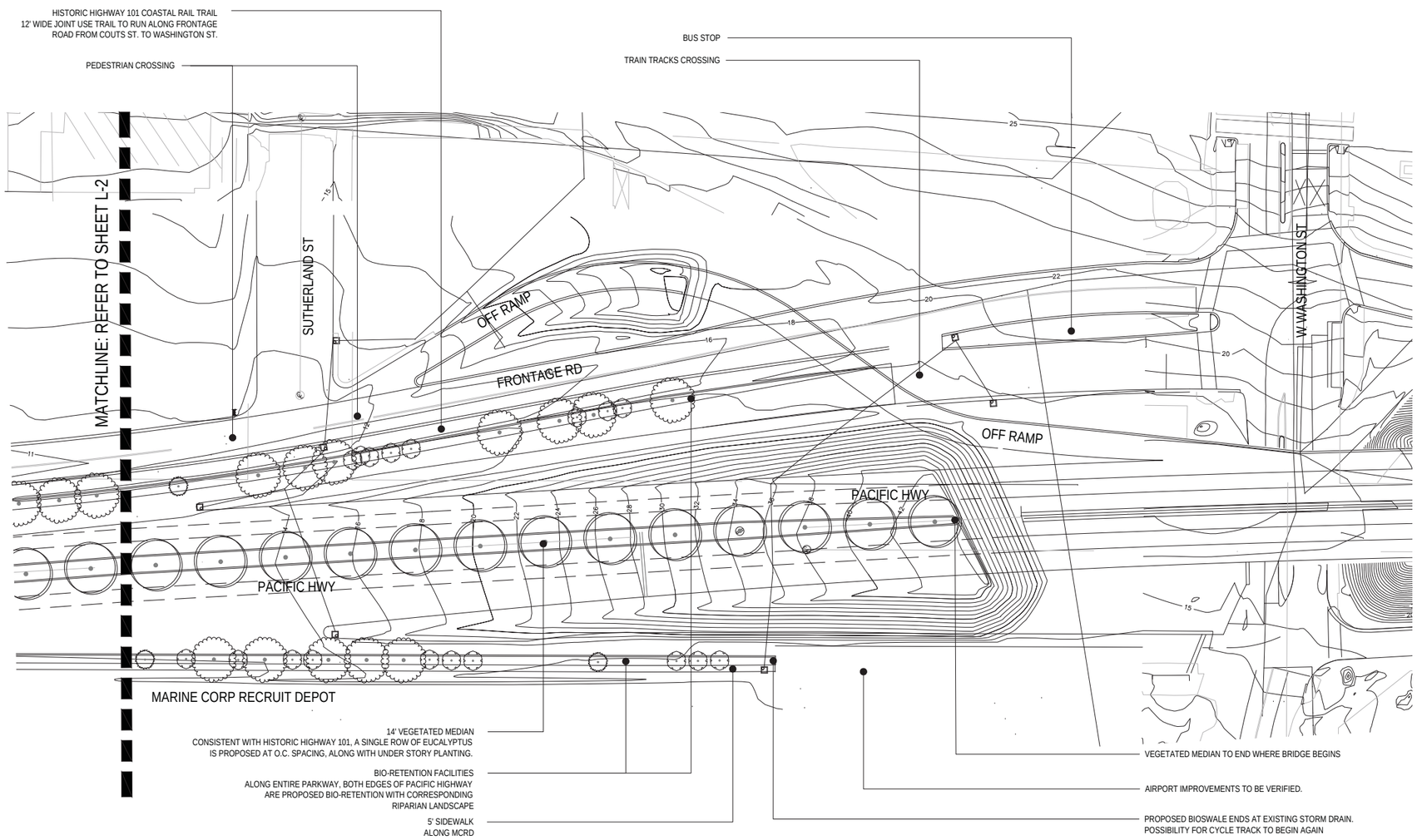
INSPECTOR DATE COMPLETED

L-2-D

Figure 6.3-3 Planting Plan Sheet L-3



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NAME R.C.E. NO. XXXXX EXP. XX-XX-XX DATE

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V.T.M.

