Chapter 3 – Affected Environment, Environmental Consequences, and Avoidance, Minimization and/or Mitigation Measures

This chapter describes the resources that would be affected by the proposed alternatives if they were implemented. This chapter establishes a baseline environmental situation against which decision makers and the public can compare the effects of all alternatives, and it serves as the baseline for the impact analysis that follows. Aerial photos of the study area are provided in *Figures 2-2.3, Sheets 1* through *67.* These photos depict the refined 8+4 Buffer alternative (Preferred Alternative). To aid in visualizing other alternatives, the 10+4 Buffer right-of-way, which approximates potential footprints for other build alternatives, is delineated on photos in Appendix K.

Along the I-5 North Coast Corridor, a focused study area was defined. The technical studies prepared for the project focus on this area and are listed below. The defined study area includes Mira Mesa Boulevard at I-805 in the City of San Diego, extending northward to the I-5 / I-805 merge, and I-5 from La Jolla Village Drive, extending northward approximately 27 mi to Harbor Drive/Vandegrift Boulevard in the City of Oceanside. The direct impacts relative to project implementation and construction are expected to occur within this study area.

The following technical studies were prepared in support of this Final EIR/EIS and are incorporated by reference:

Section 3.1

- I-5 North Coast Community Enhancement Plan, January 2008
- I-5 North Coast Community Enhancement Plan Project Notebook, January 2008

Sections 3.2 and 3.4

- I-5 North Coast Corridor Final Community Impact Assessment, October 2007, as amended
- Barrio Carlsbad Community Cohesion Report, Carlsbad, San Diego County, California, June 2008
- I-5 North Coast Managed Lanes Value Pricing Study from La Jolla Village Drive to Vandegrift Boulevard, Concept Plan Volumes I and II, April 2006
- Draft Relocation Impact Report for the I-5 North Coast Corridor Widening Project, October 2007
- Final Relocation Impact Statement, September 2013

Section 3.3

- North Coast Corridor Public Works Plan/Transportation & Resource Enhancement Plan
- Agricultural Viability Analysis for the Manchester Property in Encinitas and the Cannon Road Property in Carlsbad, California, September 2013

Section 3.6

- I-5 North Coast Freeway Operations Report, Prepared for the I-5 North Coast Corridor Project, June 2010
- Direct Access Ramps/Local Circulation System Impact Study, I-5 North Coast HOV/Managed Lanes Project, Technical Report No. 1, Area of Influence Analysis. Draft for Review and Comment, August 2, 2004
- Direct Access Ramps/Local Circulation System Impact Study, I-5 North Coast HOV/Managed Lanes Project, Technical Report No. 2, Existing Conditions Data Collection. Draft for Review and Comment, August 2, 2004
- Direct Access Ramps/Local Circulation System Impact Study, I-5 North Coast HOV/Managed Lanes Project, Technical Report No. 3, Traffic Analysis Methodologies and Standards. Draft for Review and Comment, July 28, 2004
- I-5 North Coast HOV/Managed Lanes Project, Technical Report No. 4, Existing Conditions Traffic Analysis, March 8, 2006
- I-5 North Coast Corridor Project, Technical Report No. 5, Traffic Demand Forecasting Report, August 2007
- I-5 North Coast Corridor Project, Draft Technical Report No. 6, Freeway Interchange Operations Report, August 2007
- I-5 North Coast Corridor Project, Draft Technical Report No. 7, Direct Access Ramps/Local Circulation System Operations Report. Draft, August 2007
- I-5 North Coast Traffic Report. A Summary of Traffic Reports, Prepared for the I-5 North Coast Corridor Project, November 2008, Revised June 2010

Section 3.7

- Interstate 5 North Coast Corridor Project Visual Impact Assessment, April 2009, as amended
- Design Guidelines: Interstate 5 North Coast Corridor Project, September 2013

Section 3.8 – Available to authorized parties upon request

- Historic Property Survey Report, March 2007, as amended
- Sixth Supplemental Historic Property Survey Report, March 2013
- Archaeological Survey Report, 2002, as amended
- Archaeological Evaluation Reports, June 2004, December 2006
- Extended Phase 1 Testing Reports for CA-SDI-6882, February 2005
- Phase I Geomorphic Assessment for Buried Archaeological Resources, May 2005
- Historic Resource Evaluation Report, July 2005, as amended

Section 3.9

- Interstate 5 North Coast Floodplain Studies Books 1, 2, and 3, February 2008 and February 2009

Section 3.10

- Interstate 5 North Corridor Water Quality Report, July 2009
    - Water Quality Technical Memorandum For I-5 North Coast Corridor Project, August 2013

Section 3.11

- Preliminary Geotechnical Report, Interstate 5 Widening, October 5, 2005

Section 3.12 – Available to authorized parties upon request

- Paleontological Resource Assessment, *I-5 NCC Project*, Caltrans District 11, San Diego County, California, June 2009

Section 3.13

- Site Investigation Report, Lead Investigation on the Route 5, from Via de la Valle to Leucadia Boulevard, San Diego, Solana Beach, and Encinitas, California, KP: R57.9/R68.7; PM: R36.0/R42.7, June 22, 2001
- Aerial Deposited Lead Investigation, Contract No. 43A0012, Task Order No.: 11-07830K-VV for the Route 5 Between Leucadia Boulevard and Brooks Street, San Diego County California. PM: R42.7/R51.2, KP: R68.7/82.4, June 28, 2001
- Limited Phase II Environmental Site Assessment Interstate 5 Expansion, Del Mar Heights Road to Birmingham Drive, San Diego California, November 15, 2005
- Phase II Environmental Site Assessment Interstate 5 Expansion, Birmingham Drive to Vandegrift Boulevard, San Diego County, California, October 31, 2006
- Aerially-Deposited Lead Survey – Interstate 5 and Genesee Avenue, San Diego, California, January 9, 2008

Section 3.14

- Air Quality Analysis for the I-5 North Coast Corridor Project, August 2007
- Draft Mobile Source Air Toxics Analysis, June 2008, as amended
- Final Mobile Source Air Toxics Analysis, May 2013
- Final Air Quality Analysis Update for the I-5 North Coast Corridor Project, August 2013

Section 3.15

- Final Noise Study Report for Interstate 5 North Coast Corridor Widening Project, April 2007
- Preliminary Noise Abatement Decision Report (NADR) Volumes 1 and 2, June 2007

Sections 3.17 through 3.22

- Interstate 5 North Coast Corridor Project Natural Environment Study (NES), June 2008
  - I-5 Widening Project Pacific Pocket Mouse Habitat Analysis and Trapping Program San Diego County, California, June 2003 (Appendix B)
  - I-5 Lagoons Marine Resource Investigation, June 2006 (Appendix C)
  - Noise Report for Sensitive Wildlife Receptors within the *I-5 NCC Project*, September 2006 (Appendix F)
- Manchester Avenue/Interstate 5 Interchange Project NES Report, January 2004
- San Elijo Lagoon Bridge Optimization Study, Final Report, April 2012
- Batiquitos Lagoon Bridge Optimization Study, Final Report April 2012
- I-5 Bridge Study at Buena Vista Lagoon, Fluvial Hydraulics and Residence Time Analysis, Final Report, May 2012
- Hydrodynamic Approach to Wetland Restoration by Optimization of Bridge Waterways, October 2010

- San Diego Regional Lagoon Planning Studies: Phase 2, October 2010
- Presence/Absence Surveys for Wandering Skipper, September 2012
- Resource Enhancement Mitigation Program, July 2013

The analysis of environmental impacts and proposed mitigation measures presented in the following sections of this document are based on preliminary project design and current environmental information and circumstances. The EIR/EIS draws from the studies for information and incorporates information which may be more current than that contained in the technical reports listed above.

HUMAN ENVIRONMENT

3.1 Land Use

This section discusses whether the proposed project would have impacts to existing and planned land uses. This section is based largely on the October 2007 Community Impact Assessment (CIA), as amended; a separate technical study prepared for the proposed project and incorporated by reference. The Land Use section includes:

- Existing and Future Land Use;
- Consistency with State, Regional and Local Plans and Programs; and
- Park and Recreational Facilities.

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.1.1 Existing and Future Land Use

3.1.1.1 Affected Environment

The project corridor traverses six municipalities; including San Diego, Del Mar, Solana Beach, Encinitas, Carlsbad, and Oceanside (see *Figure 3-1.1, Study Area Communities*). Existing land use, development trends, and future land use development projects are discussed for each of these six cities below. Future projects discussed in this section are consistent with those listed in *Table 3.25.2, Summary of Cumulative Projects,* for the I-5 corridor. *Figure 3-1.1* identifies the study area communities for this land use section. *Figures 3-1.2* through *3-1.9* depict the existing land uses within the communities adjacent to the proposed project. These 11-by-17-inch figures are located at the end of this section.

City of San Diego

Existing Land Use

For the purposes of this analysis, the portion of the City of San Diego that may be affected by the proposed project includes the area east of Del Mar at the northern City limit and south approximately to La Jolla. San Diego is the largest city adjacent to or near the proposed project with regard to total population (1,301,617 in 2010) and overall land area (342.5 square mi). There are 52 defined communities within San Diego. Communities adjacent to the proposed project are shown in *Figure 3-1.1* and include La Jolla, University, Torrey Pines, Torrey Hills, and Carmel Valley. *Figure 3-1.2* shows general land use patterns surrounding the proposed project. Primary land uses include parks and open space and residential. Additional uses include commercial, industrial park, light industrial-general, and UCSD.

The majority of the land surrounding the proposed project within the City of San Diego is either developed and urban in nature or is preserved as open space. As shown in *Figure 3-1.2*, a large amount of land surrounding the proposed project is designated for residential uses. Residential developments are generally located in the Carmel Valley community east of Del Mar, and in the southern area around UCSD. However, the topography of the area has required that a large amount of land, primarily canyons, remain as open space as well. An open space corridor of conserved land that cannot be developed is associated with the San Dieguito River Valley in the northern portion of San Diego. Open space areas are also located at Torrey Pines State Reserve west of I-5 along the Pacific Coast, and at Los Peñasquitos Canyon Preserve located east of I-805. Commercial areas are generally located along major transportation corridors including I-5, Del Mar Heights Road, and Mira Mesa Boulevard, and surrounding UCSD. These commercial and business park centers typically serve multiple surrounding neighborhoods, as well as the college area. Industrial uses cover a large portion of land use within San Diego as well and are generally located in the communities of Mira Mesa and Torrey Pines, east of I-805 and in the northwest portion of University north of UCSD.

As stated previously, the proposed project is located within five community planning areas within the City of San Diego. A brief description of the land use patterns for each community is described below.

The Torrey Hills community is composed primarily of residential areas, has large amounts of open space and industrial areas, and several small commercial areas. Residential uses range from very low-density residential to medium low-density residential in densities up to 29 dwelling units per acre (du/ac). Existing residential land uses are located north of Carmel Mountain Road, south of Arroyo Sorrento Road, west of Vista Sorrento Parkway, and along West Ocean Air Drive and East Ocean Air Drive. Commercial uses in Torrey Hills are located in the northwestern portion of the community along El Camino Real.

The University Community is composed of a balanced mix of residential, commercial, school, public facilities/institutional, industrial, park, and open space land uses. Existing residential uses differ in the northern and southern portions of the community. Residential units on the northern portion of the community consist of townhouse and condominium developments with densities as high as 75 du/ac, while residential units on the southern portion of the community consist predominantly of single-family residential units on 5,000 square-ft minimum lots. The University Community has two large clusters of commercial and office uses along La Jolla Village Drive.

The Carmel Valley Neighborhoods Composite Plan Land Use Map shows existing and planned land uses for the 10 precise planning areas within Carmel Valley. Land uses within Carmel Valley consist primarily of residential areas and natural open space. Residential uses range from spaced rural residential to medium-density residential in densities between 1 and 59 du/ac. Land uses north of SR-56 are predominately residential uses while land uses south of SR-56 are primarily natural open space.

The Torrey Pines Community is composed of a balanced mix of residential, commercial, industrial, and open space land uses with small amounts of school and public utility/facility uses. Residential land uses are concentrated in the northern portion of the planning area and range from very low-density residential to medium-density residential in densities between 0 and 44 du/ac. Existing residential land uses are located in the northern portion of the planning area along Del Mar Heights Road and Carmel Valley Road. Commercial land uses exist along Via de la Valle, Del Mar Heights Road, and Carmel Valley Road. The southern portion of the planning area consists of industrial land uses located in Sorrento Valley.

The La Jolla Community is composed primarily of residential uses (58 percent) and has substantial amounts of park and open space areas (16 percent) as well. Residential uses range from very low-density residential to medium high-density residential in densities between 0 and 45 du/ac. The vast majority of residential land uses within the planning area consist of very low density residential uses located in the interior of the planning area, while high density residential uses are located near the coast. Commercial/mixed use designations exist along the coast, while park and open space uses are located throughout the planning area.

Development Trends

Development of the San Diego metropolitan area has reflected the rapid population growth and urbanization seen throughout California in recent decades. During the 1980s, economic diversification and high job growth in San Diego led to a 35 percent population increase. As the majority of the area is now developed and land use patterns are established, future development can occur in a more directed manner than the growth that occurred during the preceding 40 years.

A vision of growth within San Diego is introduced in the Strategic Framework Element of the 2008 General Plan. The Strategic Framework Element states:

> This General Plan sets out the City's policies for wise land use and the provision of services to maintain, and where necessary improve, San Diego's natural and built environments, and its residents' quality-of-life. Over the last two centuries, San Diego has grown by expanding outward onto land still in its natural state. This is the first General Plan in the City's continuing history that must address most future growth without expansion onto its open lands. It establishes the strategic framework for how the City grows while maintaining the qualities that best define San Diego.

The 2008 General Plan presents development guidance in 11 elements: Land Use and Community Planning; Mobility; Economic Prosperity; Public Facilities, Services and Safety; Urban Design; Recreation; Historic Preservation; Conservation; Noise; and Housing. The overarching public policy for the distribution of future land use, both public and private in the General Plan is based on a "City of Villages" strategy, where development is focused in mixed-use activity centers that are pedestrian-friendly districts linked to an improved regional transit system.

Future Land Use

Future land uses near the proposed project are shown in *Figure 3-1.3.* Five proposed/planned projects (representing potential land use changes) would be located near the proposed project. These projects include the Scripps Hospital La Jolla Master Plan, Flower Hill Promenade Project, One Paseo Project, Via de la Valle Road Widening, and San Dieguito River Park Nature Center. Development of these projects is neither tied to, nor dependent upon, the proposed project.

Del Mar

Existing Land Use

Del Mar is the smallest city located near the proposed project, as well as in San Diego County, with regard to population (4,161 in 2010) and overall land area (1.79 square mi). The City of Del Mar is a long and narrow area centered along Camino Del Mar. *Figure 3-1.2* shows general land use patterns for Del Mar. Del Mar, due to its small size and desirable location, has been completely developed as an urbanized city.

Del Mar is composed primarily of residential areas with several interspersed commercial areas. The City of Del Mar Local Coastal Program (LCP) divides Del Mar into 10 districts, which have varying land uses. Residential uses range from estate residential to high-density residential with densities between 1 and 17.5 du/ac. Single-family residential development is the main land use, comprising 62 percent of total housing land area. Of this, low-density residential (1 to 4 du/ac) is the most common, which is generally located south of the Del Mar Fairgrounds and west of Camino Del Mar (City of Del Mar 1976). Very low-density and modified low-density uses (1 to 3.1 du/ac) are located in northern Del Mar, near San Dieguito Lagoon. The area west of Camino Del Mar includes a range in density from 4.3 to 17.4 du/ac. Multi-family residential developments comprise 38 percent of residential land uses in Del Mar. The southern coastal area is zoned for a maximum density of 10.9 du/ac and mainly contains multi-family residential developments.

Commercial uses in Del Mar are generally located along Camino Del Mar, an area known as "Del Mar Center." The Del Mar Center is Del Mar's principal commercial, visitor-serving, and professional area. This area is also included in the Del Mar Hotel and Del Mar Plaza Specific Plans. The Del Mar Hotel planning area limits uses to the hotel, timeshare units, and associated retail uses. The Del Mar Plaza planning area limits uses to restaurant and retail with a small percentage for office use. The primary use in Del Mar Center, however, is commercial, serving the needs of both residents and visitors.

The Del Mar Fairgrounds and Racetrack, a regionally important sporting and entertainment venue, is located in the northern portion of Del Mar and is separated from residential neighborhoods to the south by the San Dieguito River and floodway. This area is managed by the 22nd District Agricultural Association (22^{nd} DAA), an independent agency of the State of California.

Development Trends

Del Mar has been nearly entirely developed since its incorporation in 1986. Del Mar has experienced lower population growth than the region as a whole. The Draft 2013 to 2020 Housing Element of the Community Plan attributed slower growth to be most likely due to the high costs of land and construction, governmental regulations, infrastructure, environmental sensitivities, and general economic constraints. Based on development between 1990 and 2010, the City had constructed about four units annually. As Del Mar is extensively developed, future development would most likely involve infill and redevelopment on existing lots.

Future Land Use

Future land uses near the proposed project are shown in *Figure 3-1.3*. There are two proposed/planned projects (representing potential land use changes) located near the proposed project within Del Mar, the Riverview Offices Project and 22nd District Agricultural Association Fairgrounds and Horsepark Master Plan. Development of these projects is neither tied to, nor dependent upon, the proposed project.

Solana Beach

Existing Land Use

Following Del Mar, Solana Beach is the second smallest city in the proposed project vicinity with regard to population (12,867 persons as of 2010) and overall land area (3.42 square mi). *Figure 3-1.4* shows general land use patterns within Solana Beach. Solana Beach, due to its small size and desirable location, has been almost completely developed as an urbanized city.

As Solana Beach is extensively developed, future development would primarily involve infill and redevelopment projects. Such development is more likely to occur west of I-5 along Highway 101, Cedros Avenue, and Lomas Santa Fe Drive due to the age and mix of the existing development. Further, most of the area east of I-5 and north of Lomas Santa Fe Drive has been developed according to a master plan and is expected to experience very little new development activity over the next 20 years.

Approximately 58 percent of land in Solana Beach is designated for residential uses, with a range of densities from estate residential to high-density residential (0 to 20 du/ac). Low-medium residential (4 du/ac) is the most common density, comprising 17 percent of the total land in Solana Beach. Covering a total of 375.5 ac, low-medium residential provides 1,502 housing units. This density is typically found in the northeast and northwest portions of Solana Beach. Estate residential (0 to 2 du/ac) comprises 12.5 percent of land in Solana Beach and is generally located east of I-5 and south of Lomas Santa Fe Drive. Medium-high and high-density residential, 8 to 12 and 13 to 20 du/ac respectively, are generally associated with multi-family residential. Higher-density multi-family residential developments are located along the Pacific coast, the southwest municipal boundary, Lomas Santa Fe Drive east of I-5, and adjacent to the I-5 corridor south of Lomas Santa Fe Drive. Together, medium-high and high-density residential account for 9.9 percent of the total area and provide 3,112 housing units.

Commercial land use designations cover approximately 6.8 percent of the total land area in Solana Beach. As shown in *Figure 3-1.4*, commercial areas are generally located along major transportation corridors. These include Highway 101, Cedros Avenue, Lomas Santa Fe Drive, and Stevens Avenue. The Highway 101 corridor, which is also covered by the Highway 101 Corridor Specific Plan, provides diverse commercial uses for residents as well as tourists. Mixed-use commercial, office, and residential uses are located along Highway 101. The Cedros Design District is located along Cedros Avenue between Lomas Santa Fe Drive and Via de la Valle. It offers shopping and art galleries for residents as well as the tourist base. Lomas Santa Fe Drive, as the main interchange into Solana Beach, also provides commercial activity centers, including community and neighborhood shopping such as grocery stores and large retailers. In addition, the Eden Gardens/La Colonia neighborhood in south Solana Beach near Stevens Avenue has a mixed-use commercial center.

Development Trends

When Solana Beach was incorporated in 1986, the population was estimated to total 14,892 persons. The population of Solana Beach in 2010 totaled 12,867 persons (U.S. Bureau of the Census 2010). In contrast to the larger cities to the north, Solana Beach has experienced a prolonged overall decline in population, which has been primarily attributed to an increase in vacancy rates, a decrease in the average household size, and an apparent increase in the number of housing units purchased as second homes.

Solana Beach was already almost entirely developed at the time of its incorporation. East of I-5 in Solana Beach, residential areas are completely developed. West of I-5, there are some scattered vacant sites either designated or considered suitable for residential use; however, future development trends within the City would most likely be in the form of redevelopment and infill development. The City encourages the "expansion of housing development opportunities by mixed-use developments." Adopted amendments to the General Plan facilitate this growth. "In order to implement the City's Redevelopment Plan, Mixed-Use Concepts of the Highway 101 Vicinity Specific Plan and Housing Element, residential uses are allowed as a secondary use in conjunction with permitted commercial uses."

Future Land Use

Future land uses near the proposed project are shown in *Figure 3-1.5*. There are three known, potential projects (representing potential land use changes) near the freeway corridor within Solana Beach. These include the current USACE, Encinitas and Solana Beach Shoreline Protection Project, as well as two prior planned projects: the Solana Beach Gateway Resort Project (terminated and now slated for an open space park), and the Mixed-Use Solana Beach Train Station ("Cedros Crossing") Project (terminated in 2008). As the latter two projects are no longer being planned, they are not further addressed in *Section 3.1.* Implementation of the shoreline protection effort is neither tied to, nor dependent upon, the proposed project.

Encinitas

Existing Land Use

The City of Encinitas is the fourth most populous city located near the proposed project, with a population in 2010 of 59,518 persons and a total land area of 19.4 square mi. *Figure 3-1.4* shows general land use patterns surrounding the proposed project. Encinitas is largely an urbanized city, although the eastern areas have a more rural quality, established through the presence of open space, agricultural areas, and large-lot residential development. According to the Encinitas Land Use Map (City of Encinitas 2003), the land in north Encinitas is designated for rural residential uses (one to two du/ac) and the vacant land in southern Encinitas is categorized as rural residential and open space/ecological resource/park. Both of the vacant pieces of land in southern Encinitas are Special Study Areas, indicating development constraints and the need to conserve unique natural resources.

The majority of land adjacent to the freeway corridor is developed and urban in nature. Vacant land, though limited due to the urbanized nature of most of Encinitas, is located east of I-5 near Batiquitos Lagoon, west of I-5 at Santa Fe Drive, and east of South El Camino Real near Manchester Avenue. As shown in *Figure 3-1.4*, land uses adjacent to I-5 are predominately a mixture of residential, commercial, open space, and agriculture. The dominant designated land use in Encinitas is single-family residential. Residential densities within Encinitas range from 0.25 to 25.0 du/ac. Land east of I-5 within Encinitas is primarily single-family residential with typical densities ranging from 1 to 8 du/ac. High-density multi-family residential ranging from 11 to 15 du/ac is located along Encinitas Boulevard and along the coastal areas. The eastern portions of Encinitas are characterized by rural residential developments and planned open space.

Commercial centers and multi-family residential units are generally located along major roads, including the length of Coast Highway 101, Encinitas Boulevard, and El Camino Real. Open space preserves are generally located to the east of I-5 around Batiquitos Lagoon, San Elijo Lagoon, and the Encinitas Ranch Golf Course. Parks are generally located near residential neighborhoods and schools. An open space corridor of conserved open space associated with Batiquitos Lagoon is located around the Encinitas Ranch Golf Course; however, there is some residential use north of the course. Agricultural areas are also located around the Encinitas Ranch Golf Course.

Development Trends

As with the majority of coastal cities in southern California, Encinitas has grown at a relatively rapid pace over the last several decades. Accordingly, the Land Use Element of the General Plan addresses Growth Management and states policies and guidelines to manage slower, more orderly growth in accordance with a long-term plan that protects and enhances community values (City of Encinitas 1989). Policy 2.3 states the growth within Encinitas would be managed in a manner that does not exceed the availability of Encinitas, special districts, and utilities to provide a desirable level of facilities and services.

While urban Encinitas continues to grow, much of the remaining undeveloped land within the City has environmental constraints such as topography, drainage, and other resources. The Housing Element addresses growth within Encinitas and has established policies, including an annual residential building limitation, based on the total number of dwelling units in the City at build-out. The annual allocation limit is updated at the beginning of each year. Based on experience, an estimated 200 new units have been permitted each year since 1989. Moderate- and low-income residential units are exempted from this annual allocation. According to the Draft 2005-2010 Housing Element, the net developable acres in Encinitas total 719, with a total potential development of 720 units. In addition to development on vacant land, there is also a potential for additional units as infill and mixed-use developments in the downtown area and along Coast Highway 101 within Encinitas.

Under land use build-out at mid-range densities, the General Plan would accommodate approximately 25,842 dwelling units, supporting an estimated population of 66,122 persons (City of Encinitas 1989). Given this estimation and based on a population of 59,518 as of 2010, this would represent an additional 6,604 persons (an increase of 11 percent). The projected number of new housing units by the end of 2005 is 25,227, according to General Plan estimates; this would indicate a future accommodation of 615 units. The residential capacity of Encinitas varies within each of the five original communities. As of 2003, New Encinitas is projected to experience the most growth, followed by Leucadia, Old Encinitas, Cardiff, and Olivenhain.

Future Land Use

Future land uses near the proposed project are shown in *Figure 3-1.5*. Four ongoing or proposed/planned projects (representing potential land use changes) would be located near the freeway corridor (Hall Property Community Park, Coral Cove Residential Project, Scripps Hospital Encinitas Master Plan, and North 101 Corridor Streetscape Improvements). Development of these projects is neither tied to, nor dependent upon, the proposed project.

Carlsbad

Existing Land Use

Carlsbad is the third-largest city adjacent to the proposed project, with a population in 2010 of 105,185 persons and a total land area of 42.2 square mi. *Figure 3-1.6* shows the general land use patterns surrounding the proposed project. Carlsbad is primarily residential; however, it does provide commercial centers, recreational activities, and employment opportunities. Carlsbad also has several larger tourist attractions, including Legoland, "The Flower Fields," the Westfield Shoppingtown Plaza Camino Real, and the Carlsbad Company Stores. Carlsbad is known for its natural resources and open space, including Buena Vista, Agua Hedionda, and Batiquitos Lagoons in addition to its stretch of beaches.

Carlsbad is an urbanized city; however, the eastern areas have a relatively rural quality that is established through the presence of open space, agricultural areas, and spaced residential development.

As shown in *Figure 3-1.6*, much of the central portion of Carlsbad between Agua Hedionda Lagoon and Poinsettia Lane is open space, industrial, and commercial, with residential areas east of I-5 south of Palomar Airport Road. Agua Hedionda Lagoon and its associated open space, the McClellan-Palomar Airport, and an industrial sphere, divide Carlsbad into north and south residential sectors. The McClellan-Palomar Airport is located south of the Agua Hedionda Lagoon valley and east of Aviara Parkway in central Carlsbad. Health, safety, and noise issues generated by the airport have influenced land use in central Carlsbad. Residential and institutional uses (including schools and hospitals) have been excluded north and south of the airport itself (but within the airport influence area); however, there is one residential area southeast of the airport. As a result, industrial, commercial, and open space uses have grown throughout those open areas of Carlsbad, and it is now a regional employment center.

The largest proportion of residential uses in Carlsbad, approximately 34 percent, is reserved for single-family designations, defined by the City of Carlsbad General Plan as low-medium density with 0 to 4 du/ac. Residential developments within the eastern portions of Carlsbad are typically of lower density and along with the open space in this area give the area a relatively rural quality. The more densely populated portion of Carlsbad is located between the coast and I-5. Medium-high density (8 to 15 du/ac) and high-density (15 to 23 du/ac) single-family and multi-family residential developments are located in this area. Together, these higher densities encompass approximately five percent of the total land area of Carlsbad. Commercial centers serving residents, tourists, and traffic along I-5 are located along major thoroughfares including Carlsbad Village Drive and SR-78, as well as adjacent to I-5 along Carlsbad Village Drive and between Cannon Road and Palomar Airport Road.

Vacant lands, shown as light grey in *Figure 3-1.6*, are located in the eastern parts of Carlsbad and are generally associated with areas surrounding the airport and industrial center. Much of this land is designated open space, planned industrial, and low-density residential (0 to 1.5 du/ac) by the Carlsbad General Plan. The northwest corner of College Boulevard and Cannon Road is currently vacant but is planned for a mix of low- to medium-density residential and open space.

As discussed previously and shown in *Figure 3-1.6,* the central portion of Carlsbad is relatively devoid of residential uses, with clusters mainly to the north and south of Agua Hedionda Lagoon, including land adjacent to I-5. As much of this central land area is unsuited for residential development, it contains large amounts of open space and would remain primarily undeveloped.

Development Trends

Since 1986, Carlsbad has been a "growth management" city, in which major public facilities have been carefully planned and financed with defined capacities in order to best serve a targeted ultimate population and number of household units. The city government has recognized that Carlsbad was approximately half "built-out" and that there would be an upper limit on the ultimate population and intensity of development in Carlsbad. Carlsbad's future development patterns would be influenced greatly by its unique landforms, non-residential corridor in the center of the City, the airport, and the regional employment center surrounding the airport.

To help preserve the quality of life for its residents, Carlsbad has developed a Growth Management Plan, which was ratified by Carlsbad voters in 1986 and is included in the Carlsbad General Plan. The Growth Management Plan would ensure that adequate public facilities and services are guaranteed as growth occurs within the City. The plan divides Carlsbad into four quadrants with a maximum number of dwelling units set for each. The limits are as follows: Northwest Quadrant 5,844; Northeast Quadrant 6,166; Southwest Quadrant 10,677; and Southeast Quadrant 10,801. The future development of Carlsbad is based on the centralized employment core of the airport and industrial sphere that both supports and is supported by the adjoining self-contained residential communities. In addition to the Growth Management Plan, a Citywide Facilities and Improvements Plan and Local Facilities Management Zone have been established to set performance standards for 11 public facilities. Comprehensive City review of all proposed developments determines compliance with these set standards. Based on targeted numbers, as of January 2004, Carlsbad had been developed to approximately 72 percent of its capacity. An additional 11 percent of the capacity has been planned and/or is under construction. The remaining 17 percent of residential capacity remains undetermined and would most likely consist of infill development.