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DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	XXX			
AS-BUILTS				

XXXX-XXXX NADB3 COORDINATES
XXX-XXXX LAMBERT COORDINATES

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

L-3-D

Figure 6.3-4 Planting Legend Sheet L-4

PLANT_SCHEDULE

TREES	BOTANICAL NAME	COMMON NAME	CONT
	CERCIS OCCIDENTALIS	WESTERN REDBUD	24"BOX
	CUPRESSUS ARIZONICA `BLUE ICE`	ARIZONA CYPRESS	24"BOX
	EUCALYPTUS POLYANTHEMOS	REDBOX	36"BOX
	PLATANUS RACEMOSA	CALIFORNIA SYCAMORE	24"BOX
	QUERCUS ILEX	HOLLY OAK	24"BOX

BIORETENTION/ RIPARIAN	BOTANICAL NAME	COMMON NAME
	ACHILLEA MILLEFOLIUM	COMMON YARROW
	BACCHARIS PILULARIS	DWARF COYOTE BRUSH
	CAREX DIVULSA	BERKELEY SEDGE
	CAREX PANSA	SANDDUNE SEDGE
	CAREX PRAEGRACILIS	SLENDER SEDGE
	CAREX SPISSA	SAN DIEGO SEDGE
	CHONDROPETALUM TECTORUM	CAPE RUSH
	FESTUCA RUBRA `MOLATE`	MOLATE FESCUE
	FRAGARIA CHILOENSIS	BEACH STRAWBERRY
	HETEROMELES ARBUTIFOLIA	TOYON
	IRIS DOUGLASIANA	DOUGLAS IRIS
	JUNCUS EFFUSUS	SOFT RUSH
	JUNCUS PATENS	CALIFORNIA GRAY RUSH
	LEYMUS CONDENSATUS `CANYON PRINCE`	NATIVE BLUE RYE
	MUHLENBERGIA RIGENS	DEER GRASS
	MYRICA CALIFORNICA	PACIFIC WAX MYRTLE
	ROSA CALIFORNICA	CALIFORNIA WILD ROSE
	SALVIA SPATHACEA	HUMMINGBIRD SAGE
	SALVIA ULIGINOSA	BOG SAGE
	SAMBUCUS MEXICANA	MEXICAN ELDERBERRY
	SISYRINCHIUM BELLUM	BLUE EYED GRASS
	SOLIDAGO CALIFORNICA	CALIFORNIA GOLDENROD