Future Land Use

Future land uses near the proposed project are shown in *Figure 3-1.7*. There are six proposed/planned projects (representing potential land use changes) located near the proposed project within Carlsbad. These projects include the Northern Inlet Jetty Restoration, Agua Hedionda Sewer Lift Station and Force Main Replacement, Westfield Carlsbad Project, Caruso Affiliated Project, Carlsbad Energy Center Project, and Poseidon Desalination Plant. Development of these projects is neither tied to, nor dependent upon, the proposed project.

Oceanside

Existing Land Use

As the northern end of the proposed project is located within the southern portion of Marine Corps Base (MCB) Camp Pendleton, a small portion of the military installation is included in the Oceanside discussion. MCB Camp Pendleton-related development and ongoing activities have influenced the social and economic context of Oceanside since its origins in the World War II era.

After San Diego, Oceanside is the largest city located near the proposed project, with a total population of 167,344 per the 2010 census and overall land area of 42.16 square mi. *Figure 3-1.8* shows regional land use patterns within Oceanside. Land uses along the freeway corridor include residential, commercial, industrial, and agricultural uses, as well as parks and open space, golf courses, public services, vacant land, and military areas.

Large portions of Oceanside lie within a highly urbanized area of coastal California. Eastern areas of Oceanside, however, generally have a more rural quality established through the greater presence of open space and agricultural uses as well as low-density residential development. As shown in red in *Figure 3-1.8,* the majority of land within Oceanside along the freeway corridor is designated for residential uses. Residential densities within Oceanside range from 0.9 to 43.0 du/ac. The eastern portions of Oceanside are characterized by larger residential developments surrounded by planned open space, with commercial areas generally located along major roads. Typical residential designations in eastern Oceanside, as defined in the General Plan (City of Oceanside 2002), include estate residential and medium-density (A and B) residential, which vary from 0.9 to 20.9 du/ac, respectively. The portion of MCB Camp Pendleton near the proposed project is a mixture of residential, institutional facilities (including schools), and open training areas used by the U.S. Marine Corps.

Residential densities within Oceanside are generally higher near the coastal area and along the I-5 corridor, with urban high-density and single-family residential lots being the most abundant, at 43.0 and 5.9 du/ac, respectively (City of Oceanside 2002). Transit-oriented development (TOD), which aims to locate high-density residential complexes and mixed uses around public transportation centers, is located within the coastal region, in particular adjacent to the NCTD Coaster and Amtrak station. TOD expanded in eastern Oceanside with the development of the Sprinter Community Rail (Sprinter) completed in December 2007, which provides light rail service from Oceanside to San Marcos, south of and parallel to Oceanside Boulevard.

As shown in *Figure 3-1.8*, commercial areas are generally located along major transportation corridors, including Mission Avenue, SR-76, and Oceanside Boulevard. These commercial centers typically serve multiple surrounding neighborhoods. The far northeast corner of Oceanside (excluded from *Figure 3-1.8*) is primarily reserved for agricultural uses. Industrial uses cover a large portion of land use within Oceanside as well, as either existing or planned, and are generally located in the Rancho Del Oro planning area, east of I-5 and north of Oceanside Boulevard. The Rancho Del Oro planning area is also defined by the General Plan as a Mineral Resource Area and is used for extractive industry.

The majority of land along the freeway corridor is developed and urban in nature. Areas of undeveloped land, shown in gray in *Figure 3-1.8*, are located directly east of I-5 and south of SR-76. According to the Oceanside Land Use Map (City of Oceanside 2002), this land is designated medium-density residential (15.0 du/ac), with special commercial along SR-76. Another undeveloped tract of land is located at the southwest intersection of Oceanside Boulevard and El Camino Real. This tract of land is planned for estate B residential (3.5 du/ac).

Land adjacent to the proposed project east of I-5 is primarily single-family detached residential with a maximum density of 5.9 du/ac and estate B residential with a maximum density of

3.5 du/ac (City of Oceanside 2002). An open space corridor of mainly undevelopable land in the San Luis Rey River Valley is located along the northern edge of the City. Light industrial uses are located just south of the San Luis Rey River open space area, south of SR-76. These parcels provide a wide range of moderate- to low-intensity industrial uses that are deemed compatible with the surrounding residential uses.

Development Trends

Since 1970, Oceanside's population has continued to increase at a faster pace than the larger San Diego region. During the 1970s and 1980s, the population of Oceanside grew by 82 percent and 67 percent, respectively (City of Oceanside 2002). By 1995, approximately 75 percent (20162 ac) of the land in Oceanside was developed. About 10 percent (2567 ac) of the land was deemed undevelopable due to physical or environmental constraints such as steep slopes, floodplains, wetlands, or public ownership. The remaining 15 percent (4255 ac) of land in the City was deemed vacant and available for development (City of Oceanside 2002).

The City's General Plan identifies a broad range of residential land use categories and does not constrain the opportunity for a broad range of housing types and densities. Oceanside does not currently implement any growth management activities that limit the number of residential units. SANDAG has identified Oceanside's share of regional housing needs for 1994 through 2004 as seven percent, or 6,671 units.

The coastal area in Oceanside, west of I-5, is primarily developed with high-density single-family and multi-family residential. Development opportunities in this area are limited and recently have been mainly associated with the redevelopment of the downtown area. The eastern portions of Oceanside are generally characterized by lower-density single-family residential developments, which help maintain a more rural residential quality.

Future Land Use

Planned land uses near the proposed project are shown in *Figure 3-1.9*. There are three proposed/planned projects (representing potential land use changes) located near the proposed project within Oceanside (Oceanside Pier Resort Project, Mesa Ridge Project, and Inns at Buena Vista Creek Project). Development of these projects is neither tied to, nor dependent upon, the proposed project.

3.1.1.2 Environmental Consequences

Construction-related impacts would be similar for all four alternatives. Construction activity along the I-5 North Coast Corridor would occur in phases in order to minimize disruptions. Construction-related impacts to existing land uses in the vicinity of the proposed project include vehicular and pedestrian access disruptions and the use of parking lots and vacant areas as staging grounds for construction activities. However, land use impacts related to construction activities are considered temporary proximity impacts and are not anticipated to result in permanent impacts to existing land uses along the corridor. Caltrans would implement a Traffic Management Plan (TMP) throughout the duration of construction activities that would be made available to the public. The TMP would serve to minimize project-related construction disruptions and would include traffic mitigation strategies designed in coordination with the local communities. Permanent impacts related to each alternative are discussed below.

City of San Diego

Existing Land Use

Land use within the San Diego portion of the project corridor is primarily urban and includes UCSD, the Sorrento Valley business park area, and some residential developments located east of the freeway. Agricultural operations south of San Dieguito Lagoon and east of I-5 potentially would be affected by the proposed project, but encroachments would be limited to the western edge of existing fields and would not preclude continued agricultural activities on the site. There are also scattered open space areas along the corridor, including Los Peñasquitos Canyon Preserve and San Dieguito Lagoon. The proposed project would potentially affect some of these open space areas located directly adjacent to the freeway but would not result in large land use pattern shifts, since these areas are preserved as open space and are not ideal for development due to terrain and resource restrictions. According to *Section 3.4*, *Community Impacts,* no residential or business displacements would occur within San Diego. The proposed project would consist of the expansion of an existing established freeway and would be consistent with existing transportation uses. No adverse land use impacts are anticipated.

Development Trends

The area directly adjacent to the project corridor within San Diego is generally urbanized, with built-out areas interspersed with agriculture and open space areas designated for preservation. Since agricultural activities could continue on site, encroachment into adjacent farmlands would not affect development within the area. While some developments are proposed near the proposed project, such as Pacific Highlands Ranch, these are located outside of the project corridor and would not be affected by the proposed project. The proposed project would expand an existing transportation corridor and, therefore, is not anticipated to alter development trends in the area.

Future Land Uses

Future land use development projects in the vicinity of I-5 include the Scripps Hospital La Jolla Master Plan, Flower Hill Promenade Project, One Paseo Project, Via de la Valle Road Widening, and San Dieguito River Park Nature Center. Most of these projects are still in the review phase; as of August 2013, the Flower Hill Promenade Project is largely completed with some renovations remaining to be done. Edges of the Scripps Hospital project at Genesee Avenue and I-5, and the Flower Hill Promenade Project at I-5 and Via de la Valle/San Andreas Drive, could be temporarily affected by the *I-5 NCC Project*. Such site-specific effects would not change the planned land uses for either planned project, both of which involve the demolition of existing facilities and construction of replacement buildings. The narrower footprint of the refined 8+4 Buffer alternative would further minimize potential effects to planned land uses.

The One Paseo Project at Del Mar Heights Road and El Camino Real, Via de la Valle Road Widening from El Camino Real west to San Andreas Drive, and San Dieguito River Park Nature Center at Via de la Valle and San Andreas Drive are all well east of I-5. These projects, therefore, are at sufficient distances from the *I-5 NCC Project* such that effects to planned land uses would not occur.

Del Mar

Existing Land Use

Del Mar is generally built-out and is primarily made up of residential development with pockets of commercial development focused in the Del Mar Center. The proposed project is not within the city limits of Del Mar; however, the proposed project would be located near existing residential development, agricultural areas, and open space associated with San Dieguito Lagoon. In addition, the Del Mar Fairgrounds and Racetrack is located west of the freeway. No encroachment into existing land uses is proposed in Del Mar under the proposed project; therefore, no shifts in existing land use or adverse land use impacts are anticipated.

Development Trends

Del Mar is nearly entirely developed, with remaining open space areas designated for preservation. There are no anticipated development trends that would shift land uses within Del Mar. The project would not encroach into existing land uses and, therefore, would not contribute to any unplanned development trends.

Future Land Uses

Planned future land uses within Del Mar would likely be in the form of infill development and redevelopment. The proposed project would not shift existing land uses, nor would it affect any future land use trends within the City. Future land use development projects in the vicinity of I-5 include the Riverview Offices Project and 22nd District Agricultural Association Fairgrounds and Horsepark Master Plan. The Riverview Offices site at the corner of Jimmy Durante Boulevard and San Dieguito Drive is well west of I-5, and the Horsepark Property near El Camino Real and Via de la Valle is well east of I-5. These projects, therefore, are at sufficient distances from the *I-5 NCC Project* such that effects to planned land uses would not occur.

Proposed *I-5 NCC Project* boundaries near the Del Mar Fairgrounds are within the existing I-5 right-of-way, and would not alter the land uses for the master plan changes to the Fairgrounds. The narrower footprint of the refined 8+4 Buffer alternative would further minimize potential effects to planned land uses.

Solana Beach

Existing Land Use

Solana Beach is generally urbanized and encompasses residential development, as well as various commercial areas that are primarily focused on Highway 101 and Cedros Avenue west of the proposed project corridor, and areas along Lomas Santa Fe Drive. Transportation uses associated with the I-5 corridor are located at the eastern boundary of Solana Beach.

The proposed project would consist of the expansion of an existing established freeway corridor and would be consistent with existing land uses. Though land uses in specific parcels would shift from residential to transportation, overall land use patterns in the community would not be affected, and no adverse land use impacts are anticipated.

Development Trends

Solana Beach is nearly entirely developed, and future development trends would be primarily associated with redevelopment or infill projects. As noted above, encroachments into individual properties that may require relocation would not affect areas outside of specific parcels. The proposed project would expand an existing transportation corridor and would not affect long-term development or redevelopment trends. Therefore, the proposed project is not anticipated to affect development trends within the City.

Future Land Uses

Future land uses are anticipated to consist primarily of infill and redevelopment projects in already urbanized areas of Solana Beach. A future land use development project in the vicinity of I-5 is the USACE, Encinitas, and Solana Beach Shoreline Protection Project. The project site (along the shoreline) is located well west of I-5 in Solana Beach and, therefore, is at sufficient distance from the *I-5 NCC Project* that effects to the project would not occur.

Encinitas

Existing Land Use

Encinitas is primarily urbanized, similar to the other communities within the project corridor, and land uses generally consist of residential and commercial development, with a number of isolated greenhouse and nursery operations scattered along the corridor. In addition, open space areas surround Batiquitos and San Elijo lagoons. As discussed in *Section 3.3, Farmlands/Agricultural Lands,* the proposed project would directly affect a portion of Unique Farmland used for greenhouse and nursery operations. The proposed project would also convert 18.5 ac of the total 30.5 ac of prime farmland currently being farmed east of I-5 and north of Manchester Avenue to transportation uses. These encroachments would not preclude the continuation of agricultural activities at the nursery. Additionally, 412 ac of farmland east of I-5 and north of Manchester Avenue could remain in agricultural production. These encroachments would not lead to shifts in existing land uses outside of these individual properties. As identified in *Section 3.4*, the proposed project would result in the displacement of residential and commercial land uses. These displacements would be isolated to specific parcels along the alignment, however, and would not result in shifts in land use outside of the affected parcels. The proposed project would consist of the expansion of an existing established freeway corridor and would be consistent with existing land uses. Though land uses in specific parcels would shift from residential and agricultural uses to transportation, existing land use patterns in the community would not be affected, and no adverse land use impacts are anticipated.

Development Trends

The areas directly adjacent to the project corridor within Encinitas are currently urbanized and generally built-out, with the exception of open space areas designated for preservation, a future park, and agricultural uses. Development trends in Encinitas are largely anticipated to be in the form of infill and redevelopment, particularly west of I-5. As noted above, encroachments into individual properties that may require relocation would not affect areas outside of specific parcels. The proposed project would be located within the existing transportation corridor and would not affect future development trends. Therefore, the proposed project is not anticipated to affect development trends within the City.

Future Land Uses

Future land use development projects in the vicinity of I-5 include the Hall Property Community Park, Coral Cove Residential Project, Scripps Hospital Encinitas Master Plan, and North 101

Corridor Streetscape Improvements. The Hall Property Community Park was formerly a greenhouse operation located immediately adjacent to the west side of I-5 north of MacKinnon Drive and is currently under construction. The park has been designed to accommodate the potential right-of-way for the proposed project. Therefore, implementation of the proposed project would not affect development of the park. Operational impacts related to implementation of the proposed project are not likely to occur since planning of the Hall Property Community Park was coordinated with Caltrans to ensure that the park would be compatible with the proposed project. Caltrans and the City of Encinitas have agreed to an easement dedication of land that would provide Caltrans with the right-of-way needed to improve I-5. Furthermore, implementation of the proposed project would improve circulation along I-5 and reduce traffic congestion on the roadways surrounding the Hall Property Community Park. Therefore, implementation of the proposed project would not affect Hall Property Community Park.

The Scripps Hospital Encinitas Master Plan at Santa Fe Drive and I-5 would involve modification and expansion of the existing hospital. Proposed *I-5 NCC Project* boundaries at the hospital property are within the existing I-5 right-of-way, so I-5 improvements would not change the land uses for the hospital project, which is under construction.

The Coral Cove Residential Project at Ashbury Street and Vulcan Avenue and the North 101 Corridor Streetscape Improvements from A Street to La Costa Avenue are well west of I-5; therefore, these projects are at sufficient distances from the *I-5 NCC Project* such that effects to planned land uses would not occur.

Carlsbad

Existing Land Use

Carlsbad is primarily urbanized within the project corridor and contains both residential development and commercial centers along the I-5 North Coast Corridor. In addition, isolated greenhouses and nurseries, as well as some stretches of farmland (mainly strawberry fields at Cannon Road), provide agricultural operations within the City. The City also has a number of open space areas that are associated with Buena Vista, Agua Hedionda, and Batiquitos lagoons. The proposed project would encroach on agricultural operations in the City, including a greenhouse and strawberry fields located south of Agua Hedionda Lagoon. The proposed encroachments would not preclude continued agricultural activities on the affected sites, however, and are not anticipated to shift existing land use patterns in the area. In addition, the strawberry fields that would be affected are designated for recreation and tourist uses and are not specifically identified as supporting long-term agricultural activity at this time. *Section 3.4* identifies potential relocation for residential and commercial businesses in Carlsbad. These displacements would be isolated to specific parcels along the alignment, however, and would not result in shifts in land use outside of the affected parcels. The proposed project would consist of the expansion of an existing established freeway corridor and would be consistent with existing land uses. The Encina Power Plant would relocate the four transmission poles and a distribution pole farther back from the freeway within the plant's own property. Though land uses in specific parcels would shift to transportation, existing land use patterns in the community would not be affected, and no adverse land use impacts are anticipated.

Development Trends

Development within Carlsbad is monitored through a growth management plan, which requires the development of specific public facilities before growth can occur. Growth is anticipated to primarily consist of infill projects west of I-5 and new developments on vacant land east of I-5. As noted above, encroachments into individual properties that may require relocation would not affect areas outside the specific parcels. Future development trends are mainly established by the growth management plan and would not be affected by the proposed project. Therefore, the proposed project is not anticipated to affect development trends within the City.

Future Land Uses

Future land use development projects in the vicinity of I-5 include the Northern Inlet Jetty Restoration, Agua Hedionda Sewer Lift Station and Force Main Replacement, Westfield Carlsbad Project, Caruso Affiliated Project, Carlsbad Energy Center Project, and Poseidon Desalination Plant. The Northern Inlet Jetty Restoration at Agua Hedionda Lagoon is west of I-5, and the Westfield Carlsbad Project at El Camino Real and Marron Road is well east of I-5; therefore, these projects are at sufficient distances from the *I-5 NCC Project* that effects to planned land uses would not occur.

The strawberry fields that would be partially affected are designated for future travel and recreational uses. Potential modifications to I-5 near Cannon Road could affect the potential Caruso Affiliated Project. While an application for a specific project at this site has not been submitted to the City for review, discussions are under way. The *I-5 NCC Project* would only affect the western edge of the property, and the unaffected portion of the parcel could still be developed. In addition, the Cannon Road DAR has been eliminated from the refined 8+4 Buffer alternative (Preferred Alternative), avoiding effects previously anticipated.

Edges of the Encinas Water Pollution Control Facility and Encina Power Station properties could be temporarily affected by the *I-5 NCC Project*. Such site-specific effects would not change the planned land uses for these areas, including the Agua Hedionda Sewer Lift Station and Force Main Replacement, Carlsbad Energy Center Project, and Poseidon Desalination Plant.

Oceanside

Existing Land Use

The portion of Oceanside located along I-5 is highly urbanized with some interspersed open space, similar to the other communities within the project corridor. Residential, commercial, and open space areas associated with the San Luis Rey River are the primary uses along the alignment. No designated agricultural land is located along the corridor; most agricultural operations within Oceanside are located in the northeast portion of the City. *Section 3.4* identifies the displacement of residential and business land uses within Oceanside. These displacements would be isolated to specific parcels along the alignment, however, and would not result in shifts in land uses outside of the affected parcels. The proposed project would consist of the expansion of an existing established freeway corridor and would be consistent with existing land uses. Though land uses in specific parcels would shift from residential to transportation, existing land use patterns in the community would not be affected, and no adverse land use impacts are anticipated.

Development Trends

Development in Oceanside is likely to be in the form of redevelopment or infill projects west of I-5. Vacant land within the City is concentrated east of the project corridor, much of which is planned for future residential development. As noted above, encroachments into individual properties that may require relocation would not affect areas outside of specific parcels. The proposed project would be located within the existing transportation corridor and would not affect future development trends. Therefore, the proposed project is not anticipated to affect development trends within the City.

Future Land Uses

Future land uses within the City are expected to continue to increase housing and business opportunities for residents. Future land use development projects in the vicinity of I-5 include the Oceanside Pier Resort Project, Mesa Ridge Project, and the Inns at Buena Vista Creek Project. The Oceanside Pier Resort Project at Pacific Street and Pier View Way is well west of I-5, and the Mesa Ridge Project (at Mesa Drive and Foussatt Road) and the Inns at Buena Vista Creek Project (at Jefferson Street and SR-78) are well east of I-5; therefore, these projects are at sufficient distances from the *I-5 NCC Project* that effects to planned land uses would not occur.

Alternatives

10+4 Barrier

As discussed above, implementation of the 10+4 Barrier would result in impacts to residential, commercial, agricultural, undeveloped, recreational, and roadway land uses. Land use patterns, development trends, or proposed land uses would not shift outside of the affected parcels displaced.

10+4 Buffer

The 10+4 Buffer would require a narrower right-of-way alignment than the 10+4 Barrier; impacts would be slightly reduced for the majority of the existing and proposed resources. Implementation of the 10+4 Buffer alternative would result in impacts to residential, commercial, agricultural, undeveloped, recreational, and roadway land uses. Land use patterns, development trends, or proposed land uses would not shift outside of the affected parcels displaced.

8+4 Barrier

The 8+4 Barrier would require a similar right-of-way alignment to the 10+4 Buffer. As such, this alternative would have slightly reduced impacts for the majority of the existing and proposed resources compared to the 10+4 Barrier. Implementation of the 8+4 Barrier alternative would result in impacts to residential, commercial, agricultural, undeveloped, recreational, and roadway land uses. Land use patterns, development trends, or proposed land uses would not shift outside of the affected parcels displaced.

8+4 Buffer (Preferred Alternative)

The refined 8+4 Buffer is the smallest right-of-way alignment, and impacts would be slightly reduced for the majority of the existing and proposed resources. Implementation of the 8+4 Buffer alternative would result in impacts to residential, commercial, agricultural, undeveloped, recreational, and roadway land uses. Land use patterns, development trends or proposed land uses would not shift outside of the affected parcels displaced.

No Build

Implementation of the No Build alternative would not result in changes to the land use patterns, development trends or proposed land uses.

3.1.1.3 Avoidance, Minimization, and/or Mitigation Measures

The proposed project would not result in adverse impacts to land use relative to development trends or shifts in overall land uses/patterns. Impacts to planned land uses would not occur. Design detail, including a reduced project footprint throughout the corridor and for the Manchester Avenue DAR, removal of both the Cannon Road and Oceanside Boulevard DARs, and other corridor-wide auxiliary lane reconfigurations and/or removals, reduced overall projected impacts to existing land use under the refined 8+4 Buffer alternative.

No mitigation measures are required. Caltrans has undertaken efforts to integrate the proposed project with the adjacent and/or adjoining communities. In addition to the www.keepsandiegomoving.com website, Caltrans has been available for community meetings to provide the community information about the proposed project.

3.1.2 Consistency with State, Regional, and Local Plans and Programs

This section is based on the October 2007 CIA, as amended; a separate technical study prepared for the proposed project that is incorporated by reference. This analysis examines the consistency of the proposed project with regional plans, jurisdiction-wide plans, and applicable small-scale plans. Proposed specific projects near the project alignment and potential impacts are described in *Section 3.1.1*.

3.1.2.1 Affected Environment

San Diego Association of Governments Regional Comprehensive Plan (RCP), RTPs, and RTIPs

SANDAG's RCP for the San Diego Region is a compilation of local and regional plans of each member jurisdiction. The RCP contains the long-term planning framework for the San Diego region. It sets forth a regional vision and balances population, housing, and employment growth with habitat preservation, agriculture, open space, and infrastructure needs to create a more sustainable region. The RCP and RTP planning processes are iterative, each informing the other. SANDAG is working to update the RCP to reflect the 2050 RTP.

The SANDAG 2050 RTP[1] lays out a regional transportation system to enable current and future planning efforts. The RTP identifies specific transportation needs that over the next 37 years

[1] On December 20, 2012, the San Diego Superior Court entered a judgment finding that the EIR for the 2050 RTP is legally inadequate with regard to greenhouse gas emissions. Although the judgment may be overturned on appeal, this Final EIR/EIS has been drafted to avoid the narrow alleged deficiencies found by the Court. Where this Final EIR/EIS relies upon 2050 RTP information, that information has not been challenged and is not part of the current lawsuit.

would enhance the land use-transportation connection in development within the San Diego region. The proposed project is consistent with the 2050 RTP.

The 2012 RTIP was developed to implement the San Diego region's overall transportation strategy for providing mobility and improving the efficiency and safety of the transportation system. The 2012 RTIP aims to reduce transportation-related air pollution in an effort to attain federal and State air quality standards for the San Diego region.

The design concept and scope of the proposed project is also generally consistent with the project description in the 2030 RTP and the 2010 RTIP.

Natural Communities Conservation Plans: MSCP Subarea Plan and MHCP

The project crosses two regional habitat conservation planning areas: the City of San Diego's MSCP Subarea Plan and SANDAG's MHCP, encompassing the seven incorporated cities in northwestern San Diego County. Both regional plans covering the project area are approved but the subsidiary plan for the City of Encinitas is undergoing review and is not yet approved. Caltrans and FHWA are not signatory agencies to the MSCP. Therefore, the regional highway projects were not covered. Any impacts to the MSCP and MHCP areas are included in the biological resource sections of this Final EIR/EIS.

The MSCP Subarea Plan was prepared to meet the requirements of the California Natural Communities Conservation Planning (NCCP) Act of 1992 pursuant to a general outline developed by the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW; previously California Department of Fish and Game) (both of these agencies are referred to herein as the "wildlife agencies"). The MSCP Subarea Plan serves as the basis for the Implementing Agreement that serves as the contract between the City of San Diego and the wildlife agencies to ensure implementation of the plan and allow the City of San Diego to issue take permits at the local level. The Multiple Habitat Planning Area (MHPA) delineates core biological resource areas and corridors targeted for conservation while also allowing for limited development to occur. The MHPA was developed by the City of San Diego in cooperation with wildlife agencies, property owners, developers, and environmental groups based on the Preserve Design Criteria contained in the overall MSCP and the City Council adopted criteria for the creation of the MHPA.

Solana Beach, Encinitas, Carlsbad, and Oceanside are four of the seven cities in northwest San Diego County that have adopted a joint MHCP. This regional MHCP is characterized by a regulatory compliance status similar to that described above for the MSCP. Within the MHCP, the Cities of Encinitas, Carlsbad, and Oceanside constitute their own subareas. The Cities of Carlsbad and Oceanside Subarea Plans have been approved, and the City of Encinitas issued a draft subarea plan in 2001. That plan is still undergoing agency review and revision. Until plan approval, all jurisdictions must apply directly to the resource agencies for incidental take authorizations under Section 10 of the Federal Endangered Species Act (FESA). Due to its small size and built-out conditions, the City of Solana Beach is exempt from preparing a subarea plan.

Coastal Zone Management Act

The project is generally located within the Coastal Zone except for the segment of I-5 north of Tamarack Avenue to the southern edge of Buena Vista Lagoon in Carlsbad, and the segment north of Buena Vista Lagoon to Mission Avenue in Oceanside (see *Figure 3-3.3*). The Coastal

Zone Management Act of 1972 (CZMA) is the primary federal law enacted to preserve and protect coastal resources. The CZMA sets up a program under which coastal states are encouraged to develop coastal management programs. States with an approved coastal management plan are able to review federal permits and activities to determine whether they were consistent with the State's management plan.

California has developed a coastal zone management program and has enacted its own law, the California Coastal Act of 1976 (Coastal Act), to protect the coastline. The policies within Chapter 3 of the California Coastal Act include the protection and expansion of public access and recreation; the protection, enhancement, and restoration of environmentally sensitive areas; the protection of agricultural lands; the protection of scenic beauty; and the protection of property and life from coastal hazards. The California Coastal Commission (CCC) is responsible for implementation and oversight under the California Coastal Act.

Just as the federal CZMA delegates power to coastal states to develop their own coastal management plans, the Coastal Act delegates power to local governments to enact their own LCPs. LCPs determine the short- and long-term use of coastal resources in their jurisdiction consistent with the Coastal Act goals. A federal consistency determination may be needed as well. The Cities of Encinitas and Oceanside General Plans include issues and policies related to the requirements of the Coastal Act, which are combined to create the General Plan and LCP Land Use Plan (LUP) for each city. The Cities of San Diego and Carlsbad have certified LCPs separate from their General Plan, while the City of Solana Beach has a certified LUP, but is still developing a Local Implementation Plan as required for a complete, certified LCP.

Due to the size and scope of the proposed project, which traverses several jurisdictions, there are several means by which Caltrans could meet permitting requirements. One means is by preparing a public works plan (PWP) with the CCC, which is an alternate vehicle for obtaining approval of large or phased public works projects that remains under the authority of the CCC irrespective of coastal permit jurisdictional boundaries. Another means would be permitting through local jurisdictions and/or the CCC for the individual construction stages of the project (which could require multiple coastal development permits for different components of a public works project).

In coordination with the CCC staff, SANDAG and Caltrans have prepared the PWP/TREP (Appendix R) to recommend measures to achieve consistency with the CZMA, Coastal Act, and the certified LCPs. Most of the impacts of the project would occur within the coastal zone, including impacts to agricultural lands (see *Section 3.3*), visual resources (see *Section 3.7, Visual/Aesthetics*), and the biological environment (see *Section 3.17, Natural Communities; 3.18, Wetlands and Other Waters; 3.19, Plant Species; 3.20, Animal Species; and 3.21, Threatened and Endangered Species*). Details regarding consistency with the management program, and needed permits and approvals, are provided in *Table 3.1.1* under the heading: California Coastal Act.

City of San Diego General Plan

The City of San Diego Process Guide and General Plan was prepared in 1979 to set forth goals and objectives for the development of the City of San Diego through the year 1995. The Process Guide and General Plan established a land use distribution pattern for future development, established a framework for future transportation networks, and provided recommendations and measures for achieving the plan's goals and objectives. The City of San

Diego General Plan went through a comprehensive update and was adopted in 2008. The General Plan provides guidance to meet both the needs of a growing city and enhance the quality of life for current and future residents of San Diego. The General Plan utilized the City of Villages strategy, which aims to enhance the City's many communities as growth occurs over the next 20-plus years by focusing growth into mixed-use development areas linked to an improved regional transportation system. The strategy is designed to sustain long-term economic, environmental, and social health for the City of San Diego and its communities. The proposed project traverses a variety of land uses along the I-5 corridor, which have been designated by the Land Use Element. Designated land uses surrounding the proposed project are shown in *Figure 3-1.2*.

The City of San Diego has developed community plans that identify specific goals for each of the communities within the City. Each of these community plans discusses issues that are specific to that community, while also being consistent with the broader City of San Diego General Plan policies. The proposed project would traverse the following City of San Diego communities: La Jolla, University, Torrey Pines, Torrey Hills, and Carmel Valley. Each of these communities has a community plan (each community plan can be found on www.sandiego.gov/planning/community/profiles/index.shtml) that discusses General Plan topics that are more specific to that community, while also being consistent with the larger policies of San Diego. A brief discussion of each community plan as it pertains to the proposed project is provided below. The planning area locations for each community plan are shown in *Figure 3-1.1*. A more detailed listing of relevant goals and policies and the proposed project's consistency with those policies is provided in *Table 3.1.1* (found at the end of this *Section 3.1.1*).

La Jolla Community Plan

The La Jolla Community Plan was last updated in March 2004. The overall goals of the community plan are to maintain La Jolla as a primarily residential recreation-oriented community, conserve and enhance the natural amenities of the community, and provide adequate public facilities and an adequate circulation system. The community plan also aims to enhance existing public access to the ocean, beach, and park areas, and allow for the provision of added public parking in the village core area.

University Community Plan

The University Community Plan was last updated in February 2008. The overall goals of the community plan are to meet the needs of the growing professional and commercial sectors of the community while also meeting the needs of the UCSD campus. No relevant goals from this community plan were identified for the proposed project. In addition, the UCSD Long Range Development Plan (PBS&J 2004) discusses development and growth for the University area.

Torrey Pines Community Plan

The Torrey Pines Community Plan was last updated in April 2011. The overall goals of the community plan are to provide a high quality of life for its residents and businesses while preserving the community's unique natural environment. The Transportation Element sets out to provide an efficient, safe, and environmentally sensitive transportation system, and to ensure that transportation improvements do not negatively impact open space systems located throughout the planning area. The Resource Management and Open Space Element sets out to ensure the long-term sustainability of the planning area's unique ecosystems; plant communities and wildlife habitat; and paleontological, archaeological, Native American, and historic resources. The Resource Management and Open Space Element also sets out to preserve, enhance, and restore all natural open space and sensitive resource areas.

Torrey Hills Community Plan

The Torrey Hills Community Plan was last updated in April 2011. The overall goals of the community plan are to develop the community with land uses that complement surrounding developing areas and maximize mobility opportunities; that reflect the variety of landforms characterizing the community; that protect and enhance important wildlife habitat; and that provide for a high-quality urban form reflective of the area's unique location and natural attributes. The Transportation Element sets out to provide a transportation system that provides linkages to the community's activity centers and to the rest of the metropolitan region and to ensure that development of transportation facilities would avoid unnecessary encroachment into environmentally sensitive areas. The Open Space and Resource Management Element sets out to preserve, protect, enhance, and, where possible, restore all natural open space and sensitive resource areas, and prohibit encroachment and impacts of adjacent development, both private and public, on areas designated for open space.

Carmel Valley Community Plan

Carmel Valley (North City West) Community Plan was adopted in February 1975. The overall goals of the community plan include the following: establish a physically, socially, and economically balanced community; establish an identity for the community; preserve the natural environment; establish a balanced transportation system; and establish a phased development plan. The Circulation Element's primary goal is to provide a transportation system that provides mobility, accessibility, and safety for residents within the community. The Park, Recreation, and Open Space Element sets out to meet the recreational needs of the community with both parks and open space areas.

The Carmel Valley community plan stipulated that precise plans must be developed for each development unit within the community. The proposed project is located near Neighborhoods 2 and 3 of the Carmel Valley community plan. The Neighborhood 2 Precise Plan, also known as the North City West Employment Center, was designed to serve as an employment base for housing in other areas of Carmel Valley. The Neighborhood 2 Precise Plan provides guidance for future development within the community in conformance with the existing Carmel Valley community plan. The Neighborhood 2 Precise Plan does not contain policies relevant to the proposed project. Draft Amendments to the Employment Center Precise Plan, Rezone and Carmel Valley Planned District are currently proposed by the One Paseo project and will be incorporated into the Neighborhood 2 Precise Plan. The Neighborhood 3 Precise Plan, last amended in March 1992, is primarily a residential development with some recreation and open space uses. The Neighborhood 3 Precise Plan provides guidance for future development within the community in conformance with the existing Carmel Valley community plan. The Neighborhood 3 Precise Plan does not contain policies relevant to the proposed project. Although, many of the neighborhood design concepts set out in the plan are directly relevant to regional and community enhancements proposed as part of the project, including an improved pedestrian and bike trail system.

City of Del Mar Community Plan

The City of Del Mar Community Plan was last updated with an addendum in January 2002. The community plan contains stated community goals and policies designed to shape the long-term development of the City, as well as protect its environmental, social, cultural, and economic resources. Land uses surrounding the proposed project are shown in *Figure 3-1.2.* As all of Del Mar is located within the California Coastal Zone, the LCP for the City of Del Mar is the main planning document for the City. The LCP outlines issues and policies related to the requirements of the California Coastal Act, including land use. The LCP includes the Land Use Element, which describes and shows designated land uses within Del Mar; however, the proposed project would not directly or indirectly affect land uses within Del Mar. Therefore, no specific policies or goals in the Del Mar LCP Land Use Element pertain to the proposed project.

City of Solana Beach General Plan

The City of Solana Beach General Plan was last amended in 2006 and as of December 2012 is in the process of being updated. The adopted General Plan contains stated community goals and policies designed to shape the long-term development of the City, as well as protect its environmental, social, cultural, and economic resources. The Land Use Element sets out to promote development of a well-balanced and functional mix of land uses and ensure that long-term protection of the environment is given the highest priority. Land uses surrounding the proposed project are shown in *Figure 3-1.4.* The Circulation Element sets out to provide a street network to move people and goods safely and efficiently. The Open Space and Conservation Element sets out to protect and conserve the City's natural resources, cultural resources, sensitive open space areas, and viewsheds. A more detailed listing of relevant goals and policies and the proposed project's consistency with those policies is provided in *Table 3.1.1* (found at the end of this section 3.1.1).

Although Solana Beach is located within the California Coastal Zone, Solana Beach has not yet developed a fully certified LCP outlining issues and policies related specifically to the requirements of the California Coastal Act; the City of Solana Beach has a certified LUP but does not currently have a certified Local Implementation Plan. Planning in the coastal zone is generally discussed in the Land Use and Open Space and Conservation Elements of the General Plan.

City of Encinitas General Plan

The City of Encinitas General Plan is in the process of a comprehensive update. This update began in 2010 and as of December 2012 is still in draft form. Because the updated General Plan has yet to be adopted, the adopted 1989 General Plan was used for analysis. The General Plan contains stated community goals and policies designed to shape the long-term development of the City, as well as protect its environmental, social, cultural, and economic resources. The Land Use Element, last amended September 23, 2009, establishes a land use distribution based on a mix of development consistent with the goals and objectives of the General Plan. Land uses surrounding the proposed project are shown in *Figure 3-1.4*. The Land Use Element sets out to preserve natural open spaces, slopes, bluffs, and lagoon areas, and to maintain the sense of spaciousness and semi-rural living within the I-5 view corridor. The Circulation Element, last amended January 22, 2003, sets out to provide a safe, convenient, and efficient transportation system that is sensitive to and compatible with surrounding community character. The Resource Management Element, last amended May 11, 1995, sets out to preserve natural resources such as mature trees, vegetation, and wildlife habitat within the City of Encinitas. The Resource Management Element also encourages the preservation of agricultural land in the City, although not as a constraint to development. A more detailed listing of relevant goals and policies and the proposed project's consistency with those policies is provided in *Table 3.1.1* (found at the end of this section).

A large portion of Encinitas and study area is located within the California Coastal Zone; therefore, issues and policies related to the requirements of the California Coastal Act are also included in the General Plan. These are combined to create the General Plan and LCP LUP for the City. The LUP includes the entire coastal area of Encinitas, generally from the Pacific Ocean to El Camino Real. It also encompasses San Elijo Lagoon.

City of Carlsbad General Plan

The City of Carlsbad General Plan is in the process of a comprehensive update. This update began in 2008 and is not expected to be completed until mid-2013. As such, the adopted 1994 General Plan was used for analysis. The General Plan establishes the vision and planning framework for the development of Carlsbad and identifies the location, distribution, and arrangement of land uses within the municipal boundaries. The underlying principle of the Land Use Element is that Carlsbad would develop as a balanced community with a full range and variety of land uses. Land uses surrounding the proposed project are shown in *Figure 3-1.6*. The Land Use Element sets out to protect and conserve natural resources, fragile ecological areas, unique natural assets, and historically features of the community (including Buena Vista Lagoon, Batiquitos Lagoon, and Agua Hedionda Lagoon). The Circulation Element sets out to provide a transportation system that helps minimize air pollution and traffic congestion and supports commerce and economic development.

A large portion of Carlsbad and the study area is located within the California Coastal Zone; therefore, issues and policies related to the requirements of the California Coastal Act are included in the City of Carlsbad LCP, last amended in 2010. The LCP includes the entire coastal area of Carlsbad, generally from the Pacific Ocean to El Camino Real in the north and south and to the industrial area in central Carlsbad. It also encompasses Agua Hedionda and Batiquitos lagoons. Relevant LCP policies include the preservation of prime agricultural land throughout the coastal zone. This policy includes preservation of the Carlsbad Flower Fields, an approximately 50-ac flower field that blooms between early March and early May each year. In addition, the Agua Hedionda LUP proposes land uses and environmental control measures for an 1100-ac segment of the Carlsbad Coastal Zone, including the 230-ac Agua Hedionda Lagoon and adjacent marsh, upland habitats, and wetland areas. A more detailed listing of relevant goals and policies and the proposed project's consistency with those policies is provided in *Table 3.1.1* (found at the end of this *Section 3.1.1*).

City of Oceanside General Plan

The City of Oceanside General Plan is the primary source of long-range planning and policy direction used to guide growth and preserve the quality of life within the City of Oceanside. The Oceanside General Plan states that a goal of the City is to analyze proposed land uses to ensure that the designations would contribute to a proper balance of land uses within the community. Land uses surrounding the proposed project are shown in *Figure 3-1.8.* The Oceanside General Plan contains stated community goals and policies designed to shape the long-term development of the City, as well as protect its environmental, social, cultural, and economic resources.

The Circulation Element contained within the City of Oceanside General Plan, updated in September 2012, sets out the City's long-range policy direction for transportation. The Circulation Element's principal objective is to provide for the transportation needs of the community and subregion by implementing a circulation system that provides a high level of mobility, efficiency, access, safety, and environmental consideration for all modes and purposes of travel. The Circulation Element acknowledges that the circulation system does not stand on its own but is an integral part of the overall land use planning for the City. It also must function as a component of the regional transportation system. A more detailed listing of relevant goals and policies and the proposed project's consistency with those policies is provided in *Table 3.1.1.*

A large portion of Oceanside and the study area is located within the California Coastal Zone; therefore, issues and policies related to the requirements of the California Coastal Act are also included in the General Plan. These are combined to create the General Plan and LCP LUP for the City. The LUP includes the entire coastal area of Oceanside, generally from the Pacific Ocean to Coast Highway. It is also inclusive of the San Luis Rey River and Buena Vista Lagoon.

San Dieguito River Park Concept Plan

The San Dieguito River Park Concept Plan was developed to create an open space park within the San Dieguito River Valley to protect its unique resources while providing compatible recreational opportunities. The plan provides guidance for the preservation of open space, protection of natural and cultural resources, creation of a scenic trail system, and the establishment of appropriate recreational areas.

San Elijo Lagoon Area Enhancement Plan

The San Elijo Lagoon Area Enhancement Plan provides ownership, planning, and jurisdictional information for San Elijo Lagoon. The primary goal of the San Elijo Lagoon Area Enhancement Plan is to recommend methods to preserve and augment a gradient of self-sustaining habitats that range from salt marsh in the west basin to freshwater marsh in the east basin. The long-range plan for this area is to continue to provide for the habitat needs of wildlife while maximizing passive recreational and educational opportunities for the public.

Agua Hedionda Land Use Plan

The Agua Hedionda Land Use Plan was developed as a revision to the Agua Hedionda Specific Plan and proposes land uses and environmental controls for an 1,100-ac segment of the Carlsbad Coastal Zone, including the 230-ac Agua Hedionda Lagoon and adjacent marsh, upland habitats, and wetland areas. The plan combines relevant requirements of the California Coastal Act and Carlsbad General Plan as they apply to this segment of the 1,100-ac segment of the Carlsbad Coastal Zone.

Batiquitos Lagoon and Buena Vista Lagoon

Implementation of the proposed project would not require acquisitions of any land within Batiquitos Lagoon or Buena Vista Lagoon, nor would it impact any recreational activities at either of the lagoons. Therefore, land use plans pertaining to these specific lagoons were not evaluated for policy consistency.

Bicycle and Pedestrian Plans

Local communities that lie on the coast have all come together to develop General Plans that fully accommodate pedestrian and bicycle modes. Collectively, general plans propose to improve the quality of life by offering safe transportation alternatives to the automobile.

The various General Plans have in common the following goals and/or principles:

- Seek to ensure that there is adequate distance between signal-controlled intersections, "smart crosswalks," or stop signs. At heavily used pedestrian crossings, consider all-way stop signals that allow the free flow of pedestrians through the intersection, "smart" signals to calm traffic and improve intersection safety, and pedestrian/bicycle-activated signals that allow bikes and pedestrians to cross busy streets without inviting traffic onto cross streets.

- Consider pedestrian crosswalk “runway” lights in the pavement at intersections with severe or higher-than-average pedestrian collision rates.

- Encourage and educate the public on the use of painted and unpainted crosswalks; enforce jaywalking regulations on main arterials.

- Encourage the creation of accessible pedestrian medians or islands in wide streets where people have to cross more than two lanes.

- Enforce pedestrian right-of-way laws.

- Provide improved connectivity via increased access points across rail right-of-way and the I-5 corridor.

- Provide additional Class I Bike Paths, primarily in the undeveloped areas of the region.

- Roadways programmed for Class II Bike Lanes should be constructed as soon as practical (the City of Carlsbad has an almost complete Class II Bike Lane network throughout the City).

- Increase bicycle ridership (the Bicycle Master Plan for the City of San Diego calls for an increase of bicycle ridership, currently at 1 percent, to at least 10 percent by the year 2020).

- All agencies strive for an interconnected network of bicycle facilities that are safe.

- Several agencies strive to provide bicycle trip-end facilities such as showers, lockers, and safe bicycle storage facilities.

Portions of the NC Bike Trail, proposed as part of this project (see *Section 2.3*, *I-5 North Coast Regional and Community Enhancement Projects*), would support compliance with the goals and principles of the local communities’ General Plans, as outlined above.

3.1.2.2 Environmental Consequences

Construction-related impacts would be similar for all four alternatives. Construction activity along the I-5 North Coast Corridor would occur in phases in order to minimize disruptions. Construction activities may create conflicts with relevant existing plans and programs by disrupting vehicular and pedestrian access; increasing noise, dust, and harmful emissions; creating visual impacts; and using parking lots and vacant areas as staging grounds for construction activities. The project would implement Caltrans' Standard Specifications related to temporary dust and emissions, as well as noise control. In addition, any impacts related to these disruptions are considered temporary proximity impacts and are not anticipated to result in permanent conflicts with relevant existing plans and programs. Caltrans would implement a TMP throughout the duration of construction activities that would be made available to the public. The TMP would serve to minimize project-related construction disruptions and would include traffic mitigation strategies designed in coordination with the local communities.

Permanent impacts from the proposed project would be similar for all four proposed alternatives. Although the amount of land converted to other uses may vary between alternatives, the type of conflicts with existing relevant plans would be similar for all four proposed alternatives. A brief synopsis of the consistency of the proposed project and relevant plans is provided below, followed by more detailed policy comparisons of the proposed project with relevant portions of the plans in *Table 3.1.1.*

San Diego Association of Governments RTPs and RTIPs

As noted above, the proposed project is included in the 2030 RTP and 2010 RTIP. The proposed project is also included in the current 2050 RTP, adopted on October 28, 2011. The project is identified in the 2012 RTIP (adopted on September 28, 2012 and subsequently amended) in Chapter 3, on page 33, as the Interstate 5 – HOV Managed Lanes (Metropolitan Planning Organization [MPO] ID: CAL09) to include: "From La Jolla Village Dr. to Harbor Dr. – construct High Occupancy Vehicle (HOV)/Managed Lanes on I-5" (SANDAG 2012). The U.S. Department of Transportation (USDOT) issued a finding of conformity for the 2050 RTP on December 2, 2011. The 2012 RTIP is consistent with the 2050 Revenue Constrained RTP (described below) and, as a financially constrained document, it contains only those major transportation projects listed in the revenue constrained RTP. The SANDAG Board of Directors made a conformity finding for the 2012 RTIP and redetermination of conformity for the 2050 RTP, and approved the final 2012 RTIP at its September 28, 2012, meeting.

The proposed alternatives are included under two scenarios, the Revenue Constrained Plan and the Unconstrained Network, in Appendix A, Projects, Costs, and Phasing, of the 2050 RTP. Appendix A of the 2050 RTP contains the projects included in the air quality analysis (SANDAG 2011). In Table A.1, on page 350, the proposed project is included under the Revenue Constrained Plan as part of two projects. The first project would improve I-5 between the I-5 / I-805 Merge and SR-56, from 8 general purpose lanes or 14 general purpose lanes with 2 HOV lanes (some variation exists within the segment) to 8 general purpose lanes with 4 Managed Lanes or 14 general purpose lanes with 4 Managed Lanes, respectively. The second project would improve I-5, between SR-56 and Vandegrift Boulevard, from 8 general purpose lanes or 8 general purpose lanes with 2 HOV lanes (some variation exists within the segment) to 8 general purpose lanes with 4 Managed Lanes. Managed Lanes include HOV lanes and Value Pricing lanes (SANDAG 2011). For the Unconstrained scenario, refer to Table A.9, Unconstrained Network, on page 394, the project is included as part of four projects.

The first project would improve I-5 between the I-5 / I-805 Merge and SR-56, from 8 general purpose lanes or 14 general purpose lanes with 2 HOV lanes (some variation exists within the segment) to 8 general purpose lanes with 4 Managed Lanes or 14 general purpose lanes with 4 Managed Lanes, respectively. The second project would improve I-5, between SR-56 and Manchester Avenue, from 8 general purpose lanes with 2 HOV lanes to 10 general purpose lanes with 4 Managed Lanes. The third project would improve I-5, between Manchester Avenue and Palomar Airport Road, from 8 general purpose lanes to 10 general purpose lanes with 4 Managed Lanes. The fourth project would improve I-5 between Palomar Airport Road and Vandegrift Boulevard, from 8 general purpose lanes to 10 general purpose lanes with 4 Managed Lanes (SANDAG 2011).

As stated above, the proposed project is included in SANDAG's 2030 and 2050 RTPs, as well as the 2010 and 2012 RTIPs, as amended. These documents and the related conformity determinations have been approved by the USDOT.

Natural Communities Conservation Plans: Multiple Species Conservation Program Subarea Plan and Multiple Habitat Conservation Program

The MSCP Subarea Plan identifies native habitat for multiple species to be conserved in perpetuity, known as the MHPA. The proposed project would encroach into areas preserved by the City of San Diego's MHPA. However, the proposed project is consistent with the policies in Section 1-4.2 of the MSCP Subarea Plan. The proposed project is consistent with these policies and guidelines because it has been designed to minimize impacts to biological resources, where possible, by taking reduced amounts of right-of-way and limiting the grading footprint. Additionally, the proposed project is consistent with these policies and guidelines because it is identified in the Mobility Element of the 2008 City of San Diego General Plan and is not located in a canyon bottom, would not disrupt a wildlife corridor, and would include measures to minimize impacts from construction-related activities. Therefore, the proposed project is conditionally compatible with the biological objectives of the MSCP. See *Section 3.17* for further information.

Individual jurisdictions implement their portions of the MHCP plan through the preparation and adoption of citywide subarea plans which describe the specific policies each city would institute for the MHCP. Carlsbad has adopted a subarea plan under the MHCP (the Carlsbad Habitat Management Plan [HMP]). Oceanside has prepared a final subarea plan (The Oceanside Subarea Habitat Conservation Plan [HCP]/Natural Community Conservation Plan), Encinitas has prepared a public review draft subarea plan, and Solana Beach is not required to prepare a subarea plan. Coordination between Caltrans and the cities is ongoing to ensure that impacts to sensitive biological species or communities targeted for preservation in the draft subarea plan is minimized, where feasible. Potential impacts to sensitive habitats and appropriate mitigation measures are discussed in *Sections 3.17* through *3.22*. With respect to the Carlsbad HMP, segments of the proposed project would encroach into areas conserved for their wildlife value as part of the HMP preserve system. However, these encroachments would be minimal and would not affect the overall biological value of the preserve areas. With respect to the Oceanside HCP, as seen on *Figure 4-1*, Preserve Planning Map and Habitat Conservation Overlay Zones, a softline pre-approved mitigation area has been established north of Oceanside Boulevard and south of Mission Avenue. This area near I-5 contains coastal sage scrub (CSS), disturbed CSS, some riparian habitat, least Bell's vireo, and coastal California gnatcatcher. Construction of I-5 hardscape would be within existing right-of-way and minimal cut and fill would occur outside of existing right-of-way, with encroachment primarily resulting from temporary construction easements. As such, encroachments beyond the existing right-of-way would be minimal, temporary, would consist of fill that would be revegetated with native coastal sage scrub species, and would not affect the overall biological value of the preserve areas. Furthermore, Caltrans has coordinated with the cities and/or wildlife agencies as required to ensure that potential impacts to HMP and HCP species or habitat are minimized to the maximum extent practicable and mitigated (see discussion of the project REMP in this Final EIR/EIS).

Coastal Zone Management Act

The PWP/TREP (Appendix R) provides a planning, analytical, and implementation mechanism to address improvements throughout the North Coast Corridor as a system consistent with Coastal Act. The Coastal Act includes specific policies that focus on protecting, enhancing, and maintaining coastal resource values, and maximizing public access to coastal resources and recreational facilities. The PWP/TREP is intended to serve as a public works plan to meet the Coastal Act permitting requirements and provide the CCC the necessary information for a consistency determination for the project. A CCC staff member assigned full time for this project attended the bi-monthly (monthly since 2010) PWP/TREP meetings along with the Caltrans and SANDAG managers, and technical specialists to develop this document, since 2007. *Table 3.1.1* includes the following applicable CZMA sections; 30231, 30233, 30240, 30241, 30241.5, 30242, 30244, 30250, 30251, and 30253; and Section 30007.5 for resolution of conflict. The project is consistent with the enforceable policies of Chapter 3 of the Coastal Act and CZMA.

City of San Diego General Plan

The City of San Diego General Plan and applicable community plans identify specific goals and policies for the various communities. The proposed project involves the expansion of an existing transportation corridor within San Diego County. The proposed alternatives would not result in any substantial land use changes within the project corridor and would minimize effects to adjacent existing land uses. In addition, encroachment into adjacent open space would be minimized and would not result in fragmentation of any preserved open space or habitat. The Mobility Element of the San Diego General Plan explicitly outlines an increase in capacity and a reduction in congestion along the freeway system as a primary goal. Additionally, applicable community plans within San Diego reflect this larger goal of the provision of a transportation system that provides convenient linkages to the rest of the metropolitan region. Therefore, the project would be generally consistent with the city and community plans and policies established for the City of San Diego within the project corridor. A more detailed listing of relevant goals and policies of specific community plans and the proposed project's consistency with those policies is provided in *Table 3.1.1.*

City of Solana Beach General Plan

The Solana Beach General Plan outlines specific goals and policies for existing and future development within the City. The proposed project would convert residential land uses to transportation uses as discussed in *Section 3.1* of this Final EIR/EIS. However, this would not substantially affect land use patterns within Solana Beach. Encroachment into adjacent residential uses would be minimized and would not result in fragmentation or displacement of residential neighborhoods. The proposed project would improve circulation along I-5 by increasing capacity. Although the proposed project would not include alternatives to motorized transportation such as bike lanes, implementation of the proposed project would not inhibit any existing alternative modes of transportation and would increase HOV capacity for carpooling and transit.

Segments of the proposed alternatives would encroach into open space areas and potentially impact natural resources. However, these encroachments would be minimized through design efforts and would not affect the overall biological value of the open space areas. Furthermore, Caltrans has coordinated with the City and/or wildlife agencies as required to ensure that potential impacts to natural resources would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS). Therefore, the proposed project would be generally consistent with the City of Solana Beach General Plan. A more detailed listing of relevant goals and policies and the proposed project's consistency with those policies is provided in *Table 3.1.1.*

City of Encinitas General Plan

The proposed project would convert existing residential and commercial land uses to transportation uses as discussed in *Section 3.1* of this Final EIR/EIS. However, impacts would be restricted to isolated parcels along an existing transportation corridor and would not substantially affect land use patterns within Encinitas. The proposed project would improve circulation along I-5 by increasing capacity and would also support an alternative to motorized transportation through implementation of proposed elements of the NC Bike Trail. Implementation of the proposed project would not inhibit any existing alternative modes of transportation and would increase HOV capacity for carpooling and transit.

Segments of the proposed alternatives would encroach into open space areas and potentially impact natural resources. However, these encroachments would be minimized through design efforts and would not affect the overall biological value of the open space areas. Furthermore, Caltrans has coordinated with the City and/or wildlife agencies as required to ensure that potential impacts to natural resources would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS). As discussed in *Section 3.3* of this Final EIR/EIS, implementation of the proposed project would convert prime farmland to nonagricultural uses. Conversion of this prime farmland would conflict with Goal 12 of the Resource Management Element and the proposed project alternatives would be inconsistent with the agricultural goals of the City of Encinitas General Plan. A more detailed listing of relevant goals and policies and the proposed project's consistency with those policies is provided in *Table 3.1.1.*

City of Carlsbad General Plan

The proposed project would convert existing residential and commercial land uses to transportation uses as discussed in *Section 3.1* of this Final EIR/EIS. However, impacts would be restricted to isolated parcels along an existing transportation corridor and would not substantially affect land use patterns within Carlsbad.

The proposed alternatives would minimize encroachment into adjacent open space areas along the alignment and would also incorporate measures to avoid indirect impacts to such areas, consistent with the Carlsbad General Plan Land Use Element, Environmental Goal. In addition, while the alternatives would affect agricultural operations, continued agricultural activities on the affected sites would not be precluded. Any future land uses on those sites, such as the strawberry fields designated for future travel and tourist uses, could occur on the remainder of the parcel.

The proposed project would improve circulation along I-5 by increasing capacity. In addition, the proposed project would increase capacity for carpooling and transit, and include trails, pedestrian overpass connections, and suspended trails at freeway bridges to create pedestrian linkages throughout the community. The proposed project would have the potential to affect natural resources such as Buena Vista, Batiquitos, and Agua Hedionda lagoons. However, Caltrans has coordinated with the City and/or wildlife agencies as required to ensure that potential impacts to natural resources would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS). A more detailed listing of relevant goals and policies and the proposed project's consistency with those policies is provided in *Table 3.1.1.*

City of Oceanside General Plan

The proposed project would convert residential and commercial land uses to transportation uses as discussed in *Section 3.1* of this Final EIR/EIS. However, impacts would be restricted to isolated parcels along an existing transportation corridor and would not substantially affect land use patterns within Oceanside.

The proposed alternatives would be consistent with the Circulation Element of the Oceanside General Plan, which seeks to provide an integrated transportation network that allows for the safe and efficient movement of people and goods within and through Oceanside, with minimal disruption to the environment. The proposed project would improve circulation along I-5 by increasing capacity. In addition, the proposed project would increase capacity for carpooling and transit, and would include trails, pedestrian overpass connections, and suspended trails at freeway bridges to create pedestrian linkages throughout the community. Encroachments into adjacent open space at Buena Vista Lagoon and along the San Luis Rey River would be minimized and measures incorporated to avoid indirect effects to water quality. Therefore, the proposed project would be consistent with the City of Oceanside General Plan. A more detailed listing of relevant goals and policies and the proposed project's consistency with those policies is provided in *Table 3.1.1.*

San Dieguito River Park Concept Plan

Implementation of the proposed project would result in minor acquisitions of land and open water within the San Dieguito River Park. However, these acquisitions would not affect the function of the park. Additionally, Caltrans has coordinated with the City and/or wildlife agencies as required to ensure that potential impacts to biological resources at San Dieguito Lagoon would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS).

San Elijo Lagoon Area Enhancement Plan

Implementation of the proposed project would result in minor acquisitions of land in the San Elijo Lagoon Ecological Reserve. However, these acquisitions would not affect the habitat or recreational values of the San Elijo Lagoon Ecological Reserve. Additionally, implementation of the proposed project would include construction of an enhanced trail connection consisting of a pedestrian walkway structure suspended on the west side of the widened I-5 bridge in the San Elijo Lagoon Ecological Reserve. Caltrans has coordinated with the City and/or wildlife agencies as required to ensure that potential impacts to biological resources at the San Elijo Lagoon Ecological Reserve would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS).

Agua Hedionda Land Use Plan

Implementation of the proposed project would result in minor acquisitions of land and open water within Agua Hedionda Lagoon. However, these acquisitions would not affect the habitat or recreational values of Agua Hedionda Lagoon. Additionally, Caltrans has coordinated with the City and/or wildlife agencies as required to ensure that potential impacts to biological resources at Agua Hedionda Lagoon would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS).