MEDIAN/ GROWS UNDER EUCALYPTUS	BOTANICAL NAME	COMMON NAME
	ABELIA X GRANDIFLORA	GLOSSY ABELIA
	ACACIA BAILEYANA	BAILEY ACACIA
	ACACIA BOORMANII	SNOWY RIVER WATTLE
	ACACIA CULTRIFORMIS	KNIFE ACACIA
	ACACIA GLAUCOPTERA	CLAY WATTLE
	ACACIA LONGIFOLIA	GOLDEN WATTLE
	ACHILLEA MILLEFOLIUM	COMMON YARROW
	AGAPANTHUS ORIENTALIS	LILY OF THE NILE
	ALOE SPECIOSA	ALOE
	APTENIA CORDIFOLIA	HEARTS AND FLOWERS
	ARCTOSTAPHYLOS EDMUNDSII `CARMEL SUR`	CARMEL SUR MANZANITA
	ARCTOSTAPHYLOS MANZANITA	MANZANITA
	ARCTOSTAPHYLOS PAJAROENSIS	PAJARO MANZANITA
	ARCTOSTAPHYLOS RUDIS `GREENHEART`	SHAGBARK MANZANITA
	ASPIDISTRA ELATIOR	CAST IRON PLANT
	BERGENIA CORDIFOLIA	HEARTLEAF BERGENIA
	BOUGAINVILLEA PERUVIANA	BOUGAINVILLEA
	CALAMAGROSTIS FOLIOSA	REED GRASS
	CALLISTEMON CITRINUS	LEMON BOTTLEBRUSH SHRUB
	CALLISTEMON CITRINUS `JEFFERSII`	BOTTLEBRUSH
	CALLISTEMON CITRINUS `LITTLE JOHN`	DWARF BOTTLE BRUSH
	CALOTHAMNUS QUADRIFIDUS	NETBUSH
	CARPENTERIA CALIFORNICA	BUSH ANEMONE
	CASSIA ARTEMISIOIDES	FEATHERY CASSIA
	CEANOTHUS X `WHEELER CANYON`	WESTERN LILAC
	CERCOCARPUS BETULOIDES	MOUNTAIN MAHOGANY
	CHAMELAUCIUM UNCINATUM	GERALDTON WAX FLOWER
	CHORIZEMA CORDATUM VARIUM	FLAME PEA
	CISTUS SPECIES	ROCKROSE
	CORREA PULCHELLA	AUSTRALIAN FUCHSIA
	CORREA X `DUSKY BELLS`	AUSTALIAN FUCHSIA
	CORREA X `IVORY BELLS`	IVORY BELLS AUSTRALIAN FUCHSIA
	COTONEASTER DAMMERI	BEARBERRY COTONEASTER
	COTONEASTER SALICIFOLIUS	COTONEASTER
	CRASSULA MULTICAVA	CAPE PROVENCE PYGMYWEED
	DELOSPERMA COOPERI	PURPLE ICE PLANT
	DIETES VEGETA	AFRICAN IRIS
	DROSANTHEMUM SPECIOSUM	ICE PLANT
	ECHIUM FASTUOSUM	PRIDE OF MADEIRA
	ELYMUS CONDENSATUS `CANYON PRINCE`	CANYON PRINCE WILD RYE
	ERIOGONUM GIGANTEUM	ST. CATHERINE`S LACE
	EURYOPS PECTINATUS	GOLDEN DAISY BUSH
	FREMONTODENDRON MEXICANUM	SOUTHERN FLANNEL BUSH
	GREVILLEA LANIGERA	WOOLY GREVILLEA
	HAKEA SUAVEOLENS	SWEET HAKEA
	HETEROMELES ARBUTIFOLIA	TOYON
	HEUCHERA MAXIMA	ISLAND ALUM ROOT
	ISOMERIS ARBOREA	BLADDERPOD
	JUNIPERUS SP.	JUNIPER
	LEPTOSPERMUM LAEVIGATUM	AUSTRALIAN TEA TREE
	LIGUSTRUM JAPONICUM	JAPANESE PRIVET
	LIRIOPE MUSCARI	LILY TURF
	LOMANDRA LONGIFOLIA	MAT RUSH
	MAHONIA AQUIFOLIUM	OREGON GRAPE
	MAHONIA AQUIFOLIUM `COMPACTA`	COMPACT OREGON GRAPE
	MELALEUCA NESOPHILA	PINK MELALEUCA
	MUHLENBERGIA RIGENS	DEER GRASS
	MYOPORUM PARVIFOLIUM	TRAILING MYOPORUM
	PENSTEMON DIGITALIS	BEARD-TONGUE
	PHILADELPHUS MEXICANUS	MOCK ORANGE
	PHORMIUM TENAX	NEW ZEALAND FLAX
	PITTOSPORUM TOBIRA	MOCK ORANGE
	RHAMNUS CALIFORNICA	CALIFORNIA COFFEE BERRY
	RHAMNUS CALIFORNICA `EVE CASE`	CALIFORNIA COFFEEBERRY
	RHAPHIOLEPIS UMBELLATA	YEDDA HAWTHORN
	RHUS OVATA	SUGAR BUSH
	RIBES INDECORUM	WHITE FLOWERED CURRANT
	RIBES VIBURNIFOLIUM	EVERGREEN CURRANT
	ROSA CALIFORNICA	CALIFORNIA WILD ROSE
	ROSMARINUS OFFICINALIS	ROSEMARY
	SALVIA LEUCOPHYLLA	PURPLE LEAF SAGE
	SOLLYA HETEROPHYLLA	AUSTRALIAN BLUEBELL
	WESTRINGIA FRUTICOSA	COAST ROSEMARY
	WESTRINGIA FRUTICOSA `WYNABBIE GEM`	WYNABBIE GEM COAST ROSEMARY