Summary of Project Consistency with Local Plans and Policies

As shown on *Table 3.1.1*, the proposed project would be potentially inconsistent with several community and general plans. The proposed project could conflict with the University Community Plan Open Space and Recreation Element because it would convert land within the MHPA to transportation uses. The proposed project could conflict with the City of Encinitas Resource Management Element because it would convert land within the San Elijo Lagoon Ecological Reserve to transportation uses and convert prime farmland to transportation uses.

The proposed project has the potential to be inconsistent with several community and general plan element policies, as stated in *Table 3.1.1*. The proposed project involves the expansion of an existing designated major transportation corridor and has been designed to minimize impacts to existing community land use patterns. Encroachments associated with the proposed project would be discrete and would not adversely affect the overall value of the open space, park, biological, and agricultural resources within the respective jurisdictions. Furthermore, these discrete encroachments would not disrupt or affect overall land use patterns within the respective jurisdictions. Although the amount of land converted to other uses may vary between alternatives, the type of conflicts with existing relevant plans would be similar for all four proposed alternatives. These inconsistencies are not considered to be adverse.

The No Build alternative would not result in any acquisition of land or open water or change the existing condition of habitat or recreational values at Agua Hedionda Lagoon. The No Build alternative would be consistent with existing plans and policies.

3.1.2.3 Avoidance, Minimization, and/or Mitigation Measures

As described in *Section 3.1.3*, Caltrans has undertaken extensive efforts to integrate the proposed project with the adjacent/adjoining Cities of San Diego, Del Mar, Solana Beach, Encinitas, Carlsbad, and Oceanside. Additionally, the proposed project is consistent with SANDAG's 2010 and 2012 RTIPs, as amended, and SANDAG's 2030 and 2050 RTPs.[2] Continuing efforts between Caltrans and these cities to work cooperatively to avoid land use compatibility conflicts with State transportation facilities are ongoing. Efforts have also been made during Inter-Governmental Review processes as well as with collaborative CEQA documents. These efforts have intended to minimize impacts to land use and have also served to minimize conflicts with applicable policies and goals as described above. These efforts have included designing all four alternatives to follow the existing I-5 alignment wherever possible and going through several design iterations to avoid and/or minimize potential impacts to land

[2] On December 20, 2012, the San Diego Superior Court entered a judgment finding that the EIR for the 2050 RTP is legally inadequate with regard to greenhouse gas emissions. Although the judgment may be overturned on appeal, this Final EIR/EIS has been drafted to avoid the narrow alleged deficiencies found by the Court. Where this Final EIR/EIS relies upon 2050 RTP information, that information has not been challenged and is not part of the current lawsuit.

use. Subsequent to circulation of the Draft EIR/EIS in 2010, continuing minimization of project footprint resulting from deletion of the Cannon Road DAR, redesign of the Manchester Avenue DAR, and refinement of the 8+4 Buffer alternative, have resulted in planned land use impacts that are further reduced from those assessed in the Draft EIR/EIS.

As discussed previously, the PWP/TREP recommends measures to achieve consistency with the CMZA, California Coastal Act, and the applicable LCPs. Subsequent to circulation of the Draft EIR/EIS in 2010, continuing minimization of project footprint resulting from deletion of the Cannon Road DAR, redesign of the Manchester Avenue DAR, and refinement of the 8+4 Buffer alternative, has resulted in increased consistency with these regulatory acts and documents. Potential impacts to agricultural properties in the City of San Diego have been eliminated, and overall agricultural impacts have been reduced from a total of 24 acres assumed for the 8+4 Buffer alternative at the time of Draft EIR/EIS public circulation to a total of 10.9 acres. The PWP/TREP would provide an implementation mechanism to address improvements throughout the corridor as a system that would avoid or offset impacts while focusing on protecting, enhancing, and maintaining coastal resource values, and maximizing public access to coastal resources and recreational facilities.

Table 3.1.1: Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
Natural Community Conservation Plans		
City of San Diego Multiple Species Conservation Program (MSCP) Subarea Plan		
Overarching Goal: to maintain and enhance biological diversity in the region and conserve viable populations of endangered, threatened, and key sensitive species and their habitats, thereby preventing local extirpation and ultimate extinction, and minimizing the need for future listings, while enabling economic growth in the region. **Management Objectives** (1) To ensure the long-term viability and sustainability of native ecosystem function and natural processes throughout the MHPA. (2) To protect the existing and restored biological resources from intense or disturbing activities within and adjacent to the MHPA while accommodating compatible public recreational uses. (3) To enhance and restore, where feasible, the full range of native plant associations in strategic locations and functional wildlife connections to adjoining habitat in order to provide viable wildlife and sensitive species habitat. (4) To facilitate monitoring of selected target species, habitats, and linkages in order to ensure long-term persistence of viable populations of priority plant and animal species and to ensure functional habitats and linkages. (5) To provide for flexible management of the preserve that can adapt to changing circumstances to achieve the above objectives.	The MSCP Subarea identifies native habitat for multiple species to be conserved in perpetuity, known as the Multiple Habitat Planning Area (MHPA). The proposed project would encroach into areas preserved by the City's MHPA. However, the proposed project is consistent with the policies in Section 1-4.2 of the MSCP Subarea Plan. The proposed project is not in an MHPA Biological core area or linkage. The proposed project is consistent with these policies and guidelines because it has been designed to minimize impacts to biological resources, where possible, by taking reduced amounts of right-of-way and limiting the grading footprint. Additionally, the proposed project is consistent with these policies and guidelines because the I-5 corridor is identified in the Mobility Element of the City of 2008 San Diego General Plan. Specifically, the proposed project is not located in a canyon bottom, would not disrupt a wildlife corridor, and would include measures to minimize impacts from construction-related activities.	All alternatives would be consistent.
Multiple Habitat Conservation Program (MHCP) (Encinitas, Carlsbad, Oceanside, Solana Beach)		
Overall Goal: to maintain biodiversity and ecosystem health in the region while maintaining quality of life and economic growth opportunities. **Goals:** (1) Biological Goals: maintain the range of natural biological communities and species native to the region, and contribute to regional viability of endangered, threatened, and key sensitive species and their habitats, thereby preventing local extirpation or species extinction. (2) Economic Goals: create greater certainty for economic and urban development by identifying where new development should and should not occur, and encourage investment by establishing a legal and procedural framework that streamlines the permitting process and provides a reliable basis for economic decision making. (3) Social Goals: protect the quality of life for local residents by maintaining the area's scenic beauty, natural biological diversity, and recreational opportunities.	Individual jurisdictions implement their portion of the MHCP plan through the preparation and adoption of citywide subarea plans that describe the specific policies each city would institute for the MHCP. Only Carlsbad has adopted a subarea plan under the MHCP (the Carlsbad HMP). Encinitas and Oceanside have prepared public review draft subarea plans, and Solana Beach is not required to prepare a subarea plan. While not signatory to the MHPA, Caltrans strives to be consistent with its guidelines, and would continue to coordinate with the appropriate wildlife agencies to ensure that impacts to sensitive biological species or communities targeted for preservation in the draft subarea plans are minimized, where feasible. Potential impacts to areas within the MHPA and appropriate mitigation measures are discussed in *Sections 3.17* through *3.22* of the EIR/EIS. The proposed project's consistency with the Carlsbad HMP is evaluated below.	All four build alternatives would be generally consistent. There are potential biological impacts that would be mitigated. No Build alternative would be consistent.
City of Carlsbad Habitat Management Plan (HMP)		
Overall Goal: to contribute to regional biodiversity and the viability of rare, unique or sensitive biological resources throughout the City of Carlsbad and the larger region while allowing public and private development to occur consistent with the Carlsbad General Plan and Growth Management Plan. **Specific Biological Objectives:** (1) Conserve the full range of vegetation types remaining in the City, with a focus on rare and sensitive habitats; (2) Conserve areas of habitat capable of supporting the HMP Species in perpetuity; and (3) Maintain functional wildlife corridors and habitat linkages within the City and to the region, including linkages that connect gnatcatcher populations and movement corridors for large mammals. **Specific Conservation Objectives:** (1) Maintain functional biological cores; (2) Maintain functional linkages and movement corridors; (3) Conserve rare vegetation communities; (4) Conserve narrow endemic species and maintain populations or target species; and (5) Apply a "no net loss" policy to the conservation of wetlands, riparian and oak woodland habitats.	Segments of the proposed project would encroach into areas conserved for their wildlife value as part of the HMP preserve system. However, these encroachments would be small and would not affect the overall biological value of the preserve areas. Furthermore, Caltrans has coordinated with the appropriate wildlife agencies as required to ensure that potential impacts to HMP species or habitat would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS).	All four build alternatives would be generally consistent with small encroachments into preserve areas. Potential biological impacts would be fully mitigated. No Build alternative would be consistent.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
Natural Community Conservation Plans (cont.)		
City of Carlsbad Habitat Management Plan (HMP) (cont.)		
Specific Land Use Objectives: (1) Protect important wildlife habitats while allowing for orderly growth and development; (2) Provide a menu of land use measures to protect and conserve habitat according to the Plan including standards relating to mitigation, open space dedications and density transfers; (3) Provide a framework for coordinating and monitoring the protection and management of biological resources in natural open space; and (4) Provide for the continued implementation of the Growth Management Plan, particularly the provision for ensuring adequate public facilities to serve new growth. **Specific Economic Objectives:** (1) Minimize environmentally sensitive area (ESA)-related mitigation costs to public and private projects; (2) Allow continued economic growth and development in the City; and (3) Minimize the overall cost of HMP implementation to the City and its residents.		
City of Oceanside Subarea Habitat Conservation Plan (HCP)/Natural Community Conservation Plan		
Overall Goal: to contribute to regional biodiversity and the viability of rare, unique or sensitive biological resources throughout the City and the larger region while allowing public and private development to occur consistent with the City's General Plan and Capital Improvement Program. **Goals:** (2) Participate in conserving the regions' biodiversity and enhancing the overall quality of life for residents of the Oceanside area. (3) Provide a strategy to proactively mitigate and minimize impacts to sensitive species and their habitats. (4) Protect and manage functional ecological communities, rather than focusing preservation on single species or isolated areas of habitat. (6) Reduce constraints on development projects that result from the uncoordinated application of federal and State resource protection laws. (7) Maintain functional habitat linkages and wildlife corridors within the City's Preserve and areas adjacent to the Preserve to provide for the movement of wildlife and native pollinators. (8) Provide for the conservation and management of XX covered species, and contribute to the recovery of covered species that are State and/or federally listed.	The proposed project potentially would encroach into areas identified as pre-approved mitigation area as part of the HCP. The potential encroachment would be small and would not affect the overall biological value of the preserve areas. Furthermore, Caltrans has coordinated with the appropriate wildlife agencies as required to ensure that potential impacts to HCP species or habitat would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS).	All four build alternatives would be generally consistent with small encroachments into preserve areas. Potential biological impacts would be fully mitigated. No Build alternative would be consistent.
City of San Diego Community Plans		
Torrey Hills Community Plan and Local Coastal Program		
Transportation Element **Goals:** (1) Construct and maintain an adequate community circulation network that is compatible with the regional transportation system; (3) Provide a transportation system that maximizes the opportunities for public transit; (4) Provide a system of bikeways and pedestrian facilities that would encourage bicycling and walking as a means of transportation; and (5) Provide a transportation system that is a convenient linkage to the community's activity centers and to the rest of the metropolitan region. **Policies:** (9) Development of transportation facilities shall avoid unnecessary encroachment into environmentally sensitive areas.	The proposed project would maintain or improve future travel times and levels of service in the corridor. The proposed project also includes other modal improvements, such as improved bicycle and pedestrian facilities, promotes carpooling, and is compatible with and complements future Bus Rapid Transit (BRT) service. The project is consistent with the region's 2050 RTP.	All four build alternatives would be consistent and would exceed plan goals. No Build alternative would be consistent.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
City of San Diego Community Plans (cont.)		
Torrey Hills Community Plan and Local Coastal Program (cont.)		
Open Space and Resource Management Element **Goals**: (1) Preserve, protect, enhance, and, where possible, restore all natural open space and sensitive resource areas including Los Peñasquitos Canyon Preserve, coastal sandstone bluffs and identified wildlife corridors; (2) Prohibit encroachment and impacts of adjacent development, both private and public, on areas designated open space.	The proposed project would not encroach upon land designated for open space by the Torrey Hills Community Plan. This would include the Los Peñasquitos Canyon Preserve. The proposed project would potentially result in the loss of some natural open resources located in the existing Caltrans right-of-way within the boundaries of the Torrey Hills Community Plan. These land conversions would be small and would not affect the overall biological value of the open space areas. Furthermore, Caltrans has coordinated with the wildlife agencies as required to ensure that potential impacts to HMP species or habitat would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS).	All four build alternatives would be consistent. No Build alternative would be consistent.
Community Facilities Element **Policies**: Minimize potential impacts to Los Peñasquitos Lagoon by providing drainage facilities to control runoff, erosion, and sedimentation.	The proposed project would not expand beyond the existing Caltrans right-of-way into the Los Peñasquitos Lagoon. Additionally, the proposed project would include construction of treatment basins, swales, and other design features to control runoff, erosion, and sedimentation to the extent practicable that could affect Los Peñasquitos Lagoon. These design features and appropriate mitigation measures are described in *Section 3.10.4* of the EIR/EIS.	All four build alternatives would be consistent. No Build alternative would be consistent.
Community Design Element **Landscape Concept** **Goals**: (1) Develop a landscape design concept which reinforces the community's landform grading concepts; (3) Establish a landscape planting palette which employs drought-tolerant, native and naturalized plant materials which are compatible with existing native vegetation, particularly the use of Torrey Pines; (4) Encourage the planting of landscape materials in natural, random freeform groupings in the same manner as existing native plant materials on and around the site;	Landscaping of the edges of the new Caltrans right-of-way would be consistent with the requirements of the Torrey Hills Community Plan.	All four build alternatives would be consistent. No Build alternative would be consistent.
Coastal Zone Policies **Open Space and Resource Management** **Policies**: (2) No fill or permanent structures shall be permitted within the boundaries of the Carmel Valley Restoration and Enhancement Project (CVREP) unless such development is first authorized by the California Coastal Commission; (3) No development, other than trails and fencing authorized in the approved coastal development permit, shall be constructed within the 15 m (50 ft) buffer adjacent to the CVREP, unless such development is first authorized by the California Coastal Commission. **Community Design** **Policies**: *Grading* (2) a. A grading plan that incorporates runoff and erosion control procedures to be utilized during all phases of project development shall be prepared and submitted…where such development is proposed to occur on lands that will be graded, filled or have slope of 25 percent or greater.	Implementation of the proposed project would involve widening of the existing I-5 freeway and would not encroach into CVREP. Erosion control would be utilized during construction and other appropriate Best Management Practices (BMPs).	All four build alternatives would be consistent. No Build Alternative would be consistent.
La Jolla Community Plan		
No relevant goals or policies.		

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
City of San Diego Community Plans (cont.)		
Torrey Pines Community Plan		
Resource Management and Open Space Element (1) Ensure long term sustainability of the unique ecosystems in the Torrey Pines community, including all soil, water, air, and biological components that interact to form healthy functioning ecosystems. (2) Conserve, restore, and enhance plant communities and wildlife habitat, especially habitat for rare, threatened, and endangered species. (3) Retain viable, connected systems of wildlife habitat, and maintain these areas in their natural state. (4) Identify, inventory, and preserve the unique paleontological, archaeological, Native American, and historic resources of Torrey Pines for their educational, cultural, and scientific values. (5) Preserve, enhance, and restore all natural open space and sensitive resources areas, including Los Peñasquitos Lagoon and associated uplands, Torrey Pines State park and Reserve Extension areas with its distinctive sandstone bluffs and red rock, Crest Canyon, San Dieguito Lagoon and River Valley, the Carroll Canyon Wetland/Wildlife Corridor through Sorrento Valley, and all selected corridors providing linkage between these areas. (6) Establish a pedestrian/bicycle pathway system that links all open space areas, from Carroll Canyon in the south to the San Dieguito River Valley in the north. This pathway system shall be provided concurrent with adjacent development, and shall be designed consistent with the design guidelines provided within this Plan.	The proposed project would include encroachments that would result in the loss of open space and vacant land adjacent to the existing I-5 right-of-way. This open space and vacant land may include trees, plant communities, and wildlife habitat. However, these encroachments would be small and would not affect the overall biological value of the open space and vacant lands. Furthermore, Caltrans has coordinated with the City and/or wildlife agencies as required to ensure that potential impacts to environmentally sensitive habitats would be minimized and mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS). Potential impacts to the unique ecosystems of the Torrey Pines, plant communities, and wildlife habitat and related mitigation measures are described in *Sections 3.17 through 3.22* of the EIR/EIS. The proposed project would potentially increase both the amount of urban pollutants in runoff and the volume of runoff generated along the corridor. The proposed project would include construction of treatment basins, bioswales, and other design features to control runoff, erosion, and sedimentation to the extent practicable. The proposed project would have the potential to impact paleontological and archaeological resources. Potential impacts to paleontological and archaeological resources and appropriate mitigation measures are described in *Section 3.12.4* of the EIR/EIS.	All four build alternatives are potentially inconsistent. Plan inconsistency would be mitigated through proposed project biological mitigations. No Build alternative is potentially inconsistent in opportunity loss for reduced energy consumption with use of HOV/Managed Lanes project.
Transportation Element (1) Provide an efficient, safe, and environmentally sensitive transportation system. (2) Ensure that transportation improvements do not negatively impact the numerous open space systems located throughout the Torrey Pines community. (3) Provide a transportation system that maximizes the opportunities for public transit use, especially in Sorrento Valley. (4) Provide a system of bikeways and pedestrian facilities that would encourage bicycling and walking as a means of transportation. (5) Provide a transportation system that provides convenient linkages to the community's activity centers and to the rest of the metropolitan region. (6) Provide a safe and environmentally sensitive improvement of the Del Mar Terrace neighborhood streets. (7) Provide a transportation system that encourages the use of mass transit, rather than building and/or widening roads and freeway. (8) Investigate the feasibility of providing seasonal shuttle service.	The proposed project would result in the loss of open space and vacant land adjacent to the existing I-5 right-of-way. This open space and vacant land may include trees, plant communities, and wildlife habitat. However, these encroachments would be small and would not affect the overall biological value of these areas. Furthermore, Caltrans has coordinated with the City and/or wildlife agencies as required to ensure that potential impacts to environmentally sensitive habitats would be minimized and mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS). Potential impacts to the unique ecosystems of the Torrey Pines, plant communities, and wildlife habitat and related mitigation measures are described in *Sections 3.17* through *3.22* of the EIR/EIS. The proposed project would maintain or improve travel times and levels of service in the corridor. The proposed project also includes other modal improvements, such as improved bicycle and pedestrian facilities, promotes carpooling, and is compatible with and complements future BRT service. The project is consistent with the region's 2050 RTP. The proposed project would have the potential to impact important paleontological and archaeological resources.	All four build alternatives would be consistent. No Build alternative is potentially inconsistent due to reduced opportunity for HOV/Managed Lanes users.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
City of San Diego Community Plans (cont.)		
University Community Plan		
Overall Urban Design Goals (1) Improve accessibility and use relationships within the community by establishing well-defined, multimodal linkage systems. (2) Establish standards which give physical design direction to private development and public improvements. (3) Provide for the needs of pedestrians in all future design and development decisions. (4) Ensure that San Diego's climate and the community's unique topography and vegetation influence the planning and design of new projects. (5) Ensure that every new development contributes to the public realm and street livability by providing visual amenities and a sense of place.	The proposed project includes other modal improvements, such as improved bicycle and pedestrian facilities, promotes carpooling, and is compatible with and complements future BRT service. The project is consistent with the region's 2050 RTP. Proposed HOV lanes would improve accessibility and enhance multimodal linkages by improving the carpooling and transit capacity of the corridor. Additional general purpose lanes proposed under two of the alternatives would maintain or improve travel times along the corridor for all users. The proposed project would not affect the needs of pedestrians, the public realm, or street livability within the community.	All four build alternatives would be consistent. No Build alternative would be consistent.
Transportation Element (1) Provide a network of transportation systems that are integrated, complementary and compatible with other citywide and regional goals. The network should take into account the physical, social, economic, and environmental conditions of the community, both present and future. (2) Provide a balanced public transportation system to link the entire community to all of its own activity areas and to the San Diego metropolitan areas as a whole. (3) Encourage alternative modes of transportation by requiring developer participation in transit facility improvements, the Intra-Community Shuttle Loop and the light rail transit (LRT). (4) Ensure implementation of Council Policy 600-34, Transit Planning and Development.	The proposed project would not adversely affect the community's desire to provide a network of transportation systems that is integrated, complementary, and compatible with other citywide and regional goals. Increased capacity for transit via the proposed HOV lanes would improve the community's public transportation links to the San Diego metropolitan area. The proposed project would not obstruct implementation of Council Policy 600-34, which places a high priority on public transit and outlines measures to develop public transit in the City.	All four build alternatives would be consistent. No Build alternative would be potentially inconsistent with reduced opportunity for HOV/Managed Lanes use.
Development Intensity Element (1) Create an urban node with two relatively high-density, mixed-use core areas located at the University Towne Centre and La Jolla Village Square areas. (2) Develop an equitable allocation of development intensity among properties, based on the concept of the urban node. (3) Provide a workable circulation system which accommodates anticipated traffic without reducing the Level of Service below "D."	The proposed project does not include any development projects and would not adversely affect the community's plans to develop an urban node or equitably allocate development intensity. In addition, the proposed project would improve traffic flows and would not adversely affect Level of Service (LOS) on the community's circulation system.	All four build alternatives would be consistent. No Build alternative would be consistent.
Public Facilities Element (1) Develop and maintain a public school system that would enable all students to realize their highest potential. (2) Provide a high level of service in police and fire protection. (3) Encourage the multipurpose use of existing community and private facilities.	The proposed project would not adversely affect any schools, the level of police and fire protection, or any existing community and private facilities.	All four build alternatives would be consistent. No Build alternative would be consistent.
Open Space and Recreation Element (1) Preserve the natural resources of the community through the appropriate designation and use of open space. Major topographic features and biological resources should be preserved as undeveloped open space. (2) Provide a system of population-based parks to meet the community's needs for outdoor recreation. (3) Establish an open space system that would utilize the terrain and natural drainage system to guide the form of urban development, enhance neighborhood identity, and separate incompatible land uses. (4) Promote public health and safety by designating areas with high potential for landslides, earthquake faults or aircraft accidents as open space. (5) Develop a linkage system to connect recreational and natural open space areas throughout the community.	Implementation of the proposed project would not impact any of the activities, features, or attributes of any park or recreational opportunities. In addition, the proposed project would not adversely affect existing or planned linkages between recreational and natural open space areas. However, implementation of the proposed project would result in the loss of open space and environmental resources within the MHPA.	All four build alternatives are potentially inconsistent. No Build alternative would be consistent.
Noise Element (1) Minimize and avoid adverse noise impacts by planning for the appropriate placement and intensity of land uses relative to noise sources. (2) Provide guidelines for the abatement of noise impacts where incompatible land uses are located in a high noise environment.	Caltrans is not a land use planning agency, and, therefore, has no authority on land use designation or limiting incompatible land uses adjacent to a highway. However, Caltrans proposes to construct noise barriers at various locations along the I-5 corridor, where feasible and reasonable, to abate for highway traffic noise; the location, height, materials, and other design features are discussed in *Section 3.15.3*.	All four build alternatives would be consistent. No Build alternative is potentially inconsistent, since no noise abatements are proposed and traffic noise is expected to increase with projected increased in traffic volume.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
City of San Diego Community Plans (cont.)		
University Community Plan (cont.)		
Safety Element (1) Protect the public health and safety by guiding future development so that land use is compatible with identified geologic risks, including seismic and landslide hazards. (2) Ensure that proposed development does not create or increase geologic hazards either on- or off-site. (3) Promote public safety by taking into account aircraft accident potential in the placement of structures and activities. (4) Provide for the safe operation of MCAS Miramar through the preservation of appropriate departure corridors.	The proposed project would be designed and constructed to withstand seismic events and geologic hazards in compliance with current standards; therefore, as discussed in *Section 3.11.3* of the EIR/EIS, no effect on safety due to seismic events or geologic hazards would occur. Proposed design measures to minimize geologic hazards include the addition or replacement of retaining walls in areas that are either relatively steep or have right-of-way limitations. (The proposed project would not affect operations at Marine Corps Air Station [MCAS] Miramar.)	All four build alternatives would be consistent. No Build alternative would be consistent.
Resource Management Element (1) Preserve the community's natural topography, particularly in the coastal zone and in major canyon systems. (2) Protect biological resources through the wise management and use of community's natural open space and parks. (3) Contribute to the maintenance and improvement of regional water quality by controlling siltation and urban pollutants in runoff. (4) Reduce energy consumption by requiring energy efficiency in building design and landscaping and by planning for a self-contained community and energy-efficient transportation. (5) Provide for the identification and recovery of significant paleontological resources. (6) Ensure the effective preservation and management of significant archaeological resources.	The proposed project would potentially impact the community's natural topography, natural open space, and trees in order to accommodate the additional right-of-way. Potential impacts to the community's natural topography, natural open space and trees, and related mitigation measures are described in *Section 3.17* of the EIR/EIS. The proposed project would potentially increase both the amount of urban pollutants in runoff and the volume of runoff generated along the corridor. The proposed project would include construction of treatment basins, swales, and other design features to control runoff, erosion, and sedimentation to the extent practicable. The proposed project would have the potential to impact important paleontological and archaeological resources. Potential impacts to important paleontological and archaeological resources and appropriate mitigation measures are described in *Sections 3.12.4* and *3.8.4*, respectively, of this EIR/EIS.	All four build alternatives would be consistent. No Build alternative would be consistent.
Carmel Valley Community Plan		
Park, Recreation, and Open Space Element (1) In order to promote North City West as a balanced community, a variety of park and recreational facilities would be necessary. The balanced community policy would insure a population representative of all ages, interests, social and economic status in North City West. This population would have different recreational needs. For example, one park may contain playfields and active sports areas while another may offer picnic areas and viewpoints. (3) In order to promote preservation of the natural environment, development of either public or private nature should not be allowed on lands designated for open space unless the proposed development is compatible with open space use. An inventory of the desirable natural features of all property within the study area together with alternative plans for the conservation of these amenities should be a prerequisite for development.	The proposed project would include encroachments that would result in the loss of land designated as community open space adjacent to the existing I-5 right-of-way. However, these encroachments would be small and would not affect the overall recreational or biological value of the open space lands. Furthermore, Caltrans has coordinated with the City and/or wildlife agencies as required to ensure that potential impacts to biological resources would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS).	All four build alternatives would be consistent. No Build alternative would be consistent.
Circulation Element (1) In order to promote North City West as a balanced community, a balanced transportation system must be included in initial construction of North City West. Such a system would assure mobility and access to all parts of the community for all residents and therefore facilitate a social balance.	The proposed project would not adversely affect the community's desire to provide a network of transportation systems that is integrated, complementary, and compatible with other citywide and regional goals. The proposed project would improve would maintain or improve travel times and levels of service in the corridor. The proposed project also includes other modal improvements, such as improved bicycle and pedestrian facilities, promotes carpooling, and is compatible with and complements BRT service. The project is consistent with the region's 2050 RTP.	All four build alternatives would be consistent. No Build alternative would be consistent.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
City of Solana Beach General Plan		
Land Use (1) To promote development of a well-balanced and functional mix of residential, commercial, industrial, open space, recreational, and industrial land uses. (2) To ensure that development in the City is consistent with the overall community character and contributes positively towards the City's image. (3) To ensure that long-term protection of the environment is given the highest priority in the consideration of development proposals and in the implementation of this General Plan.	The proposed project would not involve development of any residential, commercial, industrial, recreational, and industrial land uses and would not alter the existing community character. Implementation of the 10+4 Barrier alternative would result in the loss of six residential units but would not adversely affect the overall land use distribution within Solana Beach. Implementation of the refined 8+4 Buffer alternative would result in no losses of residential or commercial units within Solana Beach and would not adversely affect the overall land use distribution.	All four build alternatives would be consistent. No Build alternative would be consistent.
Housing Element (1) Encourage the adequate provision of a range of housing opportunities that would meet Solana Beach's share of the existing and future housing needs of the region. (2) Minimize governmental constraints to the development, improvement, and maintenance of housing. (3) Maintain and enhance the quality of residential neighborhoods in Solana Beach. (4) Conserve existing affordable housing opportunities. (5) Promote equal opportunity for all residents to live in the housing of their choice.	No housing would be constructed as a part of the proposed project. Although implementation of the proposed project would result in the loss of six residential units under the 10+4 Barrier alternative, this loss would not adversely affect the overall housing stock within Solana Beach. Furthermore, adequate replacement housing has been identified in the Draft Relocation Impact Report. Implementation of the refined 8+4 Buffer alternative would result in no housing losses within Solana Beach and would not adversely affect the overall housing stock.	All four build alternatives would be consistent. No Build alternative would be consistent.
Circulation (1) To provide a street network to move people and goods safely and efficiently. (2) To promote a public transportation system that is safe, convenient, efficient, and meets the identified needs of the Solana Beach Community. (3) To promote safe alternatives to motorized transportation that meet the needs of all city residents.	The proposed project would improve circulation along I-5 by increasing capacity. The proposed project would maintain or improve travel times and levels of service in the corridor. The proposed project also includes other modal improvements, such as improved bicycle and pedestrian facilities, promotes carpooling, and is compatible with and complements future BRT service. The project is consistent with the region's 2050 RTP.	All four build alternatives would be consistent. No Build alternative is potentially inconsistent due to reduced opportunity for HOV/Managed Lanes users.
Noise To protect public health and welfare by eliminating existing noise problems and by preventing significant degradation of the future acoustic environment.	The proposed project would increase noise levels along the I-5 corridor. However, the project proposes to construct soundwalls at various locations along the I-5 corridor, where feasible and reasonable, to abate for highway traffic noise; the location, height, materials, and other design features are discussed in *Section 3.15.3*.	All four build alternatives would be consistent. No Build alternative is potentially inconsistent, since no noise abatements are proposed and traffic noise is expected to increase with projected increased in traffic volume.
Safety Element (1) To minimize hazards to public health, safety, and welfare resulting from natural and man-made phenomena. (2) To provide a safe and secure environment for the City's residents, workers, and visitors.	The proposed project would be designed and constructed to withstand seismic events and geologic hazards in compliance with current standards.	All four build alternatives would be consistent. No Build alternative would be consistent.
Open Space and Conservation (1) To protect and conserve the City's natural and cultural resources. (2) To protect and enhance sensitive open space areas and viewsheds. (3) To meet the needs of the entire community by providing an adequate level of parks and recreational opportunities.	Implementation of the proposed project would not convert land designated as open space by the Solana Beach General Plan to other uses. Segments of the proposed alternatives would potentially impact natural resources. However, these impacts would be minimized and would not affect the overall biological value of natural resources within Solana Beach. Furthermore, Caltrans has coordinated with the City and/or wildlife agencies as required to ensure that potential impacts to natural resources would be minimized to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS). The proposed project would have the potential to impact cultural resources. Implementation of the proposed project would have the potential to impact existing viewsheds. Visual impacts are expected to be localized to the I-5 right-of-way. Where loss of views could occur to abutting residents due to proposed soundwalls, the use of transparent barriers would be considered. Potential impacts to existing viewsheds and appropriate mitigation measures are described in *Section 3.7.4* of the EIR/EIS. The proposed alternatives would not impact any of the activities, features, or attributes of park or recreational opportunities.	All four build alternatives would be consistent. No Build alternative would be consistent.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
City of Solana Beach General Plan (cont.)		
Economic Development (1) To provide for the long-term economic health of Solana Beach through development of an expanded commercial base. (2) To promote the City's economic health by upgrading its commercial base. (3) To assure continued delivery of adequate public services and facilities to city residents and organizations, within the limits posed by fiscal resources.	The proposed project would not impact existing commercial properties within Solana Beach. Additionally, implementation of the proposed project would contribute to implementation of an expanded or upgraded commercial base as maintenance or improvement of I-5 would support access to commercial properties within Solana Beach over No Build conditions.	All four build alternatives would be consistent. No Build alternative would not be consistent because projected increased congestion and limited accessibility would not support expansion or upgrade of the commercial base.
City of Encinitas General Plan and LCP		
Land Use Element **Goal 9:** Preserve the existence of present natural open spaces, slopes, bluffs, lagoon areas, and maintain the sense of spaciousness and semirural living within the I-5 View Corridor … (LU-26); *Policy 9.1:* Preserve … the best natural features and (avoid) the creation of a totally urbanized landscape and maintain I-5 Interchange areas to conform to the specifications of (Goal 9) … (LU-26); *Policy 9.2:* Encourage the retention of buffer zones such as natural vegetation or earth barriers, bluffs, and canyons to protect adjacent areas of freeway corridor from pollutants of noise, exhaust, and light (LU-26); *Policy 9.6:* Where it is necessary to construct retaining or noise-attenuating walls along the I-5 corridor, they should be constructed with natural-appearing materials and generously landscaped with vines, trees and shrubbery (LU-27).	The proposed project would not involve development of any residential, commercial, industrial, recreational, or industrial land uses within the I-5 view corridor and would not substantially alter the existing community character. Caltrans is not a land use planning agency, and, therefore, has no authority on land use designation or limiting incompatible land uses adjacent to a highway. However, Caltrans proposes to construct noise barriers at various locations along the I-5 corridor, where feasible and reasonable, to abate for highway traffic noise; the location, height, materials, and other design features are discussed in *Section 3.15.3*. Conversion of natural resources (e.g., wetland habitat) would be minimal and would not affect the overall health of natural resources within the City. Furthermore, Caltrans has coordinated with the City and/or wildlife agencies as required to ensure that potential impacts to natural resources would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS).	All four build alternatives would be consistent. No Build alternative would be consistent.
Circulation Element **Goal 1:** Encinitas should have a transportation system that is safe, convenient, and efficient, and sensitive to and compatible with surrounding community character (C-3); *Policy 1.1:* Ensure that the arterial circulation system provides adequate connections across the freeway for convenient circulation and rapid emergency access (C-3); *Policy 1.5:* Promote maximum utilization or expansion of existing freeways and prime arterials as an alternative to new freeway or highway construction … (C-3); *Policy 2.11:* Encourage landscaping of freeway medians and freeway unpaved rights-of-way adjacent to the freeway using reclaimed water where available (C-6); *Policy 3.5:* Encourage development of mass transit and transit access points along the existing I-5 freeway corridor or along the railroad right-of-way (C-8); **Goal 4:** The City should make every effort to develop a circulation system that highlights the environmental and scenic amenities of the area (C-9); *Policy 4.5:* Design and construct attractive bike paths and pedestrian ways along existing freeway overpasses and underpasses. Discourage separate pedestrian overpasses (C-10).	The proposed project would not adversely affect circulation or emergency access on existing connections across the freeway. The proposed project would maintain or improve travel times and levels of service in the corridor. The proposed project also includes other modal improvements, such as improved bicycle and pedestrian facilities, promotes carpooling, and is compatible with and complements future BRT service. The project is consistent with the region's 2050 RTP. In addition, the proposed project would increase HOV capacity for carpooling and transit and would include community enhancement features to create pedestrian linkages throughout the community.	All four build alternatives would be consistent. No Build alternative is potentially inconsistent due to reduced opportunity for HOV/Managed Lanes users.
Resource Management Element **Goal 3:** The City would make every effort possible to preserve significant mature trees, vegetation and wildlife habitat within the Planning Area (RM-7); *Policy 4.3:* The following Vista Points would be maintained as needed, and upgraded as necessary … Existing Vista Point on southbound I-5 … (RM-9); *Policy 4.7:* The City would designate the following view corridors as scenic highway/visual corridor viewsheds … Interstate 5, crossing San Elijo Lagoon (RM-10); *Policy 4.9:* … Road Design: Type and physical characteristics of roadways (within scenic highway/visual corridor viewsheds) should be compatible with natural character of corridor, and with the scenic highway function … (RM-10); *Policy 4.10:* … Trees and vegetation which are themselves part of the view quality along the public right-of-way would be retained. (RM-11);	The proposed alternatives would potentially involve the loss of some mature trees and vegetation along the corridor. However, the proposed project includes the planting of disturbed areas with plant species native to the vicinity. The portion of the proposed project crossing San Elijo Lagoon would involve expansion of the existing freeway, causing minor encroachment into wetlands and would be consistent with the City's proposed scenic highway/visual corridor viewshed designation. Potential impacts to existing viewsheds and appropriate mitigation measures are described in *Section 3.7.4* of the EIR/EIS. The proposed project has the potential to adversely affect San Elijo Lagoon, Batiquitos Lagoon, and other wetlands. Potential adverse effects to wetlands and appropriate mitigation measures are analyzed in associated technical studies.	All four build alternatives are potentially inconsistent. No Build alternative would be consistent.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
City of Encinitas General Plan and LCP (cont.)		
Resource Management Element (cont.) *Policy 10.6:* … There shall be no net loss of wetland acreage or resource value as a result of land use or development, and the City's goal is to realize a net gain in acreage and value whenever possible … (RM-18); *Policy 10.9:* The City would encourage the preservation and the function of San Elijo Lagoon and Batiquitos Lagoon and their adjacent uplands as viable wetlands, ecosystems and habitat for resident and migratory wildlife, by prohibiting actions … which: involve wetland fill or increased sedimentation into wetlands; adversely decrease stream flow into the wetlands; reduce tidal interchange; reduce internal water circulation; or adversely affect existing wildlife habitats (RM-20); *Policy 10.11:* In acting to maintain and, where feasible, restore the biological productivity and quality of San Elijo Lagoon, the City would limit alterations and uses to minor public facilities; restorative measures; nature study; passive, non-degrading recreational activities; and facilities necessarily adjunct aquaculture uses … (RM-22); *Policy 13.3:* Encourage the use of buffer zones to separate major thoroughfares from adjacent areas and protect them from pollutants of noise, exhaust, and light. (RM-25); **Goal 15:** The City would make every effort to conserve energy in the City thus reducing our dependence on fossil fuels (RM-27). **Goal 12:** The City would encourage the preservation of "prime" agriculture lands within its sphere of influence.	Caltrans has coordinated with the City and/or wildlife agencies as required to ensure that potential impacts to natural resources would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS). Nonetheless, the proposed project would result in permanent loss of land within the San Elijo Lagoon Ecological Reserve. The proposed alternatives would convert prime farmland to nonagricultural uses. Therefore, conversion of this prime farmland would conflict with Goal 12 of the Resource Management Element and the proposed project alternatives would be inconsistent with the agricultural goals of the City of Encinitas General Plan. This inconsistency is slight rather than substantial in nature (refer to *Section 3.3*).	
Noise Element **Goal 1:** Provide an acceptable noise environment for existing and future residents of the City of Encinitas (N-5); **Goal 3:** Ensure that residents are protected from harmful and irritating noise sources to the greatest extent possible (N-7).	Caltrans proposes to construct noise barriers at various locations along the I-5 corridor, where feasible and reasonable, to abate for highway traffic noise; the location, height, materials, and other design features are discussed in *Section 3.15.3*.	All four build alternatives would be consistent. No Build alternative is potentially inconsistent, since no noise abatements are proposed and traffic noise is expected to increase with projected increased in traffic volume.
Local Coastal Program The City of Encinitas LCP designates a Special Study Overlay for Agricultural Land and includes the following policies to protect agricultural resources within the city and its sphere of influence: • Preserve and promote the right to produce unique horticultural crops and community gardens. • Encourage preserving "prime" agriculture lands within its sphere of influence. • The Ecke Holdings, et. al., are within the City of Encinitas' Coastal Zone sphere of influence … The City recognizes this land as "prime" agriculture suitability and as such, designates it for long term preservation as "Agriculture/Open Space Preserve." • Plan for compatible land uses within and adjacent to recreation areas, natural preserves, and agricultural areas.	The proposed highway improvements within Encinitas would result in minimal encroachment and edge impacts along the existing I-5 NCC corridor to three agricultural properties. These impacts would involve the loss of approximately 8.4 acres of Prime Farmland at Manchester Avenue, which could affect the ability for continued agricultural use of the property.	All four build alternatives are potentially inconsistent. No Build alternative would be consistent. A policy conflict would require an amendment to ensure consistency of the project with the certified LCP. The standard of review for amendments to the City of Encinitas LCP would be Sections 30241 and 30242 of the Coastal Act. Refer to the analysis of the Coastal Act below.
City of Carlsbad General Plan		
Land Use Element **<u>Environmental Goal</u>:** A City which protects and conserves natural resources, fragile ecological areas, unique natural assets and historically significant features of the community (including Buena Vista Lagoon, Batiquitos Lagoon, and Agua Hedionda Lagoon) (p. 39).	The proposed alternatives would have the potential to affect natural resources such as Buena Vista, Batiquitos, and Agua Hedionda lagoons. However, Caltrans has coordinated with the wildlife agencies as required to ensure that potential impacts to natural resources would be minimized and mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS).	All four build alternatives would be consistent. No Build alternative would be consistent.
Circulation Element ***<u>Streets and Traffic Control</u>*** **A.1:** A City with an integrated transportation network serving local and regional needs which accommodates a variety of different travel modes based on safety, convenience, attractiveness, costs, environmental and social impacts (p. 5). ***<u>Scenic Roadways</u>*** **Goal:** A City which preserves and enhances the visual, environmental and historical characteristics of the local community through sensitive planning and design of transportation … corridors (p.9).	The proposed project would improve would maintain or improve travel times and levels of service in the corridor. The proposed project also includes other modal improvements, such as improved bicycle and pedestrian facilities, promotes carpooling, and is compatible with and complements BRT service. The project is consistent with the region's 2050 RTP. In addition, the proposed project would enhance include community enhancement features designed to create pedestrian linkages throughout the community.	All four build alternatives would be consistent. No Build alternative is potentially inconsistent due to reduced opportunity for HOV/Managed Lanes users.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
City of Carlsbad General Plan (cont.)		
Circulation Element (cont.) ***Implementing Policies and Action Programs*** **C2:** Establish four categories of scenic corridors and designate streets to be included within those categories as follows … Community Scenic Corridors … Interstate 5 (p.9). ***Regional Circulation Considerations*** **Goals: A.1:** A City with a transportation system which helps minimize air pollution and traffic congestion and supports commerce and economic development (p.10). ***Implementation Policies and Action Programs*** **C4:** Consider noise impacts in the design of road systems and give special consideration to those road corridors in scenic or noise sensitive areas.		
Noise Element **General –** A City which is free from excessive, objectionable, or harmful noise. **Land Use – A.1:** A City where land uses are not significantly impacted by noise. (p.6). **Roads – Goal:** To provide a roadway system that does not subject surrounding land uses to significantly adverse noise levels (p.8).	Caltrans is not a land use planning agency, and, therefore, has no authority on land use designation or limiting incompatible land uses adjacent to a highway. However, Caltrans proposes to construct soundwalls at various locations along the I-5 corridor, where feasible and reasonable, to abate for highway traffic noise; the location, height, materials, and other design features are discussed in *Section 3.15.3*.	All four build alternatives would be consistent. No Build alternative is potentially inconsistent, since no noise abatements are proposed and traffic noise is expected to increase with projected increased in traffic volume.
Open Space and Conservation Element **Special Resource Protection –** Goals: A.1: A city that preserves as open space, hillsides, ridges, valleys, canyons, lagoons, beaches, and other unique resources that provide visual and physical relief to the Cityscape.; and A.2: A City that conserves natural and man-made resources. **Trail/Greenway System – Goals:** A.1: A city with open space areas connected by Greenways; and A.2: A city with a Carlsbad Trail System. **Air Quality Preservation – Goal:** A city with clean air. **Promoting Agriculture – Goal:** A city which recognizes the important value of agriculture land horticulture lands. **Objective B.4:** To ensure that new development is sensitive to existing agricultural uses.	The proposed project would include encroachments that would result in the loss of small amounts of Buena Agua Hedionda and Batiquitos lagoons adjacent to the existing I-5 right-of-way. However, these encroachments would not adversely affect the activities at these lagoons and they would continue to function as open space resources. The proposed project would include encroachments that would result in the loss of land designated as open space adjacent to the existing I-5 right-of-way. However, these encroachments would be small and would not affect the overall recreational or biological value of the open space lands. Furthermore, Caltrans has coordinated with the wildlife agencies as required to ensure that potential impacts to biological resources would be minimized and mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS). The proposed project would also encroach upon existing agricultural operations within Carlsbad. However, these encroachments would not prevent agricultural activities from continuing on the remainder of the parcels unaffected by the proposed project. Community enhancement opportunities associated with the proposed project would include trails at several locations along the lagoons. Implementation of the proposed project would not disrupt long-term access to existing trails. The air quality analysis prepared for the proposed project did not identify any substantial regional impacts related to air quality.	All four build alternatives would be consistent. No Build alternative would be consistent.
Parks and Recreation Element **Park Development – Goals: A.1:** A City that provides a diversified, comprehensive park system utilizing contemporary concepts and planning strategies. **Recreation Programs – Goals:** A City that offers a wide variety of recreational activities and park facilities designed to encourage participation by users of all ages and interests.	The proposed project would include encroachments that would result in the loss of small amounts of Buena Agua Hedionda and Batiquitos lagoons adjacent to the existing I-5 right-of-way. However, these encroachments would not affect the activities at these lagoons and they would continue to function as recreation areas. Additionally, the proposed project would avoid impacts to Holiday Park by utilizing a retaining wall.	All four build alternatives would be consistent. No Build alternative would be consistent.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
City of Carlsbad General Plan (cont.)		
Local Coastal Program The City of Carlsbad LCP includes an extensive set of policies that address preserving and converting agricultural lands, and mitigating conversion of such lands when permitted pursuant to the LCP.	The proposed highway improvements within Carlsbad would affect 2.3 acres of Prime and Unique Farmland at Cannon Road. This impact would occur in the Agua Hedionda Lagoon planning area of the City of Carlsbad, which is the only uncertified segment of Carlsbad's certified LCP. As such, the CCC retains permit jurisdiction in this area with the standard of review for the proposed improvements being the Chapter 3 policies of the Coastal Act. Implementation of either an in-kind agricultural project, or payment of an in-lieu fee to the City's certified Agricultural Conversion Mitigation Fee program, would offset impacts to coastal agricultural resources. Although the City's program does not currently extend to the Agua Hedionda Lagoon planning area, an LCP Amendment is undergoing review with the CCC to allow for such, which could be applicable to offsetting PWP/TREP impacts.	With approval of the City's LCPA extending the City's certified Agricultural Conversion Mitigation Fee program to the Agua Hedionda Land Use planning area, all four build alternatives would be consistent. No Build alternative would be consistent. Refer to the analysis of the Coastal Act below.
Oceanside General Plan		
Land Use Element **<u>1.14 Noise Control</u>:** Objective: To improve the quality of Oceanside's environment by minimizing the negative effects of excessive noise levels.	Caltrans is not a land use planning agency, and therefore has no authority on land use designation or limiting incompatible land uses adjacent to a highway. However, Caltrans proposes to construct noise barriers at various locations along the I-5 corridor, where feasible and reasonable, to abate for highway traffic noise; the location, height, materials, and other design features are discussed in *Section 3.15.3*.	All four build alternatives would be consistent. No Build alternative would be consistent.
Circulation Element **<u>Goals</u>:** (1) Provide an integrated transportation network that provides safe and efficient movement of people and goods within and through the City of Oceanside with minimal disruption to the environment; (2) Consider all modes of transportation, including motor vehicle, mass transit, and non-motorized transportation; (3) Develop alternative transportation strategies designed to reduce traffic volumes and improve traffic flow.	In addition, the proposed project would increase HOV capacity for carpooling and transit and include community enhancement features designed to create pedestrian linkages throughout the community.	All four build alternatives would be consistent. No Build alternative is potentially inconsistent due to reduced opportunity for HOV/Managed Lanes users.
Recreational Trails Element **<u>Mission Statement</u>:** To provide a safe and efficient system of bicycle, equestrian, and pedestrian trails throughout the City, creating a non-motorized connection to recreational and commuting destinations.	The proposed alternatives would not impact existing access to trails nor physically disrupt existing trails, and would not preclude construction of future trails.	All four build alternatives would be consistent. No Build alternative would be consistent.
Noise Element **<u>Goal</u>:** To minimize the effects of excessive noise in the City of Oceanside.	Caltrans proposes to construct noise barriers at various locations along the I-5 corridor, where feasible and reasonable, to abate for highway traffic noise; the location, height, materials, and other design features are discussed in *Section 3.15.3*.	All four build alternatives would be consistent. No Build alternative is potentially inconsistent, since no noise abatements are proposed and traffic noise is expected to increase with projected increased in traffic volume.
Environmental Resource Management Element **<u>Goal</u>:** Evaluate the state of the environment and formulate a program of planned management, wise utilization, and preservation of our natural resources to ensure the health, safety, and welfare of present and future generations.	The proposed project would include encroachments that would result in the loss of natural resources adjacent to the existing I-5 right-of-way. However, these encroachments would be small and would not affect the overall recreational or biological value of the open space lands. Furthermore, Caltrans has coordinated with the wildlife agencies as required to ensure that potential impacts to biological resources would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS).	All four build alternatives would be consistent. No Build alternative would be consistent.
Appendix B – Local Coastal Program **<u>Policies</u>:** (7) The bike path along Highway 76 shall be extended under I-5 and the railroad track to the river mouth on the south side of the San Luis Rey River if and when funds are available to do so.	Implementation of the proposed alternatives would not preclude extension of the bike path along SR-76.	All four build alternatives would be consistent. No Build alternative would be consistent.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
Lagoon Management Plans		
San Dieguito River Park Concept Plan		
The San Dieguito River Park Concept Plan was developed to create an open space park within the San Dieguito River Valley to protect its unique resources while providing compatible recreational opportunities. The San Dieguito River Park Concept Plan provides guidance for the preservation of open space, protection of natural and cultural resources, creation of a scenic trail system, and the establishment of appropriate recreational areas.	The proposed project would include encroachments that would take land within the San Dieguito River Park. However, these encroachments would be small and would not affect the overall biological value of the San Dieguito River Park. Furthermore, Caltrans has coordinated with the wildlife agencies as required to ensure that potential impacts to environmental resources would be minimized and/or mitigated to the maximum extent practicable. Potential impacts to environmental resources within the San Dieguito River Park, and related mitigation measures are described in *Sections 3.3*, and *3.17* through *3.22* of the EIR/EIS (see discussion of the project REMP in this Final EIR/EIS).	All four build alternatives would be consistent. No Build alternative would be consistent.
San Elijo Lagoon Area Enhancement Plan		
The San Elijo Lagoon Area Enhancement Plan provides ownership, planning, and jurisdictional information for San Elijo Lagoon. The primary goal of the San Elijo Lagoon Area Enhancement Plan is to recommend methods to preserve and augment a gradient of self-sustaining habitats that range from salt marsh in the west basin to freshwater marsh in the east basin. The long-range plan for this area is to continue to provide for the habitat needs of wildlife while maximizing passive recreational and educational opportunities for the public.	Implementation of the proposed project would result in minor acquisitions of land in the San Elijo Lagoon Ecological Reserve. However, these acquisitions would not affect the function of San Elijo Lagoon Ecological Reserve. Additionally, Caltrans has coordinated (and would continue to coordinate) with the City and/or wildlife agencies as required to ensure that potential impacts to biological resources at San Elijo Lagoon Ecological Reserve would be minimized and/or mitigated to the maximum extent practicable.	All four build alternatives would be consistent. No Build alternative would be inconsistent, since assistance with restoration efforts would not occur.
Agua Hedionda Land Use Plan		
The Agua Hedionda Land Use Plan was developed as a revision to the Agua Hedionda Specific Plan and proposes land uses and environmental controls for a 445-hectare (1,100-acre) segment of the Carlsbad Coastal Zone, including the 93.08 ha (230-ac) Agua Hedionda Lagoon and adjacent marsh, upland habitats and wetland areas. The plan combines relevant requirements of the Coastal Act and Carlsbad General Plan as they apply to this segment of the 445-ha (1,100-acre) segment of the Carlsbad Coastal Zone.	Implementation of the proposed project would result in minor acquisitions of land and open water within Agua Hedionda Lagoon. However, these acquisitions would not affect the function of Agua Hedionda Lagoon. Additionally, Caltrans has coordinated with the wildlife agencies as required to ensure that potential impacts to biological resources at Agua Hedionda Lagoon would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in this Final EIR/EIS).	All four build alternatives would be consistent. No Build alternative would be consistent.
California Coastal Act		
Coastal Act Section 30231 The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.	The proposed project would include encroachments that would result in the loss of natural resources adjacent to the existing I-5 right-of-way; including wetlands, lagoon lands and open waters, and other coastal waters. These encroachments would be small and would not affect the overall recreational or biological value of the affected lands or affect the functions of the lagoons. Furthermore, Caltrans has coordinated with the wildlife agencies as required to ensure that potential impacts to biological resources would be minimized and/or mitigated to the maximum extent practicable (see discussion of the project REMP in *Section 3.17* of this Final EIR/EIS). As discussed in *Section 3.10* of the EIR/EIS, the project would preserve existing vegetation outside the work areas, stabilize slopes with vegetative cover, and keep the total paved area to a practical minimum. Minimization measures implemented during construction at waterway crossings include restricting equipment, material storage, and staging to disturbed areas; restricting changing oil and/or refueling to designated areas; and temporarily diverting water around work areas. Once completed, the proposed project would potentially increase both the amount of urban pollutants in runoff and the volume of runoff generated along the corridor. The proposed project would include construction of treatment basins, bioswales, and other design features to control runoff, erosion, and sedimentation to the extent practicable. These design features and appropriate temporary and permanent mitigation measures are described in *Section 3.10.4* of the EIR/EIS. There would be a water quality improvement with the build alternative(s) over the No Build alternative because of the opportunity to implement “treatment” BMPs throughout the *I-5 NCC Project* limits. These BMPs would “treat” water to remove targeted design constituents from existing impervious area as well as the impacts from future traffic volumes, which would not occur under No Build conditions.	All four build alternatives would be consistent. No Build alternative would be consistent.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
Lagoon Management Plans (cont.)		
California Coastal Act (cont.)		
Coastal Act Section 30233 Limited Allowance for Wetland Fill (a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following: (1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities. (2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps. (3) In wetland areas only, entrance channels for new or expanded boating facilities; and in a degraded wetland, identified by the Department of Fish and Game pursuant to subdivision (b) of Section 30411, for boating facilities if, in conjunction with such boating facilities, a substantial portion of the degraded wetland is restored and maintained as a biologically productive wetland. The size of the wetland area used for boating facilities, including berthing space, turning basins, necessary navigation channels, and any necessary support service facilities, shall not exceed 25 percent of the degraded wetland. (4) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities. (5) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines. (6) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas. (7) Restoration purposes. (8) Nature study, aquaculture, or similar resource dependent activities. (b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for such purposes to appropriate beaches or into suitable long shore current systems. (c) In addition to the other provisions of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary. Any alteration of coastal wetlands identified by the California Department of Fish and Wildlife, including, but not limited to, the l9 coastal wetlands identified in its report entitled, "Acquisition Priorities for the Coastal Wetlands of California", shall be limited to very minor incidental public facilities, restorative measures, nature study, commercial fishing facilities in Bodega Bay, and development in already developed parts of south San Diego Bay, if otherwise in accordance with this division. For the purposes of this section, "commercial fishing facilities in Bodega Bay" means that not less than 80 percent of all boating facilities proposed to be developed or improved, where such improvement would create additional berths in Bodega Bay, shall be designed and used for commercial fishing activities. (d) Erosion control and flood control facilities constructed on water courses can impede the movement of sediment and nutrients which would otherwise be carried by storm runoff into coastal waters. To facilitate the continued delivery of these sediments to the littoral zone, whenever feasible, the material removed from these facilities may be placed at appropriate points on the shoreline in accordance with other applicable provisions of this division, where feasible mitigation measures have been provided to minimize adverse environmental effects. Aspects that shall be considered before issuing a coastal development permit for such purposes are the method of placement, time of year of placement, and sensitivity of the placement area.	Though several project elements integral to the *I-5 NCC Project* would enhance lagoon water quality and wetland resources (i.e., bridge optimization), the existing location of I-5 necessitate the proposed improvements occur in areas containing wetlands. It is therefore infeasible to avoid all fill impacts to wetland areas during construction of the proposed project. I-5 improvements include roadway expansions that would increase the capacity of the subject transportation facilities and, therefore, potentially fall outside of the incidental public service improvement provision of Section 30233, which allows for wetland fill under Section 30233(a)(4). As such, improvements resulting in direct impacts to wetlands and found not to constitute incidental public services are potentially inconsistent with the limited uses permitted in wetlands as required by Section 30233 of the Coastal Act. Alternatives: Section 30233 allows wetland fill consistent with the provisions of that policy only where there is no feasible less environmentally damaging alternative to the proposed project. Alternatives to the project as proposed must be considered prior to finding that a project satisfies this provision of Section 30233. In allowing wetland fill, it must be demonstrated that feasible mitigation measures would be applied to minimize the adverse impacts of the proposed project as described in *Section 3.18.4.* In addition, *Section 3.17* describes all compensatory mitigation measures. On December 31, 2012, the USFWS provided the Formal Section 7 Consultation and Conference for the Interstate 5 North Coast Corridor Project, San Diego County, California to FHWA. The biological and conference opinion concluded that after reviewing the current status of the gnatcatcher, rail, goby, manzanita; designated critical habitat for the gnatcatcher; proposed critical habitat for the goby; the environmental baseline for the action area; effects of the proposed action; and the cumulative effects, it is the USFWS biological and conference opinion that the proposed action is not likely to jeopardize the continued existence of these species and is not likely to result in the destruction or adverse modification of designated critical habitat for the gnatcatcher or proposed critical habitat for the goby. The USFWS also concurred with the determination that the proposed project is not likely to adversely affect the federally endangered least Bell's vireo, southwestern willow flycatcher, and California least tern; the federally threatened western snowy plover; designated critical habitat for the vireo and flycatcher; and proposed critical habitat for the flycatcher.	All four build alternatives are inconsistent. No Build alternative would be consistent. A policy conflict would require an amendment to all affected and applicable certified LCPs to ensure consistency of the project. The standard of review for amendments to all certified LCPs would be Section 30233 of the Coastal Act. Should the project be considered inconsistent with Section 30233, denial of the project (No Build) or approval of a different project would also constitute a significant conflict with the Coastal Act. Adopting the project is the approach that, on balance, is the most protective of significant coastal resources because it would result in benefits to: • expanded coastal access; • improved water quality treatment; • support to and implementation of lagoon restoration efforts; • implementation of coastal habitat restoration and creation; • meeting multimodal transportation corridor needs; • improved community connectivity; and • enhanced recreational coastal recreational opportunities. Maintenance of existing, as well as restoring or improving dredged depths would occur as part of project design in several lagoon locations. The above benefits would not occur with the No Build alternative. Together with the provision of the proposed REMP, including all compensatory mitigation measures, approval of the proposed project is more protective of coastal resources than would be denial or modification to eliminate all impacts to wetlands. The identified REMP and mitigation measures are necessary to ensure that adverse impacts to coastal resources are avoided, minimized or mitigated to the extent feasible; and they ensure the benefits of the project for coastal resource enhancement are fully realized. Therefore, approval of the proposed project is most protective of coastal resources for purposes of the conflict resolution provisions of Coastal Act Section 30007.5.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
Lagoon Management Plans (cont.)		
California Coastal Act (cont.)		
Coastal Act Section 30240 (a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas. (b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.	The proposed project improvements would result in direct impacts to environmentally sensitive habitat areas (ESHA). Section 30240 of the Coastal Act mandates that only resource-dependent uses be allowed in ESHA. A number of proposed trail improvements and contemplated habitat restoration plans may be considered resources-dependent uses and, therefore, are permitted uses in ESHA; however, the majority of the proposed project improvements consist of public facility improvements and, therefore, are not allowed to occur in ESHA. The proposed project improvements would be located adjacent to ESHA, parks and recreation areas and, therefore, also could potentially result in indirect impacts to ESHA and special-status species.	The four build alternatives are inconsistent. A policy conflict would require an amendment to all affected and applicable certified LCPs to ensure consistency of the project. The standard of review for amendments to all certified LCPs would be Section 30240 of the Coastal Act. Should the project be considered inconsistent with Section 30240, denial of the project (no build conditions) or approval of a different project would also constitute a significant conflict with the Coastal Act. Adopting the proposed project is the approach that, on balance, is the most protective of significant coastal resources because it would result in benefits to: • expanded coastal access; • improved water quality treatment; • support to and implementation of lagoon restoration efforts; • implementation of coastal habitat restoration and creation; • meeting multimodal transportation corridor needs; • improved community connectivity; and • enhanced recreational coastal recreational opportunities. The above benefits would not occur with the No Build alternative. Together, with the provision of the proposed REMP, including all compensatory mitigation measures, approval of the proposed project is more protective of coastal resources than would be denial or modification to eliminate all impacts to ESHA. The identified REMP and mitigation measures are necessary to ensure that adverse impacts to coastal resources are avoided, minimized, or mitigated to the extent feasible; and they ensure the benefits of the project for coastal resource enhancement are fully realized. Therefore, the No Build alternative would not be most protective of coastal resources for purposes of the conflict resolution provisions of Coastal Act Section 30007.5.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
Lagoon Management Plans (cont.)		
California Coastal Act (cont.)		
Coastal Act Section 30241 The maximum amount of prime agricultural land shall be maintained in agricultural production to assure the protection of the area's agricultural economy, and conflicts shall be minimized between agricultural and urban land uses through all of the following: (a) By establishing stable boundaries separating urban and rural areas including, where necessary, clearly defined buffer areas to minimize conflicts between agricultural and urban uses. (b) By limiting conversions of agricultural lands around the periphery of urban areas to the lands where the viability of existing agricultural use is already severely limited by conflicts with urban uses or where the conversion of lands would complete a logical and viable neighborhood and contribute to the establishment of a stable limit to urban development. (c) By permitting the conversion of agricultural land surrounded by urban uses where the conversion of the land would be consistent with Section 30250. (d) By developing available lands not suited for agriculture prior to the conversion of agricultural lands. (e) By assuring that public service and facility expansions and nonagricultural development do not impair agricultural viability, either through increased assessment costs or degraded air and water quality. (f) Assuring that all divisions of prime agricultural lands, except those conversions pursuant to subdivision (b) of this section, and all development adjacent to the prime agricultural lands shall not diminish the productivity of such prime agricultural lands. **Coastal Act Section 30250** (a) New residential, commercial, or industrial development, except as otherwise provided in this division, shall be located within, contiguous with, or in close proximity to, existing developed areas able to accommodate it or, where such areas are not able to accommodate it, in other areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on coastal resources. In addition, land divisions, other than leases for agricultural uses, outside existing developed areas shall be permitted only where 50 percent of the usable parcels in the area have been developed and the created parcels would be no smaller than the average size of surrounding parcels. (b) Where feasible, new hazardous industrial development shall be located away from existing developed areas. (c) Visitor-serving facilities that cannot feasibly be located in existing developed areas shall be located in existing isolated developments or at selected points of attraction for visitors.	The proposed highway improvements within Del Mar, Solana Beach, and Oceanside would not result in encroachment or edge impacts along the existing I-5 highway corridor to designated or active agricultural lands. Impacts to agricultural lands from proposed highway improvements would occur in the cities of Encinitas and Carlsbad, affecting Prime Farmland, non-Prime Farmland identified as Unique Farmland, and lands currently in agricultural production but not designated as Important Farmland. Also since circulation of the Draft EIR/EIS, impacts to agricultural properties in the City of San Diego have been eliminated. The proposed San Elijo Multi-use Facility and DAR at Manchester Avenue within Encinitas under the refined 8+4 Buffer alternative would affect approximately 8.4 acres of a 30.5-acre property designated as Prime Farmland that is actively farmed and often cultivated with strawberries and flowers. Coordination with the landowner is under way to determine the possibility of continuing agricultural operations and/or purchase of the property (or partial purchase) for habitat restoration purposes. Proposed highway improvements would also affect a small area along the western edge of Unique Farmland properties that house greenhouse and nursery operations located east of, and adjacent to, I-5 at Union Street. The project encroachments would affect the edge of the facilities and would not preclude agricultural activities in the greenhouse or nursery on the remainder of the parcel. Proposed highway improvements in the City of Carlsbad would directly affect agricultural land currently in cultivation for strawberries and/or flowers. This parcel, which is designated as Prime Farmland and Farmland of Statewide Importance, is located south of Agua Hedionda Lagoon. Eliminating the proposed DAR at Cannon Road reduced impacts to agricultural land with Carlsbad from 16 to 2.3 acres with the refined 8+4 Buffer alternative. The impact is along the western edge of the property and would not bisect or preclude continued agricultural operation of the larger parcel. Because the project is directly adjacent to or within agricultural lands and/or operations along I-5, it is infeasible to avoid all impacts to agricultural resources during construction of the proposed improvements. Also, temporary, construction-related impacts to agricultural resources throughout the corridor could result from conversion of important agricultural lands or other disruption of agricultural activities due to construction/assembly and construction staging areas that may be proposed within an area currently used for agricultural production. In addition, Caltrans is currently pursuing opportunities to acquire properties in the corridor to help restore, enhance, and expand coastal wetlands, freshwater wetlands, and upland areas. Potential sites could include properties designated, currently, or previously used for agricultural purposes, which could affect agricultural resources. Coastal Act Section 30241 allows the conversion of agricultural land surrounded by urban uses where the conversion of the land would be consistent with Section 30250. Section 30250, in turn, allows development located within, contiguous with, or in close proximity to, existing developed areas able to accommodate it. The proposed improvements are contiguous with or in close proximity to existing developed areas and are wholly consistent with Section 30250 of the Coastal Act.	The four build alternatives are potentially inconsistent. A policy conflict would require an amendment to the affected and applicable certified LCPs within Carlsbad and Encinitas to ensure project consistency. The standard of review for amendments to these certified LCPs would be Sections 30241 and 30242 of the Coastal Act. Should the project be considered inconsistent with Sections 30241 and 30242, denial of the project (No Build) or approval of a different project would also constitute a significant conflict with the Coastal Act. Adopting the proposed project is the approach that, on balance, is the most protective of significant coastal resources because it would result in benefits to: • expanded coastal access; • improved water quality treatment; • support to and implementation of lagoon restoration efforts; • implementation of coastal habitat restoration and creation; • meeting multimodal transportation corridor needs; • improved community connectivity; and • enhanced recreational coastal recreational opportunities. The above benefits would not occur with the No Build alternative. Together with the provision of feasible mitigation measures discussed below, substantial adverse impacts would be minimized to agricultural resources. Impacts to active coastal agricultural lands within the cities of Encinitas and Carlsbad have been minimized through ongoing design refinement, and unavoidable impacts would be addressed pursuant to a tiered approach, with the highest priority being implementation of an in-kind, project-specific school or community garden within the affected jurisdiction. The next priority would be for payment of an in-lieu fee under an approved Agricultural Conversion Mitigation Fee program, such as that currently implemented within the City of Carlsbad. The purpose and intent of the Fee program would be to contribute to additional efforts to support and maintain agricultural lands and practices within the North