NAME R.C.E. NO. XXXXX EXP. XX-XX-XX DATE

COMPANY NAME
COMPANY ADDRESS
COMPANY PHONE
COMPANY FAX
COMPANY EMAIL

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AS-BUILTS				

XXXX-XXXX NAD83 COORDINATES
XXX-XXXX LAMBERT COORDINATES

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

L-4-D

Figure 6.3-5 Civil Engineering Sheet C-1

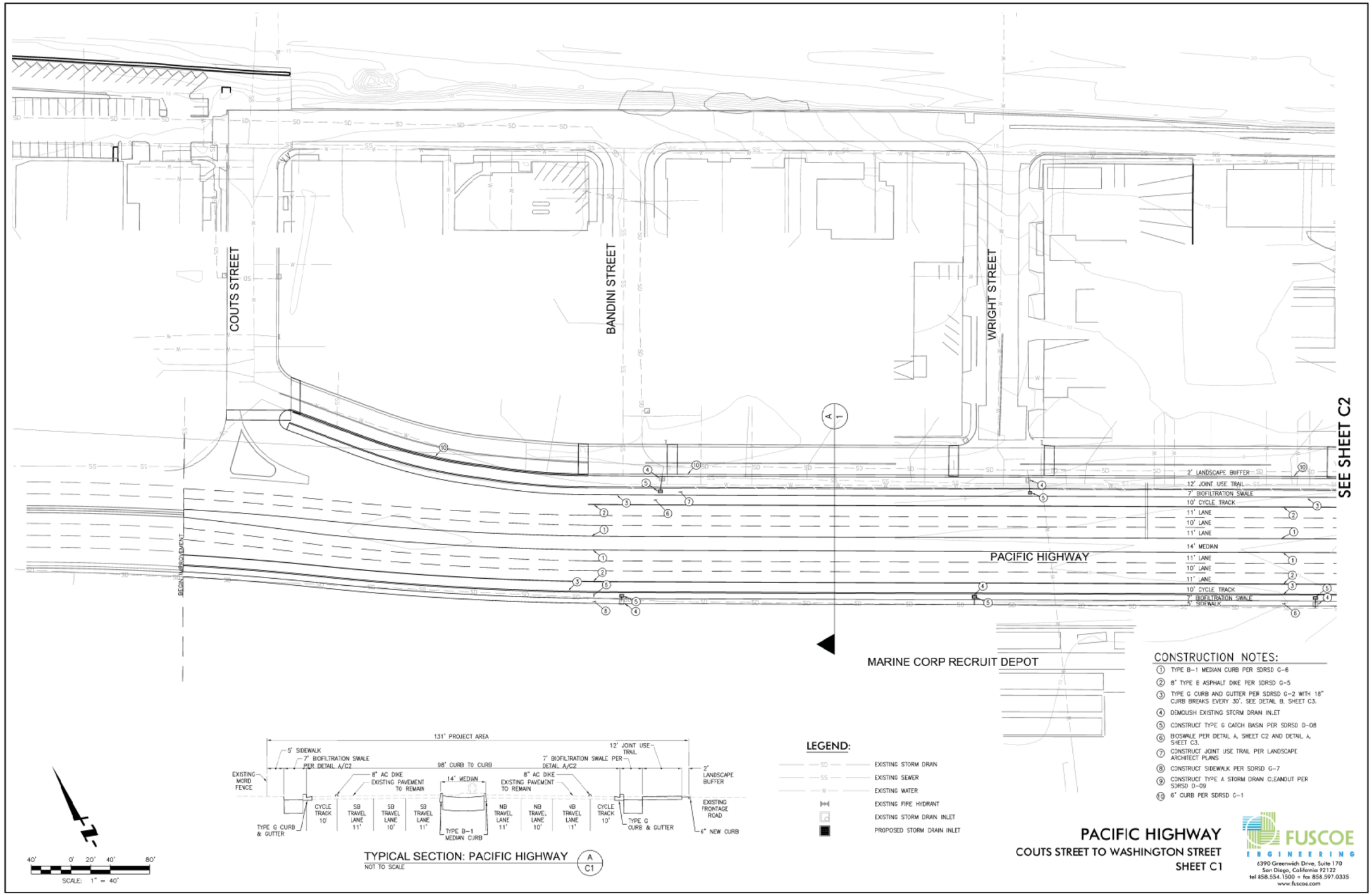


Figure 6.3-6 Civil Engineering Sheet C-2

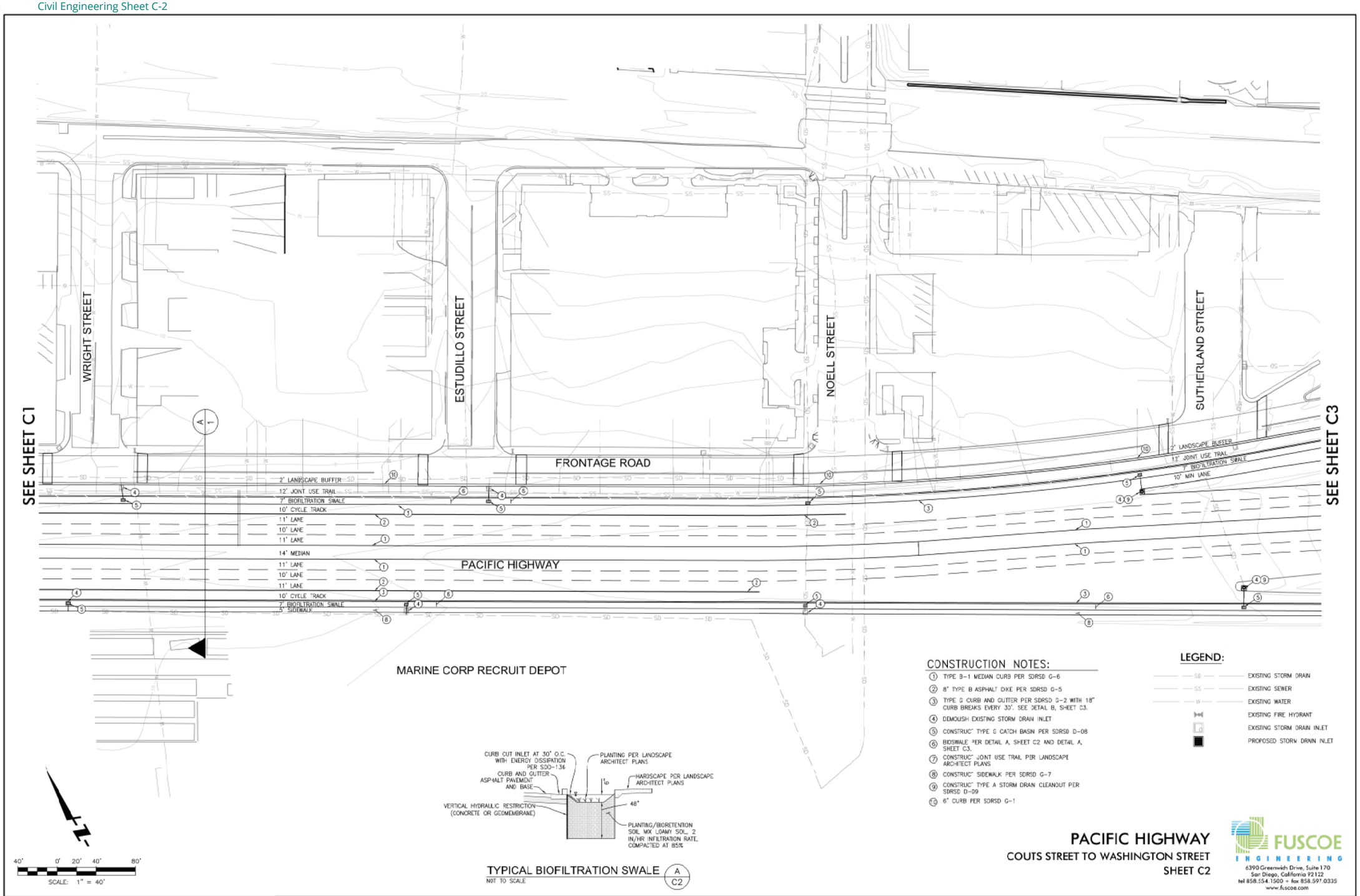
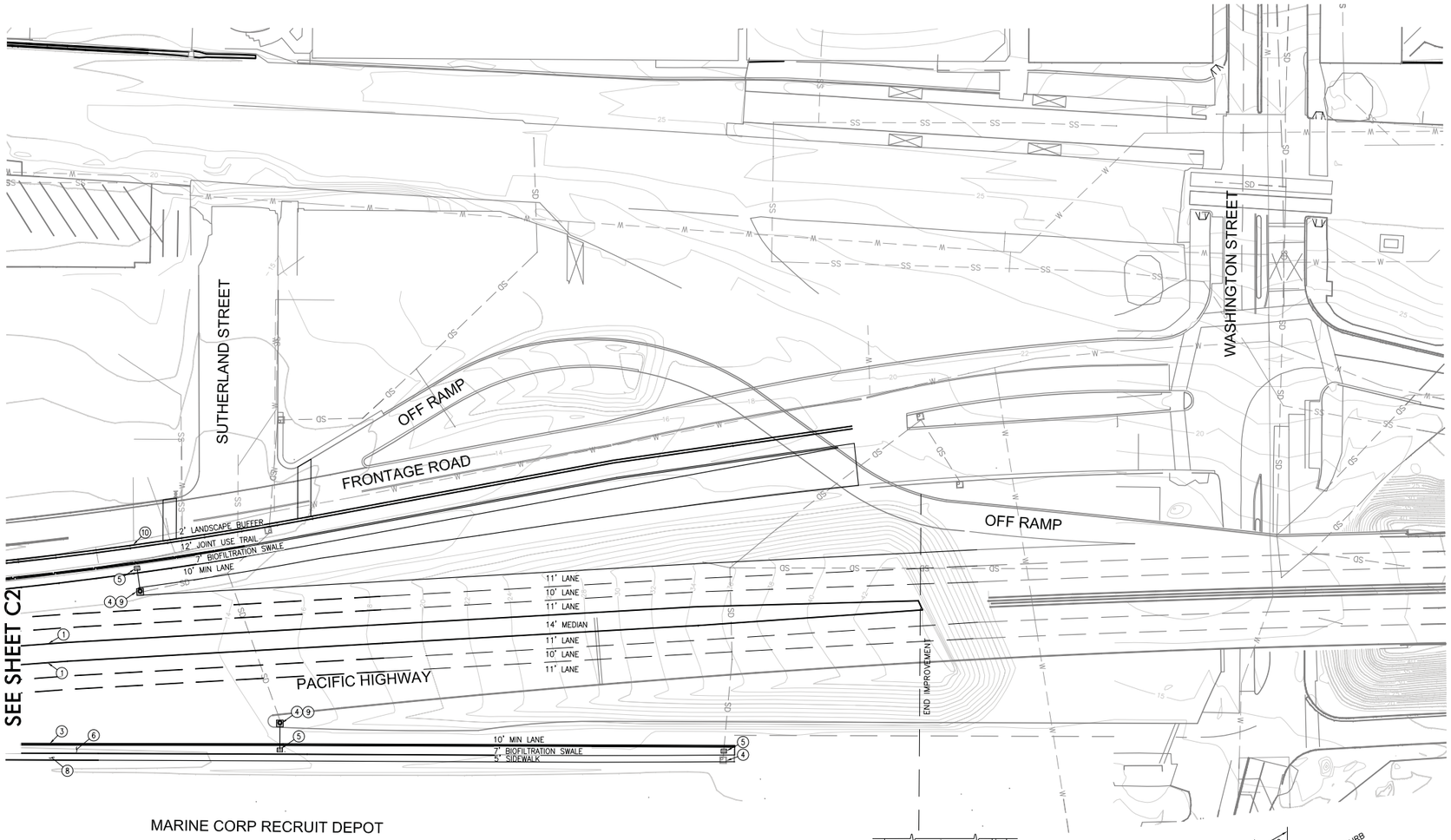