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
Lagoon Management Plans (cont.)		
California Coastal Act (cont.)		
Coastal Act Section 30250 (cont.)	If the *I-5 NCC Project* is found inconsistent with the Coastal Act's agricultural resource protection policies due to the impacts to agricultural lands described above, the project may, nonetheless, be approved through the conflict resolution provision of Coastal Act Section 30007.5. In this case, it must be demonstrated that no other feasible, less-damaging alternative exists for the project components that would result in unavoidable impacts to agricultural resources, and that feasible measures have been included to minimize substantial adverse impacts to agricultural resources.	Coast Corridor Coastal Zone, such as purchasing agricultural lands or improving agriculture in ways that would aid in continuing agricultural production within the North Coast Corridor Coastal Zone. Other efforts include committing to specific activities that support "urban agriculture," such as farm to school programs, farm to fork restaurants, farm to grocery stores, vertical farming, farmers markets, innovative approaches to "urban agriculture" that help to create a demonstration project, re-tooling existing agricultural operations to allow for vertical farming, innovative approaches to farming, or substantial reduction in water usage, and/or endowments to programs of study in agricultural sciences in the North Coast Corridor Coastal Zone. Also, if determined feasible and desirable by the County of San Diego, another effort could involve coordinating with the County to establish a fund that would be used to assist in supporting agricultural resources and offsetting the lack of state subvention funds for the Williamson Act. For potential temporary construction related impacts, project design requires any temporarily affected agricultural areas or operations to be fully returned to pre-existing agricultural use after project construction is completed, without long-term reduction in productivity or conversion of the subject lands to non-agricultural use that could result in a significant economic loss to the county's agricultural economy. Potential loss of income and/or agricultural production from temporary construction-related impacts would be addressed as outlined above. The project also requires that plans for habitat restoration on properties supporting existing agricultural uses be prepared and submitted with the applicable notice of impending development (NOID) for restoration activities, and that the plans would include information that specifies and quantifies any important agricultural resource areas that could be affected by restoration activities. If the CCC determines that proposed restoration activities would adversely affect prime agricultural land, measures consistent with the above tiered approach would be implemented.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
Lagoon Management Plans (cont.)		
California Coastal Act (cont.)		
Coastal Act Section 30250 (cont.)		Approval of the proposed project is more protective of coastal resources than would be denial or modification to eliminate all impacts to coastal agricultural resources. The identified mitigation measures are necessary to ensure that adverse impacts to coastal resources are avoided, minimized, or mitigated to the extent feasible; and they ensure the benefits of the project for coastal resource enhancement are fully realized. Therefore, approval of the proposed project is most protective of coastal resources for purposes of the conflict resolution provisions of Coastal Act Section 30007.5.
Coastal Act Section 30241.5 (a) If the viability of existing agricultural uses is an issue pursuant to subdivision (b) of Section 30241 as to any local coastal program or amendment to any certified local coastal program submitted for review and approval under this division, the determination of "viability" shall include, but not be limited to, consideration of an economic feasibility evaluation containing at least both of the following elements: (1) An analysis of the gross revenue from the agricultural products grown in the area for the five years immediately preceding the date of the filing of a proposed local coastal program or an amendment to any local coastal program. (2) An analysis of the operational expenses, excluding the cost of land, associated with the production of the agricultural products grown in the area for the five years immediately preceding the date of the filing of a proposed local coastal program or an amendment to any local coastal program. For purposes of this subdivision, "area" means a geographic area of sufficient size to provide an accurate evaluation of the economic feasibility of agricultural uses for those lands included in the local coastal program or in the proposed amendment to a certified local coastal program. (b) The economic feasibility evaluation required by subdivision (a) shall be submitted to the commission, by the local government, as part of its submittal of a local coastal program or an amendment to any local coastal program. If the local government determines that it does not have the staff with the necessary expertise to conduct the economic feasibility evaluation, the evaluation may be conducted under agreement with the local government by a consultant selected jointly by local government and the executive director of the commission.	See discussion above.	The four build alternatives are potentially inconsistent. Potential measures to achieve consistency with build alternatives include the measures summarized above and the following: • An economic feasibility study should be conducted for any proposed specific project that would result in permanent impacts to agricultural resources in order to determine whether or not continued agricultural production would be possible after the project-related impacts have occurred. See also Project Consistency discussion of Coastal Act Section 30241 and 30250, above. As noted, should the project be considered inconsistent with Sections 30241 and 30242, denial of the project (No Build) or approval of a different project also would constitute a significant conflict with the Coastal Act.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
Lagoon Management Plans (cont.)		
California Coastal Act (cont.)		
Coastal Act Section 30242 All other lands suitable for agricultural use shall not be converted to non-agricultural uses unless: (1) continued or renewed agricultural use is not feasible, or (2) such conversion would preserve prime agricultural land or concentrate development consistent with Section 30250. Any such permitted conversion shall be compatible with continued agricultural use on surrounding lands.	The proposed project improvements would affect a maximum of approximately 11 ac of prime farmland and non-prime farmland, areas identified as unique farmland, and lands currently in agricultural production. Coastal Act Section 30242 allows the conversion of agricultural land where such conversion would preserve prime agricultural land or concentrate development consistent with Section 30250. Section 30250, in turn, allows development located within, contiguous with, or in close proximity to, existing developed areas able to accommodate it. The proposed improvements are contiguous with or in close proximity to existing developed areas and are wholly consistent with Section 30250 of the Coastal Act. The proposed improvements would not create a conflict between agricultural and urban land uses. If the *I-5 NCC Project* is found inconsistent with the Coastal Act's agricultural resource protection policies due to the impacts to agricultural lands described above, the project may, nonetheless, be approved through the conflict resolution provision of Coastal Act Section 30007.5. In this case, it must be demonstrated that no other feasible, less-damaging alternative exists for the project components that would result in unavoidable impacts to agricultural resources, and that feasible measures have been included to minimize substantial adverse impacts to agricultural resources.	The four build alternatives are potentially inconsistent. In addition, potential measures for consistency include the measures summarized above. See also Project Consistency discussion of Coastal Act Section 30241 and 30250, above. As noted, should the project be considered inconsistent with Sections 30241 and 30242, denial of the project (No Build) or approval of a different project would also constitute a significant conflict with the Coastal Act.
Coastal Act Section 30244 Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.	All archaeological sites that have been identified within or immediately adjacent to the *I-5 NCC Project* cultural resources Area of Potential Effect (APE) fall outside the project's area of direct impacts and, therefore, would not be directly affected by the proposed highway improvements. An ESA Action Plan has been developed to prevent impacts to cultural resources located adjacent to, but outside project construction activities. Also, through additional design and selection of the Preferred Alternative, two prehistoric archaeological sites, CA-SDI-12670 and CA-SDI-17928, would no longer be affected by the previously planned soundwalls. Impacts to paleontological resources could occur during earthwork activities involving sensitive geologic formations that could damage paleontological resources directly, or expose fossils to long-term surface erosion and/or uncontrolled specimen collection. Measures would be implemented to mitigate impacts.	The four build alternatives are consistent. In addition, measures for consistency include: • A qualified Native American monitor and archaeologist, or paleontologist, as applicable, should be present at all times during ground-disturbing activities occurring in areas of known or suspected archaeological and/or paleontological significance • An ESA Action Plan should be developed and implemented for construction activities located in the vicinity of eligible archaeological sites • The construction contract should contain language related to unanticipated discoveries during construction, including diverting activities away from such finds until an archaeologist can assess their nature and significance • A paleontological mitigation program should be developed and implemented during construction activities in areas of paleontological sensitivity No Build alternative would be consistent.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
Lagoon Management Plans (cont.)		
California Coastal Act (cont.)		
Coastal Act Section 30251 The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.	Changes to the existing highway facilities would generally be expansions or reconfigurations of existing facilities involving limited expansion of vertical mass beyond what currently exists. Views to the coast were considered and project elements such as soundwalls were eliminated where possible. Transparent barriers also are being considered for west-facing views. As a result, project facilities would not result in substantial visual contrasts or changes to the dominant, overall form characterizing the I-5 North Coast Corridor with regard to views westerly from I-5. Similarly, views within the larger coastal area would not be affected by project design elements located with the restricted right-of-way of this linear feature. Where impacts to sensitive or key coastal visual resources would occur, the PWP/TREP includes various policies, guidance strategies, and implementation measures to avoid or minimize potential impacts to coastal visual resources. Refer to *Section 3.7* of this Final EIR/EIS, the *I-5 NCC Project Design Guidelines*, and PWP/TREP implementation measures for additional details on how project design and development would minimize impacts to the visual quality of the corridor consistent with Section 30251 of the Coastal Act.	The four build alternatives are consistent. As indicated, measures for consistency include: • Installing a soundwall with a gap to maintain a coastal view, where visual access to the ocean, the San Dieguito River Valley, and Del Mar Racetrack would have been obscured for southbound travelers between Via de la Valle and Lomas Santa Fe Drive in Solana Beach • Utilization of low profile (e.g., Caltrans Type 60S) or see-through (e.g., Caltrans Type 80) safety barriers (where feasible and unless noise abatement is necessary for protected bird species) in areas where standard height barriers would diminish views of scenic resources from the highway • Applying design and development strategies which generally include minimizing grading, landform alteration, and vegetation removal; providing landscape treatments such as trees, shrubs, and groundcover; addressing potential night lighting impacts by limiting, shielding and directing lights to only that required for operations and safety; and implementing native revegetation efforts for areas disturbed by grading activities No Build alternative would be consistent.
Coastal Act Section 30253 New development shall do all of the following: (a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard. (b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs. (c) Be consistent with requirements imposed by an air pollution control district or the State Air Resources Board as to each particular development. (d) Minimize energy consumption and vehicle miles traveled. (e) Where appropriate, protect special communities and neighborhoods that, because of their unique characteristics, are popular visitor destination points for recreational uses.	The proposed project would be designed and constructed to withstand seismic events and geologic hazards in compliance with current standards; therefore, as discussed in *Section 3.11.3* of the EIR/EIS, no effect on safety due to seismic events or geologic hazards would occur. Proposed design measures to minimize geologic hazards include the addition or replacement of retaining walls in areas that are either relatively steep or have right-of-way limitations. The proposed project would include construction of treatment basins, swales, and other design features to control runoff, erosion, and sedimentation to the extent practicable. These design features and appropriate temporary and permanent mitigation measures are described in *Section 3.10.4* of the EIR/EIS. The proposed project would be consistent with the SANDAG RTP and RTIP. By reducing congestion and vehicular emissions, the project would improve air quality. Energy consumption and vehicle miles traveled would be reduced by the proposed project through the reduction in congestion and encouragement of alternative modes of travel for single occupancy vehicles, leading to more efficient use of fuel and reduced idling times. In addition, the proposed project includes portions of the NC Bike trail, and connections to bike paths and pedestrian improvements that would	All four build alternatives would be consistent. No Build alternative would be inconsistent, because this alternative would not be consistent with the RTP and RTIP, and improvements in congestion and air quality would not occur.

Table 3.1.1 (cont.): Project Consistency with Local Plans and Policies

Relevant Key Goals	Project Considerations	Project Consistency
Lagoon Management Plans (cont.)		
California Coastal Act (cont.)		
Coastal Act Section 30253 (cont.)	facilitate non-motorized circulation throughout the corridor, further reducing vehicle miles traveled, energy consumption, and emissions. The proposed project would help protect special communities and neighborhoods by focusing the transportation facility widening on the existing I-5 corridor, reducing the demand for new parallel roads or parallel road expansions in the coastal zone.	


Legend
Municipal Boundaries
Study Area
Proposed Project
Roads_Highway
UNINCORPORATED SAN DIEGO COUNTY
SAN MARCOS
VISTA
OCEANSIDE
CARLSBAD
ENCINITAS
SOLANA BEACH
DEL MAR
CITY OF SAN DIEGO
Carmel Valley
Torrey Hills
Torrey Pines
University
La Jolla
VANDEGRIFT BOULEVARD
MISSION AVENUE
OCEANSIDE BOULEVARD
VISTA WAY
CARLSBAD VILLAGE DRIVE
TAMARACK AVENUE
CANNON ROAD
PALOMAR AIRPORT ROAD
POINSETTIA LANE
LA COSTA AVENUE
LEUCADIA BOULEVARD
ENCINITAS BOULEVARD
SANTA FE DRIVE
BIRMINGHAM DRIVE
MANCHESTER AVENUE
LOMAS SANTA FE DRIVE
VIA DE LA VALLE
DEL MAR HEIGHTS ROAD
CARMEL VALLEY ROAD/STATE ROUTE 56
LA JOLLA VILLAGE DRIVE
PACIFIC OCEAN
76
78
5
56
805
52
PROJECT LOCATION
SAN DIEGO COUNTY
MEXICO
PACIFIC OCEAN
Miles
0
1
2
4
Source: SanGIS 2006

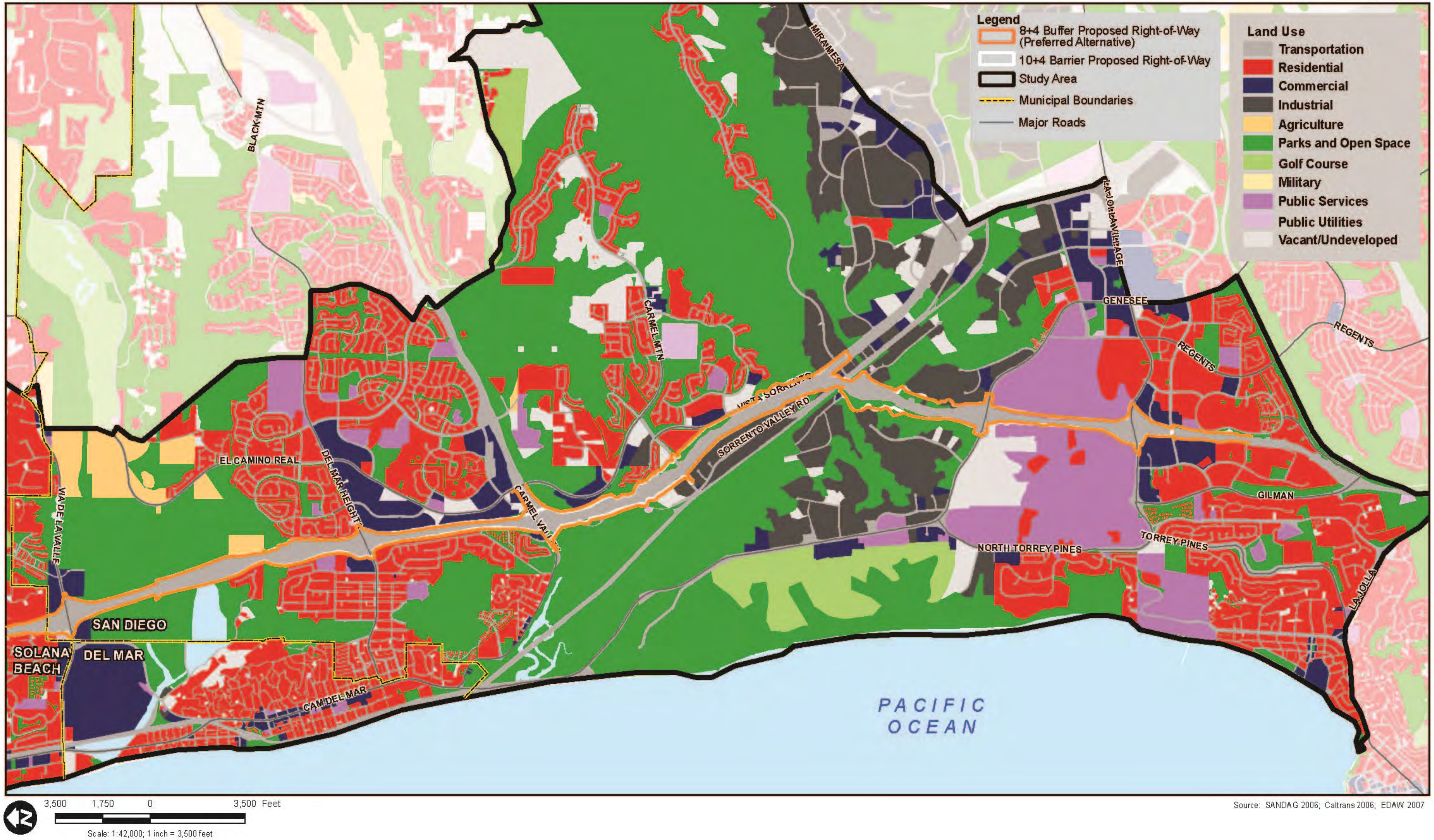


Figure 3-1.2: San Diego/Del Mar Existing Land Use

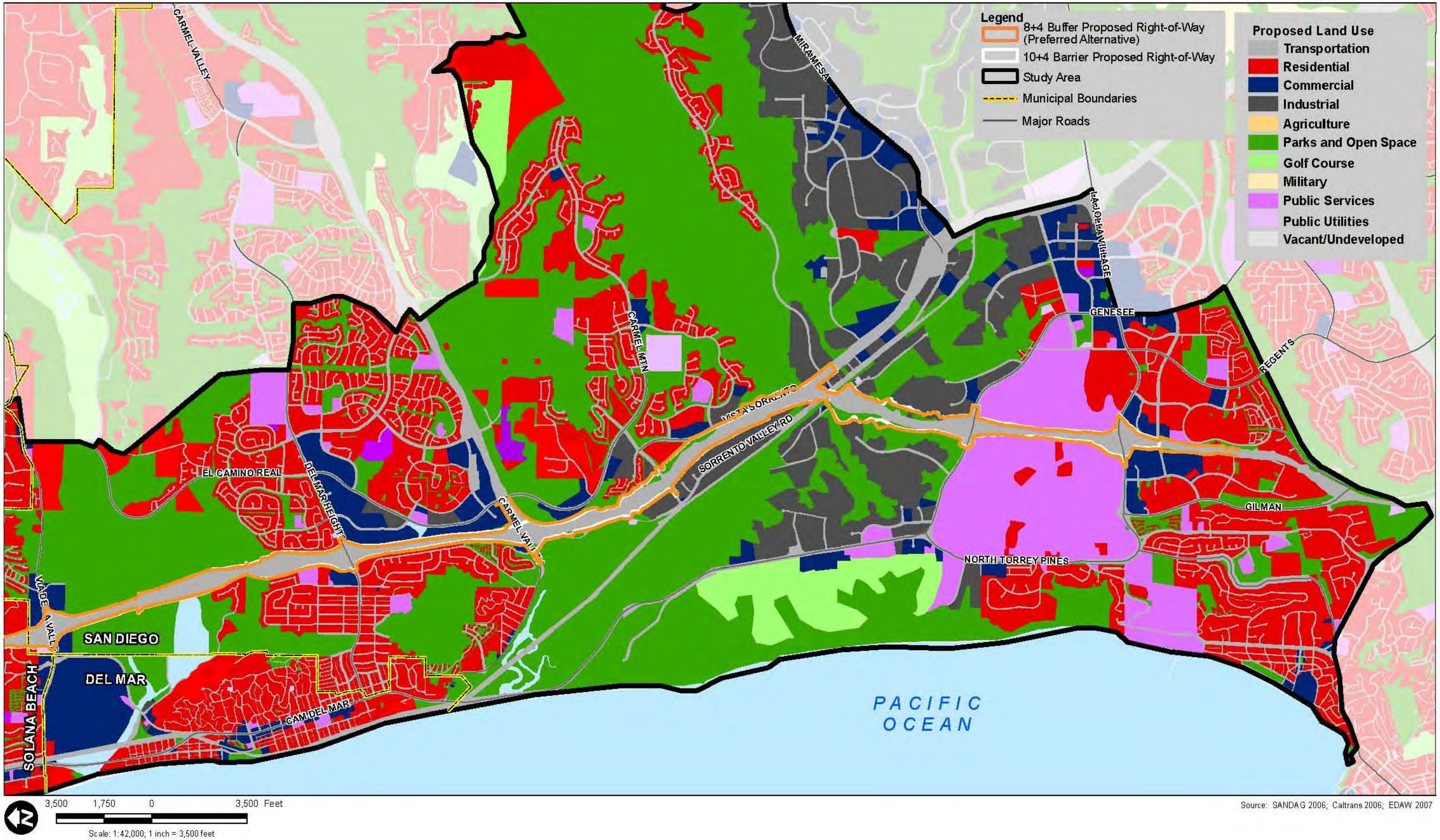


Figure 3-1.3: San Diego/Del Mar Planned Land Use

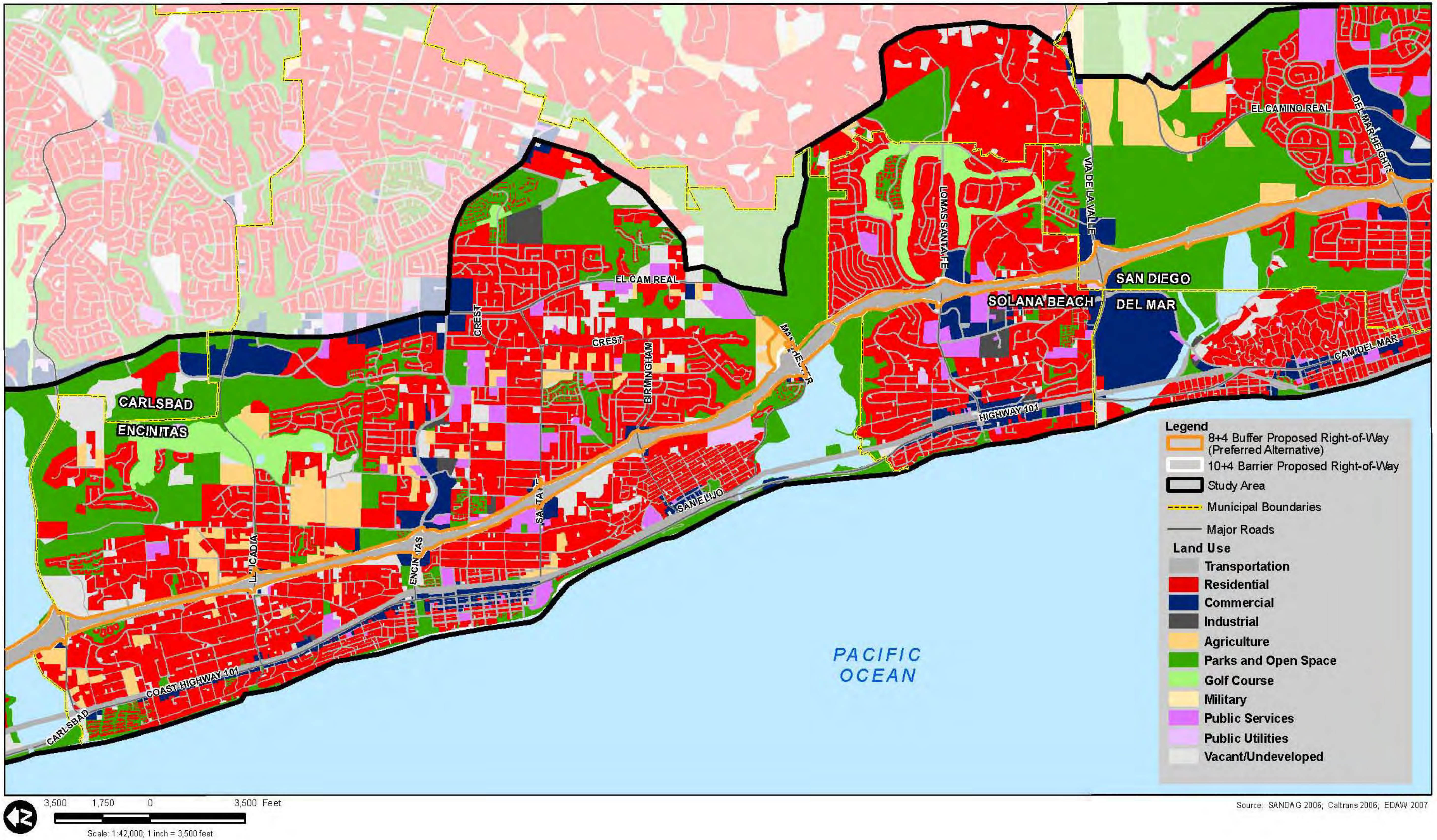


Figure 3-1.4: Solana Beach/Encinitas Existing Land Use

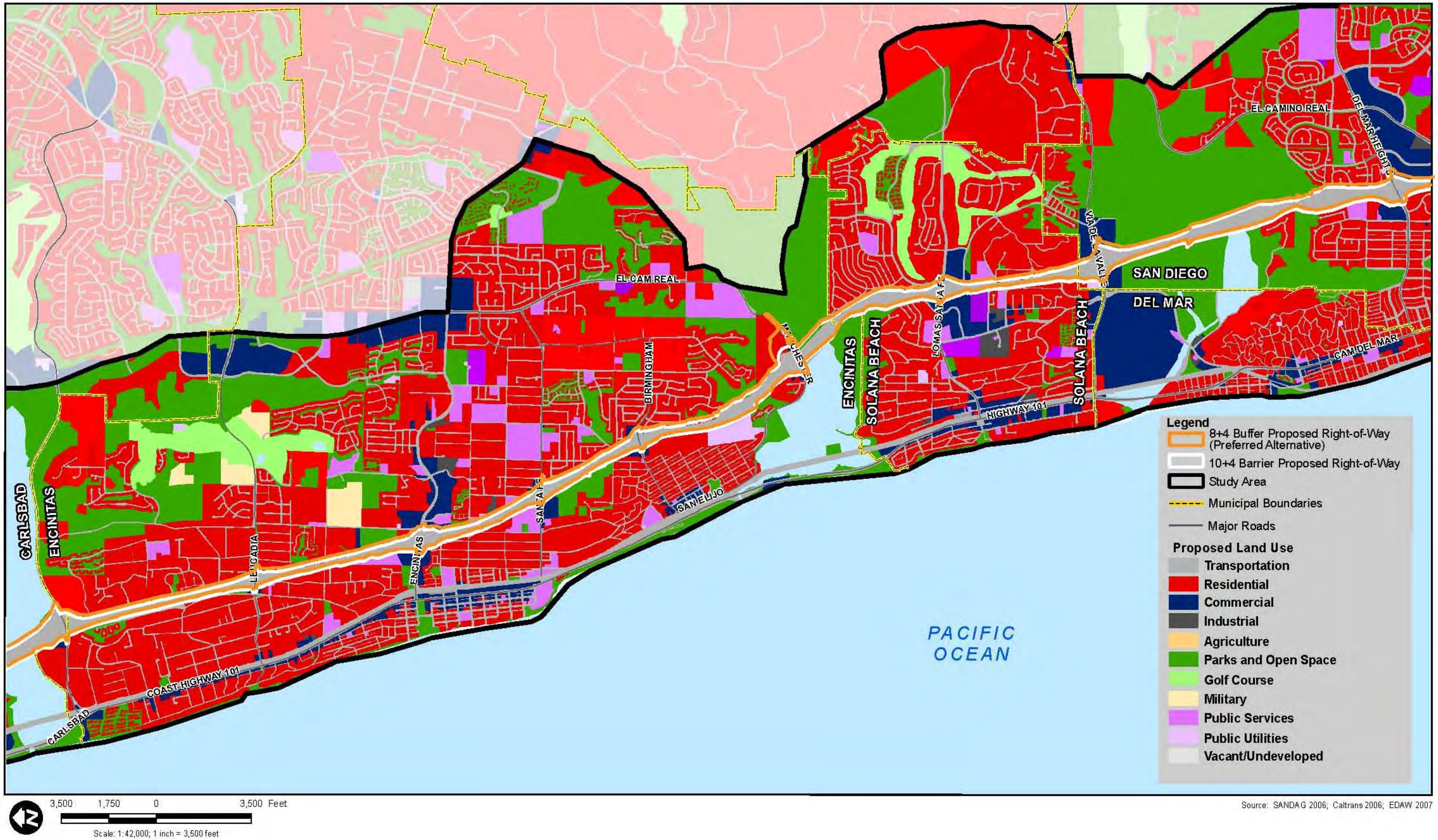


Figure 3-1.5: Solana Beach/Encinitas Planned Land Use

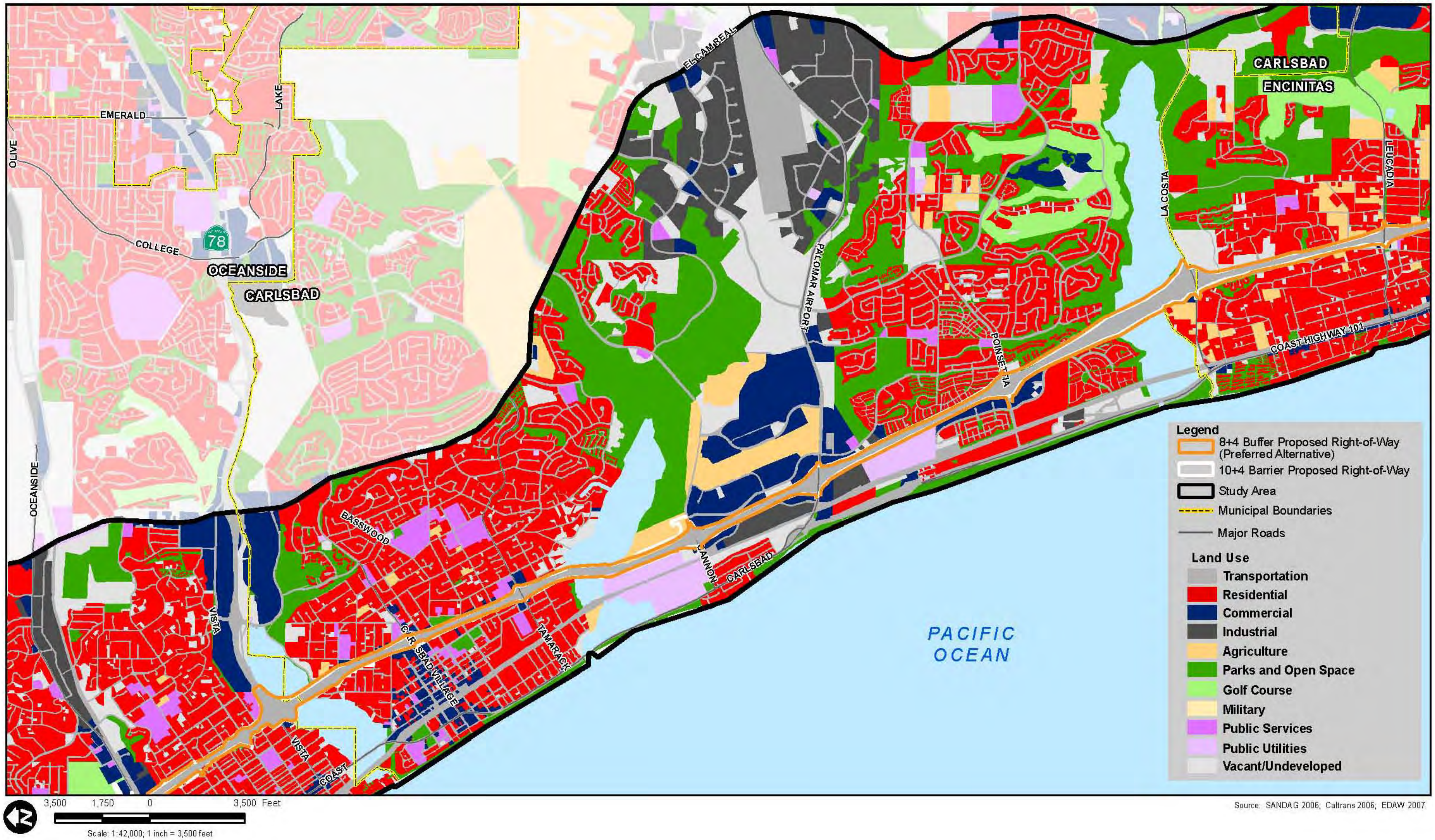


Figure 3-1.6: Carlsbad Existing Land Use

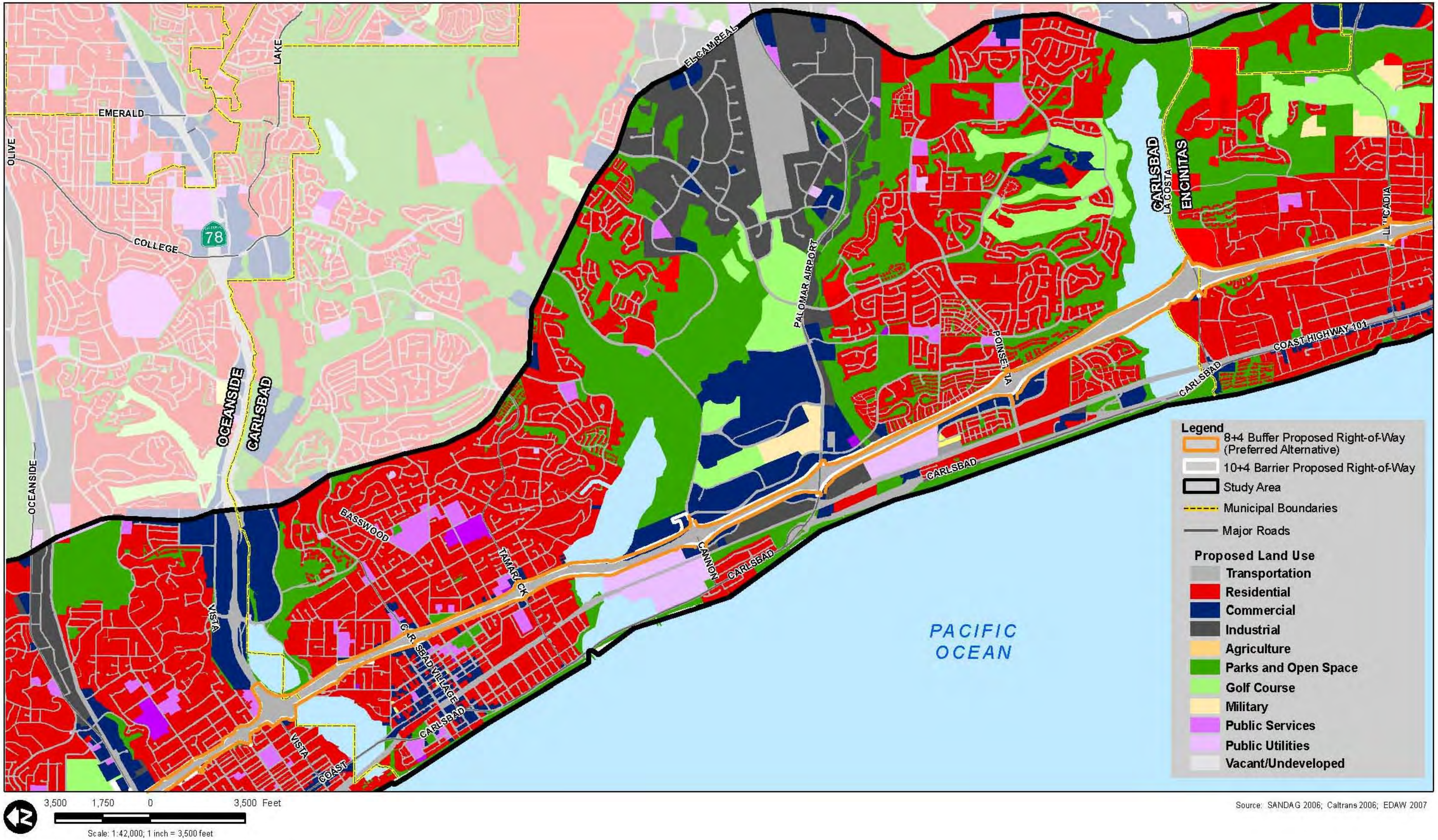


Figure 3-1.7: Carlsbad Planned Land Use

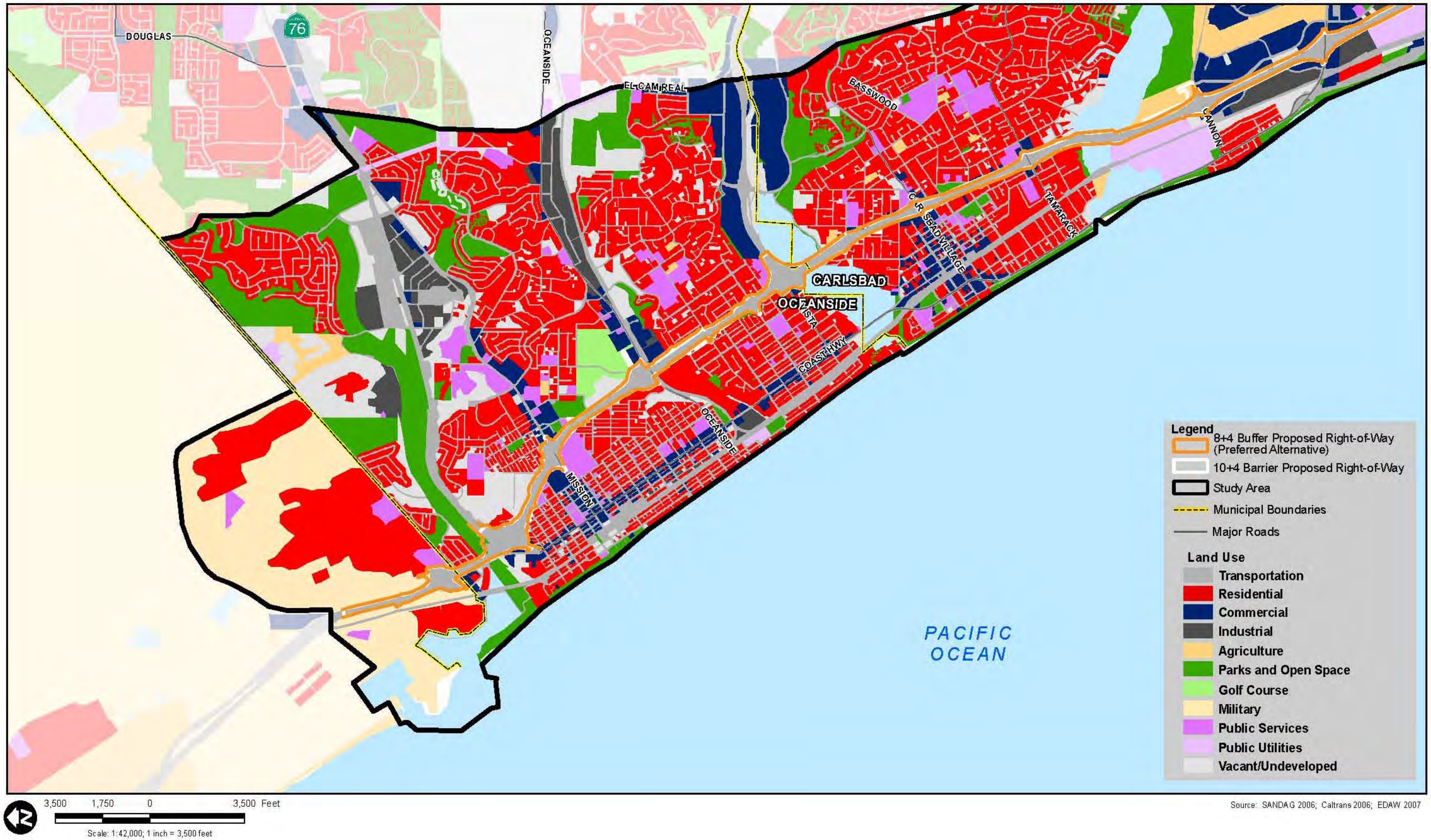


Figure 3-1.8: Oceanside Existing Land Use

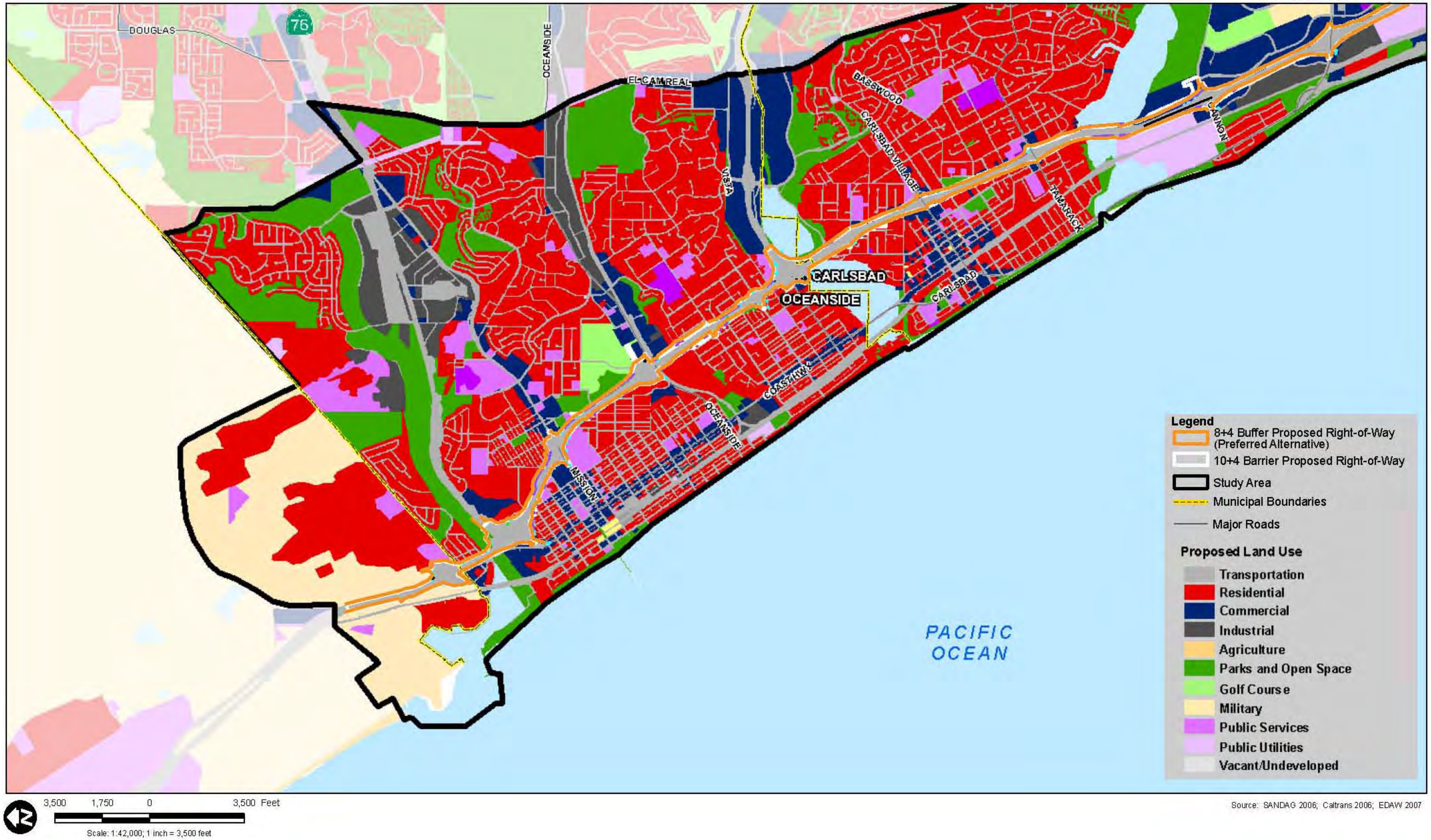


Figure 3-1.9: Oceanside Planned Land Use

3.1.3 Park and Recreational Facilities

This section is based largely the October 2007 CIA technical report prepared for the proposed project and Appendix A, Resources Evaluated Relative to the Requirements of Section 4(f) for the I-5 North Coast Corridor Project, San Diego, California.

3.1.3.1 Regulatory Setting

The California Public Park Preservation Act of 1971 (Public Resources Code [PRC] § 5400 et seq.) provides that a public agency that acquires public parkland for non-park use must either pay compensation that is sufficient to acquire substantially equivalent substitute parkland or provide substitute parkland of comparable characteristics.

In addition, Caltrans addresses Section 4(f) of the Department of Transportation Act of 1966, codified in federal law at 49 United States Code (USC) 303, which declares that "…it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites." Appendix A addresses the resources that were evaluated relative to the requirements of Section 4(f).

Section 4(f) specifies that the Secretary (of Transportation) may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of an historic site of national, State, or local significance (as determined by the federal, State, or local officials having jurisdiction over the park, area, refuge, or site) only if:

- there is no prudent and feasible alternative to using that land; and the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use; or
- consideration of any impact avoidance, minimization, and mitigation or enhancement measures, results in a *de minimis* impact on a Section 4(f) property.

3.1.3.2 Affected Environment

The six municipalities within the project area contain parklands and/or recreational facilities. The full range of park and recreational facilities is listed in Appendix A, Table 1. Eight resources are depicted on *Figure 3-1.10* at the end of this section.

San Dieguito River Park

The San Dieguito River Park (SDRP) is located within the jurisdiction of five cities and the County of San Diego as it extends from San Dieguito Lagoon adjacent to the Pacific Ocean east along the San Dieguito River to Ironside Spring on Volcan Mountain just north of Julian. Within the coastal area, it is located within the Cities of San Diego and Del Mar. The SDRP is administered by the San Dieguito River Valley Regional Open Space Park Joint Powers Authority (JPA), which is working to create a regional open space greenway and park system by preserving and restoring land along the length of the San Dieguito River watershed. This open space greenway and park system is being integrated by a regional walking, equestrian, and bicycle trail that would extend from the Pacific Ocean to Volcan Mountain. Called the Coast to Crest Trail, it is currently two-thirds complete.

The Coastal Area of the SDRP is bisected by I-5, is located entirely within the coastal zone, and is located within the incorporated boundaries of the Cities of Del Mar and San Diego, as noted above. The Coastal Area of the SDRP encompasses approximately 440 ac at the western end of the San Dieguito River Valley and is surrounded by the Pacific Ocean to the west, El Camino Real to the east, Via de la Valle to the north, and the northern edge of the Carmel Valley planning area to the south. This area includes San Dieguito Lagoon, which encompasses approximately 200 ac of estuarine open water and wetland habitat.

Access to the Coastal Area of the SDRP is primarily along the lagoon segment of the Coast to Crest Trail from El Camino Real to Jimmy Durante Boulevard. Other public trails in the coastal area include the Riverpath Del Mar, located near the Del Mar Public Works Yard, along Jimmy Durante Boulevard and the Dust Devil Nature Trail off of El Camino Real (previously called the Mesa Loop Trail).

San Elijo Lagoon Ecological Reserve

The San Elijo Lagoon Ecological Reserve is located between the Cities of Encinitas and Solana Beach and extends inland to the community of Rancho Santa Fe. The reserve is surrounded by the Pacific Ocean to the west, and a mix of residential and undeveloped land to the east, north, and south. The approximately 1000-ac lagoon is primarily a shallow-water estuary fed by a 77-square-mi watershed with two main tributaries, Escondido Creek and Orilla Creek, and is divided into basins by Highway 101, the railway, and I-5. The boundary of the reserve is contiguous with Caltrans right-of-way where I-5 bisects the two basins. It contains a diverse habitat with six plant communities including coastal strand, salt marsh, freshwater marsh, riparian scrub, CSS, and mixed chaparral. The habitat supports a variety of plant and wildlife species.

The San Elijo Lagoon Ecological Reserve includes over five mi of public hiking trails. These trails can be reached from the north end of Rios Avenue, Santa Carina Drive, and Santa Helena Drive on the south side of the lagoon in Solana Beach, and along El Camino Real at Orilla Creek in the community of Rancho Santa Fe at the east end. The only Reserve trail connecting the east and west basins is just south of Manchester Avenue in Caltrans right-of-way underneath the I-5 overcrossing. The trailheads in Solana Beach lead to hiking trails, and the trailhead at Orilla Creek is a joint hiking/equestrian facility. The joint trail system is restricted to the east basin as the riprap slope protection under the I-5 Bridge at Manchester Avenue prevents equestrian passage into the west basin. The Nature Center, located at 2710 Manchester Avenue in Encinitas on the northwest side of the reserve, provides County ranger offices, a parking lot, restrooms, drinking water, and a one-mi loop trail.

Paul Ecke Sports Park and YMCA

The Paul Ecke Sports Park and YMCA, located in Encinitas, is an approximately 9.3-ac park located at 278 Saxony Road north of the intersection of Encinitas Boulevard and I-5. The Park is owned by the YMCA, which leases the park to the City of Encinitas. The Paul Ecke family donated land to the YMCA between 1968 and 1985, and dedicated the land in 1992. There is a 25-year lease agreement ending in 2014 (with option to renew for an additional 10 years), under which the park is operated by the City of Encinitas. The Park consists of three lighted baseball fields. These fields are used for baseball, little league baseball, and adult softball, and the outfields are also used for soccer and flag football. The fields are used mainly for organized sports leagues, but the fields are also open to non-league uses when league play is not in action. The Park is open from 8:00 a.m. to 11:00 p.m. The western edge of the park abuts the existing Caltrans right-of-way.

Hall Property Community Park

The Hall Property (now named Encinitas Community Park) along the I-5 right-of-way is a park planned for construction by the City of Encinitas. The Hall Property Community Park Final EIR was certified by the City in 2008 (EDAW 2008). The City of Encinitas purchased the approximately 44-ac site for park development in May 2001. The park plan includes a mixture of active and passive uses. Active uses would include softball/baseball fields, a basketball court, multi-use turf fields, a teen center, a dog park, an amphitheatre, a skate park, and possibly an aquatic facility. Passive uses would include gardens, picnic areas, trails, and a scenic overlook. Phase one, including the skate park, the dog park, the soccer fields, ball fields and the softball field, was put out to bid by the City in April 2012, with completion anticipated for 2014.

Caltrans and the City of Encinitas agreed to an easement dedication of land that would provide Caltrans with the right-of-way needed to improve I-5. Per 23 CFR 774.11(i), this right-of-way was formally reserved for a future transportation facility at the same time planning for Hall Property Community Park was underway. The joint planning effort relating to the development of the *I-5 NCC Project* and the park results in project-related impacts not being considered a use as defined in Section 774.17. Therefore, no acquisition or use of lands planned for this Community Park would be required and this facility is not further discussed below.

Agua Hedionda Lagoon and CDFW Reserve

Agua Hedionda Lagoon, located in Carlsbad, is an approximately 400-ac, human-made water body that was constructed in 1954. The Agua Hedionda Lagoon is surrounded by the Pacific Ocean to the west, undeveloped land to the east, the Encina Power Plant to the south, and residential development to the north. Agua Hedionda Lagoon is connected to the Pacific Ocean through an inlet channel and to Agua Hedionda Creek and its tributaries in the inner lagoon. Agua Hedionda Lagoon is owned by Cabrillo Power II, a privately owned corporation, who leases the lagoon to the City of Carlsbad to manage recreational and commercial uses. The City of Carlsbad allows boating and water skiing on the lagoon and the YMCA operates a canoeing center. A white seabass research facility, jointly managed by Hubbs/Seaworld and CDFW, is located at the lagoon, as is a commercial mussel growing facility.

CDFW manages a 186-ac Ecological Reserve consisting of wetlands located at the eastern end of the lagoon.

Holiday Park

Holiday Park is a 5.9-ac public park, located along the east side of the I-5, on the corner of Chestnut Avenue and Pio Pico Drive. This park is owned by the City of Carlsbad and features horseshoe pits, a picnic area, a tot lot play area, restrooms, and large shade trees. Parking is currently available within three small parking lots (90 spots total), as well as off site along the majority of the surrounding streets. Field reconnaissance at the park was conducted on two separate occasions to determine whether parking was an existing constraint. During both visits, parking lots were observed to be at approximately half capacity, with ample off-site street parking available.