Figure 6.3-7 Civil Engineering Sheet C-3

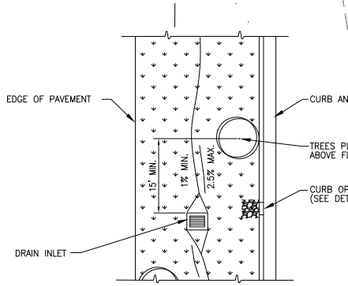


CONSTRUCTION NOTES:

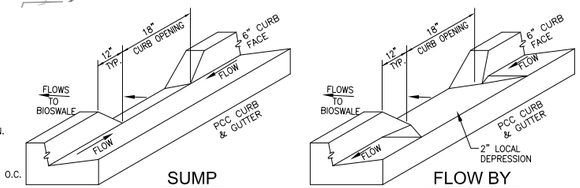
1. TYPE B-1 MEDIAN CURB PER SDRSD G-6
2. 8" TYPE B ASPHALT DIKE PER SDRSD G-5
3. TYPE G CURB AND GUTTER PER SDRSD G-2 WITH 18" CURB BREAKS EVERY 30'. SEE DETAIL B, SHEET C3.
4. DEMOLISH EXISTING STORM DRAIN INLET
5. CONSTRUCT TYPE G CATCH BASIN PER SDRSD D-08
6. BIOSWALE PER DETAIL A, SHEET C2 AND DETAIL A, SHEET C3.
7. CONSTRUCT JOINT USE TRAIL PER LANDSCAPE ARCHITECT PLANS
8. CONSTRUCT SIDEWALK PER SDRSD G-7
9. CONSTRUCT TYPE A STORM DRAIN CLEANOUT PER SDRSD D-09
10. 6" CURB PER SDRSD G-1

LEGEND:

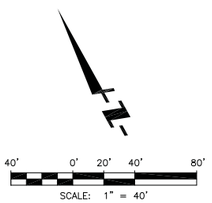
- SD — EXISTING STORM DRAIN
- SS — EXISTING SEWER
- W — EXISTING WATER
- EXISTING FIRE HYDRANT
- EXISTING STORM DRAIN INLET
- PROPOSED STORM DRAIN INLET



BIOFILTRATION SWALE A C3
NOT TO SCALE



CURB OPENING DETAIL B C3
NOT TO SCALE



PACIFIC HIGHWAY

COUTS STREET TO WASHINGTON STREET

SHEET C3

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

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