Oak Park

Oak Park consists of a 0.18-acre lot located between the Carlsbad Village off-ramp from I-5 and Pio Pico Drive, just south of a gas station. The park is situated less than 0.01 mile from I-5 and features several trees and a picnic table. There are open existing views of abutting I-5 lanes from the park.

Pio Pico Park

Pio Pico Park is a 0.80-acre passive park located immediately east of Pio Pico Drive adjacent to single-family residential uses fronting Gregory Drive and Cynthia Lane. The park is less than 0.01 mile east of I-5 and contains landscaping and picnic tables, with open views to existing I-5.

Trails

The proposed project would provide improved connections to existing and planned pedestrian and bike trails located in the cities crossed by I-5 (see *Chapter 2,* discussion of the I-5 NC Bike Trail). Existing trails associated with recreational and preserve facilities discussed in this section are primarily addressed within the facility discussions above.

A primary east-west trail in the North Coast Corridor is the Coast to Crest Trail. The overall goal of the Coast to Crest Trail is to create a multi-use trail system for hikers, bicyclists, and horseback riders that will extend from the ocean at Del Mar to the San Dieguito River's source on Volcan Mountain, just north of Julian. The Coast to Crest Trail would extend a distance of approximately 55 miles. The lagoon segment of the Coast to Crest Trail exists from Jimmy Durante Boulevard to El Camino Real, a portion of which is parallel to and under I-5. The portion that crosses underneath I-5, within Caltrans right-of-way, is within a revocable easement granted by Caltrans. East of this undercrossing, the trail turns north along the I-5 corridor before again trending east toward El Camino Real.

3.1.3.3 Environmental Consequences

San Dieguito River Park

Implementation of the proposed project would not impede the ability of the park to function as a publicly owned open regional open space park. Access to the park would not be impeded temporarily or permanently. Specifically in the lagoon trail area, the trailheads for Riverpath Del Mar and Boardwalk would continue to be accessible from Jimmy Durante Boulevard, and access to trail segments east of I-5 would be accessible from the kiosk at the end of San Andres, even during times when the trail underneath I-5 may be affected by construction activities. Access to trailheads for other trails within the SDRP, such as Crest Canyon Trail and Dust Devil Nature Trail, would not be affected by the *I-5 NCC Project*. The portion of the Coast to Crest Trail that crosses underneath I-5, within Caltrans right-of-way, is within a revocable easement granted by Caltrans and is not subject to Section 4(f) protections (see additional discussion under “Trails,” below).

The visual character of the park would be unchanged; the coastal area of the SDRP is already bisected by the I-5, which is a major transportation facility and comprises a primary element in views toward it from the park. Impacts would occur within a disturbed area adjacent to the existing I-5 bridge. The additional lanes constructed as part of the *I-5 NCC Project* would not substantially alter views, which would continue to see this large facility in profile. The horizontal expansion of the bridge and roadway across the lagoon would not be particularly notable to viewers looking at it from points east or west, and below the facility. Increases in noise levels would not be noticeable to park users because the increases, typically ranging between 2 to 3 dBA, are not generally perceptible to the human ear. Areas of natural vegetation disturbed through construction would be restored with native plant species. Since circulation of the Draft EIR/EIS, all alternatives have been refined to avoid permanently impacting land within the SDRP, except for providing a connection to and from the I-5 NC Bike Trail. None of the alternatives would impact the recreational nature of the park, and the trail connection would support recreational activity. No park land would be acquired as part of the proposed project, consistent with the California Public Park Preservation Act of 1971 (PRC § 5400 et seq). With regard to Section 4(f), Caltrans received an email on May 22, 2013 (*Figure 5-5.1*) noting that the SDRP administrator (the JPA) concurs that the "impact" associated with connecting the trails would be beneficial in nature and is therefore exempt from Section 4(f) per 23 CFR 744.13(g). Please see Appendix A of this Final EIR/EIS for additional specifics.

San Elijo Lagoon Ecological Reserve

Implementation of the proposed project would not impede the ability of the San Elijo Lagoon Ecological Reserve to function as a reserve. Access to existing trailheads and designated trails would be unaffected, and after project implementation would be enhanced. The visual character of the Reserve would remain consistent with the existing condition which already includes the highly visible I-5 freeway. The very small quantity of disturbed upland vegetation removed adjacent to the existing trail would be mitigated. Increases in traffic-related noise would not be noticeable to park users and would not impair the wildlife habitat functions of the Reserve. Potential impacts to the Reserve would vary by alternative, with impacts identified for the 10+4 Barrier (1.05 ac), 10+4 Buffer (0.92 ac), 8+4 Barrier (0.98 ac) and 8+4 Buffer (Preferred Alternative; 0.79 ac). It is not expected that the permanent use of up to 1.05 ac (approximately 0.11 percent of the total Reserve land) would impact any of the activities, features, or attributes of the Reserve, including trails or other activity areas that are officially designated as a part of the Reserve or the Nature Center. The Preferred Alternative, the smallest of the build alternatives, would permanently use 0.79 ac (approximately 0.08 percent) of the total Reserve land. This undeveloped land with a trail (in disturbed upland) is west of I-5 and south of the lagoon. This area does not possess any unique features or perform any vital functions that, if lost, would affect the Reserve's ability to function as a Section 4(f) resource. Concurrence in a Section 4(f) *de minimis* finding was received from the CDFW on August 30, 2013 (*Figure 5-5.2*), from the County of San Diego on September 10, 2013 (*Figure 5-5.3*), and from the San Elijo Lagoon Conservancy on August 12, 2013 (*Figure 5-5.4*). Please see Appendix A of this Final EIR/EIS for additional specifics. As noted above, if the refined 8+4 Buffer alternative (Preferred Alternative) is chosen for construction, the impact would be 0.79 ac, or approximately 0.08 percent (less than one tenth of one percent) of the Reserve. The small purchase of Reserve property would trigger the need for compensation sufficient to acquire substantially equivalent substitute parkland under the California Public Park Preservation Act of 1971, as described in *Section 3.1.3.1*. This is anticipated as part of project design. The project would comply with PRC §5400 et seq.

Paul Ecke Sports Park and YMCA

Implementation of any of the project build alternatives would not result in impacts to the park property. Access to the existing park and the visual character would be unaffected. Increases in traffic-related noise would not be noticeable to park users. Under the build alternatives, no permanent impacts would occur to the property, and therefore there is also not a Section 4(f) use. As no purchase of lands would occur, protection under the California Public Park

Preservation Act of 1971 would not be triggered and the project would comply with PRC §5400 et seq.

A potential temporary construction easement to build a retaining wall that avoids permanent impacts to the park is exempt from Section 4(f) per 23 CFR 774.13(d), because the impact would be minimal and would not cause permanent adverse physical impacts, nor would it interfere with the activities or purpose of the resource. Should the temporary construction easement be necessary, work would occur on a slope planted with ornamental vegetation and would not affect recreational use area. Caltrans received an email from the City of Encinitas on September 16, 2013 concurring that the temporary construction easement to build a retaining wall that avoids permanent impacts to the park constitutes temporary occupancy of the land, and that this project action is exempt from Section 4(f) per 23 CFR 774.13(d) because the impact would be minimal and would neither cause permanent adverse physical impacts nor interfere with the activities or purpose of the resource.

Agua Hedionda Lagoon

Implementation of the proposed project would not impede the ability of the 400-ac lagoon to support recreational boating, water skiing, and canoeing. Nor would it affect the 186-ac CDFW Ecological Reserve, which is located approximately 3,000 ft east of the proposed project. Public and private access to the lagoon would not be affected. The proposed project would not interfere with existing or planned trails. The visual character of the lagoon would be unchanged; the use of small amounts of City leasehold land would simply extend the Caltrans right-of-way boundary outward slightly and ultimately result in a view of the area adjacent to I-5 very similar to the existing condition. Freeway-adjacent slope areas of natural vegetation disturbed through construction would be restored with native plant species. Minor uses of open water and undeveloped land would occur at the lagoon's boundary with I-5. Potential impacts to the lagoon would vary by alternative, with impacts identified for the as follows: 10+4 Barrier (3.54 ac), 10+4 Buffer (2.0 ac), 8+4 Barrier (2.36 ac) and 8+4 Buffer (Preferred Alternative; 1.59 ac). It is not expected that the use of up to 3.54 ac (approximately 0.89 percent of the total area) of the lagoon would impact any of the recreational activities, features, or attributes of the resource. If the 8+4 Buffer alternative (Preferred Alternative), the smallest of the build alternatives, is chosen for construction, the impact would drop to 1.59 ac, approximately 0.4 percent of the total area. These minor land uses are not expected to impact the lagoon, because it is such a small percentage of the facility, and this undeveloped land does not possess any unique features or perform any vital functions that, if lost, would affect its ability to function as a Section 4(f) resource. Concurrence in a Section 4(f) *de minimis* finding was received from the City of Carlsbad (May 6, 2013; *Figure 5-5.5*). Each of the alternatives would require the use of park property, and would trigger the need for compensation sufficient to acquire substantially equivalent substitute parkland under the California Public Park Preservation Act of 1971, as described in *Section 3.1.3.1*. This is anticipated as part of project design. The project would comply with PRC §5400 et seq.

Holiday Park

Implementation of the proposed project would not result in any footprint impacts to Holiday Park; however, implementation of the 10+4 Barrier alternative would require the use of an up to 0.73-ac strip of the existing and abutting Pio Pico Drive. Currently, parking is allowed on the east side of Pio Pico Drive. The loss of this existing street right-of-way would stretch approximately 800 ft along Pio Pico Drive and displace on-street parking. Based on an assumption of one parking space equaling 20 ft, the loss of 800 ft of available parking could result in a loss of 40 available parking spaces. A solution to this loss of general off-site, on-street parking was proposed by Caltrans to the City of Carlsbad. The proposed solution consisted of the conversion of Pio Pico Drive to a one-way street, which would allow angled parking spaces to be added along the edge of the road. The average angled parking space is nine ft wide, allotting a maximum of 88 new parking spaces within the 800 ft stretch. The City of Carlsbad declined this proposal, opting for the loss of on-street parking with the continuation of a two-way street. The loss of parking along Pio Pico Drive would not substantially reduce parking available for Holiday Park. Access patterns would change slightly with the loss of on-street parking, but adequate parking would remain available in the immediate vicinity. As such, it is not expected that the loss of 40 available parking spaces along Pio Pico Drive would impact any of the activities, features, or attributes of the resource that allow it to function as a Section 4(f) resource. The 10+4 Barrier alternative is the only build alternative that would impact street parking along Pio Pico Drive next to Holiday Park, and there is ongoing coordination with the City of Carlsbad regarding the City's parking concerns. As no purchase of park lands would occur for any build alternative, protection under the California Public Park Preservation Act of 1971 would not be triggered and the project would comply with PRC §5400 et seq.

Oak Park

The park is situated less than 0.01-mile from I-5 and features several trees and a picnic table. Potential impacts to this park would vary by alternative, with 10+4 Barrier (0.12 ac), 10+4 Buffer (0.04 ac), and 8+4 Barrier (0.11 ac) alternatives all physically impacting the park in vegetated area. The refined 8+4 Buffer alternative (Preferred Alternative) would impact the park by 0.04 ac. Access to the park would not change; it would still be accessible from Pio Pico Drive. Views of the proposed project similar to existing views of abutting I-5 lanes would be available from the park. Vegetation, wildlife, air quality, and water quality would remain similar to the existing environment. An email received from the City of Carlsbad on February 21, 2013 concurs that this facility is considered a Special Use Area, without significant recreational use. As such, potential project use of this property would not trigger Section 4(f). The small purchase of this City property would trigger the need for compensation sufficient to acquire substantially equivalent substitute parkland under the California Public Park Preservation Act of 1971, as described in *Section 3.1.3.1*. This is anticipated as part of project design. The project would comply with PRC §5400 et seq.

Pio Pico Park

Pio Pico Park is less than 0.01 mile east of I-5 and contains landscaping and picnic tables. There are no potential impacts to this park under any alternative. Access to the park would not change; it would still be accessible from Pio Pico Drive. Existing views of the freeway would be shielded by this recommended soundwall regardless of build alternative. Vegetation, wildlife, air quality, and water quality would remain similar to the existing environment. An email received from the City of Carlsbad on February 21, 2013 concurs that this facility is considered a Special Use Area, without significant recreational use. As such, potential project use of this property would not trigger Section 4(f). As no purchase of park lands would occur, protection under the California Public Park Preservation Act of 1971 would not be triggered and the project would comply with PRC §5400 et seq.

Trails

For all build alternatives, the Coast to Crest Trail would be maintained in its existing placement. The portion of the trail that crosses underneath I-5 and that would be subject to temporary closures during construction activities is within a revocable easement granted by Caltrans and is, therefore, not subject to Section 4(f). In any case, every reasonable effort would be made to maintain the continuity of existing and designated trails, including providing detours when trail access would be temporarily disrupted and implementing the shortest feasible construction period where physically affecting the trail.

Construction of a retaining wall to avoid permanent use of the Coast to Crest Trail may require a temporary construction easement for the footing of the retaining wall for the 10+4 Barrier, 10+4 Buffer, and 8+4 Barrier alternatives within the SDRP, but not for the refined 8+4 Buffer alternative. If an alternative other than the Preferred Alternative is selected and a temporary construction easement is requested to avoid permanent impacts to the SDRP, then FHWA/Caltrans would coordinate with the JPA regarding a temporary construction easement.

As noted, the portion under I-5 within Caltrans right-of-way is subject to a revocable easement granted by Caltrans and is not subject to Section 4(f). A temporary closure of short duration may occur during construction activities, but no permanent use of any portion of the trail would occur. As such, no purchase of park land would be required. As no purchase of park lands would occur, protection under the California Public Park Preservation Act of 1971 would not be triggered and the project would comply with PRC §5400 et seq.

3.1.3.4 Avoidance, Minimization, and/or Mitigation Measures

The proposed project has been designed to minimize impacts, where possible, by reducing the amount of right-of-way and limiting the grading footprint to minimize impacts to natural resources while still meeting project objectives. Disturbed CSS and non-native grassland to be acquired by the proposed project would be mitigated via habitat restoration/creation at ratios agreed upon by the resource agencies as a part of the overall mitigation plan for the proposed project, as detailed in *Section 3.17, Natural Communities*. Throughout *Chapters 3* and *4*, additional mitigation is discussed (e.g., for aesthetics in *Section 3.7*, water quality in *Section 3.10*, and air quality in *Section 3.14*) that would also minimize existing effects within the corridor and associated parks.

Caltrans has continued to refine the proposed project design to further reduce the direct impacts to the individual facilities since public circulation of the Draft EIR/EIS and has coordinated this effort with the property owners and/or officials with jurisdiction for recreational areas. A liaison has been appointed to coordinate with the property owners and officials. For example, Caltrans has agreed to appoint the Project Manager for the *I-5 NCC Project* to work as a liaison with SDRP JPA staff during the engineering design of the project, particularly where the freeway interfaces with the trail and park, as well as to establish procedures for construction notifications and other construction issues in order to avoid unanticipated impacts to the recreational facility.

Caltrans would consult with the property owners and/or officials with jurisdiction over recreational areas during project design for potential aesthetic options, as applicable. During the design process, shareholder interaction will continue, guidelines will become more and more specific, locally oriented design details will be added, and a design palette of specific features and products will be developed.

Where purchase of park lands is required, compensation in accordance with the California Public Park Preservation Act of 1971 and PRC §5400 et seq. is assumed as part of project design. For the 0.79 to 1.05 ac purchase of park property from San Elijo Lagoon Ecological Reserve, and for the 1.59 to 3.54 ac purchase of land from Agua Hedionda Lagoon, a variety of options may be available. For example, Caltrans on behalf of FHWA is coordinating with the San Elijo Lagoon Conservancy, CDFW, and County of San Diego Department of Parks and Recreation regarding the possible right-of-way exchange at San Elijo Lagoon Ecological Reserve, which may take the place of acreage purchase. For the 0.04 to 0.12 ac purchase of property from Oak Park, funds would be provided to the City of Carlsbad to either purchase equivalent park land or to enhance the facility, as they determine appropriate.

The above measures required as part of project design would adequately compensate for project-related impacts to parks.

Source: DigitalGlobe 2008, SanGIS 2008, MCB Camp Pendleton 2004

Figure 3-1.10: Park and Recreational Facilities

3.2 Growth

This section discusses whether the proposed project would result in otherwise unforeseen direct, indirect, or secondary growth, or would otherwise influence growth. This section is based on the CIA prepared for the *I-5 NCC Project*, October 2007, and the Barrio Carlsbad Community Cohesion Report, June 2008. It has also been updated with more recent data from SANDAG. These separate technical studies were prepared for the proposed project and are incorporated into this document by reference.

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.2.1 Regulatory Setting

The Council on Environmental Quality (CEQ) regulations, which established the steps necessary to comply with NEPA, require evaluation of the potential environmental consequences of all proposed federal activities and programs. This provision includes a requirement to examine indirect consequences, which may occur in areas beyond the immediate influence of a proposed action and at some time in the future. The CEQ regulations, 40 Code of Federal Regulations (CFR) 1508.8, refer to these consequences as secondary impacts. Secondary impacts may include changes in land use, economic vitality, and population density, which are all elements of growth.

CEQA also requires the analysis of a project's potential to induce growth. CEQA guidelines, Section 15126.2(d), require that environmental documents "…discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment.

3.2.2 Affected Environment

The proposed project traverses a highly urbanized portion of mid to northwest San Diego County. The coastal areas typically consist of higher-density and small lot residential developments. Northeastern San Diego County has experienced development at a slower (and later) pace, due in part to an early lack of necessary infrastructure and other needs. More recently, San Diego County has been experiencing urbanization of its rural areas, especially on the fringe of the larger urban cities. Development in the eastern parts of the County is in the form of low-density residential developments on larger lots, with ample open space. East of I-5, particularly in Oceanside and Carlsbad (two of the larger jurisdictions in the study area), development of vacant land is ongoing and is anticipated to continue into the future.

The majority of the CIA study area, which includes the Cities of San Diego, Del Mar, Solana Beach, Encinitas, Carlsbad, and Oceanside, is considered to be nearly at build-out with urban uses. Few vacant developable parcels of land are remaining in the immediate vicinity of I-5. As of 2004, an estimated 91 percent of mid to northwestern San Diego County was considered developed, with 5 percent of land available for development and the remaining 4 percent undevelopable (SANDAG 2004b). In general, the coastal area of San Diego County is developed with higher-density residential and other uses, and the main form of growth would likely be in the form of redevelopment and infilling on vacant lots. The eastern parts of the study area, however, have more available vacant developable land, and growth would be in the form of larger-scale residential and commercial developments. *Table 3.2.1* shows the remaining developable acres in each of the six jurisdictions and the proportion of that land slated for residential development. Oceanside and Carlsbad, which are similar in total area, have an estimated eight and six percent of available developable land, respectively. Del Mar and Solana Beach have very little land available for future development, and nearly all of that is reserved for residential uses. It is worth noting that while only 5 percent of available land in San Diego is considered suitable for development, it is expected to absorb 35 percent growth from the region as a whole.

Table 3.2.1: Remaining Developable Acres as of 2008

Jurisdiction	Total ac	Remaining Developable Land	Proportion Planned Residential
Oceanside	26987	2275 (8%)	1118 (49%)
Carlsbad	25041	1581 (6%)	851 (54%)
Encinitas	12529	871 (7%)	697 (80%)
Solana Beach	2183	37 (2%)	28 (76%)
Del Mar	1141	40 (3%)	32 (79%)
San Diego	218388	10285 (5%)	5651 (55%)
TOTAL	**286269**	**15089 (5%)**	**8377 (56%)**

Source: SANDAG Data Warehouse July 2012

Population forecasts published by SANDAG through 2040 suggest that population growth and its associated development would continue in the study area and region. As shown in *Table 3.2.2,* the population within each of the six jurisdictions in the CIA study area is expected to increase, with growth estimates ranging from 17 percent to 31 percent over the 30-year period from 2010 to 2040. San Diego, Carlsbad, and Oceanside are expected to experience the most growth, with 31, 23, and 20 percent, respectively. Del Mar, Solana Beach, and Encinitas, have the lowest projected population growth at 14, 17, and 17 percent, respectively. In comparison, the population of San Diego County, as a whole, is projected to increase by 29 percent over that same period of time.

Table 3.2.2: Population Growth Projections for Jurisdictions within the Study Area

Jurisdiction	1970	2010	2040	Change: 1970 to 2010	Change: 2010 to 2040
Oceanside	40,494	179,105	207,237	342%	20%
Carlsbad	14,944	103,491	127,434	593%	23%
Encinitas	17,210	64,599	75,446	275%	17%
Solana Beach	5,744	13,338	15,619	132%	17%
San Diego *(NCC only)*	23,315	160,290	209,744	587%	31%
Del Mar	3,956	4,455	5,059	13%	14%
Corridor Travel Shed	**105,663**	**525,278**	**647,832**	**397%**	**23%**
San Diego County	1,357,854	3,224,432	4,163,688	137%	29%

Sources: SANDAG 2050 RTP[1] (Chapter 3), October 2011; Caltrans/SANDAG Series 12 Model, September 2011

[1] On December 20, 2012, the San Diego Superior Court entered a judgment finding that the EIR for the 2050 RTP is legally inadequate with regard to greenhouse gas emissions. Although the judgment may be overturned on appeal, this Final EIR/EIS has been drafted to avoid the narrow alleged deficiencies found by the Court. Where this Final EIR/EIS relies upon 2050 RTP information, that information has not been challenged and is not part of the current lawsuit.

Regional and local planning departments have developed growth management programs and policies to address future growth. SANDAG is the regional agency responsible for preparing population, housing, and employment projections for the San Diego region. SANDAG develops annual demographic estimates and long-range forecasts approximately every four years. The forecasts are based on General and Community Plans of each of the region's 19 jurisdictions. The proposed project is located mainly within an area identified by SANDAG as the North County West Major Statistical Area (MSA), which includes Oceanside, Carlsbad, Encinitas, and Del Mar. The southern portion of the study area is located within the North City MSA, which includes Solana Beach and San Diego.

While the 2040 Regional Growth Forecast Update examines growth from a regional perspective, each of the six jurisdictions has their own individual growth management plans or policies (or variation thereof), often contained within the General Plan, which are summarized below.

City of San Diego

Specific goals related to growth within San Diego are provided in the 10 elements of the 2008 General Plan, with the overall vision summarized in the Strategic Framework Element. The overarching public policy for the distribution of future land use, both public and private in the General Plan, is based on a "City of Villages" strategy. The strategy focuses growth into mixed-use activity centers that are pedestrian-friendly districts linked to an improved regional transit system. It was developed through an intensive process of public collaboration over a three-year period and calls for redevelopment, infill, and new growth to be targeted into compact, mixed-use, and walkable villages that are connected to a regional transit system. The strategy is designed to sustain the long-term economic, environmental, and social health of the City and its many communities. Implementation of the City of Villages growth strategy is recognized to be dependent upon close coordination of land use and transportation planning.

Del Mar

Due to the small size and built-out nature of Del Mar, the City does not identify specific policies or goals related to growth management. Future growth within Del Mar would be mainly in the form of redevelopment of existing developed parcels and infill development, and substantial population growth is not anticipated.

Solana Beach

Due to the relatively small size and built-out nature of Solana Beach, the City does not identify specific policies or goals related to growth management. Future growth within Solana Beach would be mainly in the form of redevelopment of existing developed parcels and infill development, and substantial population growth is not anticipated.

Encinitas

As with the majority of coastal cities in southern California, Encinitas has grown at a relatively rapid pace over the last several decades. Accordingly, the Land Use Element of the General Plan addresses Growth Management and states policies and guidelines so that the City should manage slower, more orderly growth in accordance with a long-term plan that protects and enhances community values. Policy 2.3 states that growth within Encinitas would be managed in a manner that does not exceed the ability of the City, special districts, and utilities to provide a desirable level of facilities and services. Encinitas has identified the need to ensure that new development does not occur at the expense of the natural environment or existing development, or before adequate infrastructure and services are in place.

Carlsbad

In 1986, Carlsbad established a Growth Management Program to link future development with the provision of public facilities and services by establishing performance standards and a maximum growth potential (54,600 dwelling units), planning facilities to meet future demand, linking development to performance, and monitoring development. The Growth Management Plan set maximum numbers of units in four established quadrants, defined by the intersections of Palomar Airport Road and El Camino Real.

Oceanside

Oceanside housing Policy 1.16C is designed to ensure that housing is developed in areas with adequate access to employment opportunities, community facilities, and public services. In addition, land use policy 1.11B indicates that the City of Oceanside would monitor the impact and intensity of land use and land use distribution to ensure that the City's circulation system is not overburdened beyond design capacity.

3.2.3 Environmental Consequences

Build Alternatives

Implementation of the proposed project consists of improvements to an existing highway that serves an urban area. The proposed project aims to increase vehicular capacity along the project area and maintain or improve existing and future traffic operations along I-5. This would, in turn, improve the safe and efficient regional movement of people and goods throughout the region, as forecasted for the year 2035. The proposed project does modify accessibility with DARs.

Due to the urbanized nature of the study area and limited availability of developable land, there are no known projects in the vicinity that are dependent on implementation of the proposed project. As such, it can be inferred that further growth in the project area and surrounding region is planned and would most likely occur with or without implementation of the proposed project.

As shown in *Table 3.2.1,* only seven percent of land within the six jurisdictions in the study area is considered available for future development, nearly half of which is planned for residential uses. Upon review of the few undeveloped properties within the project area, it was determined that much of the vacant land surrounding I-5 is infill redevelopment projects, approved projects, or open space. Jurisdictions within the CIA study area have identified growth forecasts and the anticipated maximum build-out of each city, and the proposed project would have little to no influence on this planned growth. The existing I-5 corridor currently experiences severe congestion during peak hours and the proposed project would increase the capacity of this portion of the highway to relieve both existing and future congestion, through the project design year, with all improvements constructed by 2035. The ultimate design of the project was based on coordination with regional growth forecasts, and because of the cost-effective nature of the project and other environmental constraints, it is not designed with excess capacity that could induce substantial unplanned growth during the design period. The built-out land use pattern, policies controlling future growth, and costs associated with redevelopment has a low effect on growth related impacts.

The potential for moderate growth in the project vicinity is inevitable and consistent with local land use plans and current trends. First-cut screening analysis indicates that project-related growth is not considered reasonably foreseeable. The reduction in congestion and improved safety associated with the proposed project would not substantially affect the location, rate, type, or amount of growth in the project vicinity, due to other limits on growth, including land use controls within local and regional plans and policies and the highly urbanized nature of the surrounding land uses. The proposed transportation project would have little to no influence on growth, and there would be no growth-related impacts attributable to the project. Therefore, no adverse effects associated with growth would be anticipated with implementation of any of the alternatives.

No Build Alternative

The No Build alternative would not reduce congestion. The potential for moderate growth in the project vicinity is inevitable and consistent with local land use plans and current trends. First-cut screening analysis indicates that project-related growth is not considered reasonably foreseeable. Therefore, no adverse effects associated with growth would be anticipated with implementation of any of the alternatives.

3.2.4 Avoidance, Minimization, and/or Mitigation Measures

As discussed above, growth within the project area would most likely occur without the proposed project or under any of the project alternatives. Growth is considered an indirect issue related to the proposed project that could not be minimized through alternate project features or design. Mitigation measures would not be required.

3.3 Farmlands / Agricultural Lands

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.3.1 Regulatory Setting

NEPA and the Farmland Protection Policy Act (FPPA) (7 USC 4201-4209; and its regulations, 7 CFR Part 658) require federal agencies, such as the FHWA, to coordinate with the Natural Resources Conservation Service (NRCS) if their activities may irreversibly convert farmland (directly or indirectly) to nonagricultural use. For purposes of the FPPA, farmland includes prime farmland, unique farmland, and land of Statewide or local importance.

CEQA requires the review of projects that would convert Williamson Act contract land to nonagricultural uses. The main purposes of the Williamson Act are to preserve agricultural land and to encourage open space preservation and efficient urban growth. The Williamson Act provides incentives to landowners through reduced property taxes to deter the early conversion of agricultural and open space lands to other uses.

The California Coastal Act (Coastal Act) specifies California's coastal zone management program for purposes of complying with the Federal Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. 1451, et seq.). The California Coastal Commission (CCC) ensures that projects conform to prime agricultural land standards specified in Section 30241 of the Coastal Act, and therefore the CZMA.

3.3.2 Affected Environment

This section is based on the Community Impact Assessment (CIA), a separate technical study that was prepared for the proposed project and is incorporated by reference.

For the purposes of analyzing potential impacts to farmlands and agricultural lands, the study area encompasses a 0.5-mi radius from the centerline of the existing I-5 roadway. The assessment of potential impacts to farmland from corridor-type projects is completed on form NRCS-CPA-106, Farmland Conversion Impact Rating for Corridor Type Projects, which rates impacts based on a point scale from 0 to 260. The form reflects coordination with NRCS, which administers the FPPA. The form completed for this project was signed and dated by NRCS on August 1, 2007, and is attached as Appendix E. Ratings of 0 to 160 do not need to be further considered for protection under the FPPA, while those receiving ratings of 160 to 200 may be required to undergo further evaluation or alternatives analysis. Any sites rated at over 200 are considered to result in an adverse effect. The NRCS-CPA-106 form is based on a soil inventory of important farmland soils and does not exclude those important soils that are developed with urban or other uses. The discussion below focuses on acreage that could be impacted by the project that are currently undeveloped or in agricultural uses.

City of San Diego

A limited amount of agricultural activity occurs within the City of San Diego, the majority of which is located within the northern and eastern parts of the City. As shown on *Figure 3-3.1a (*located at the back of this section), the southernmost portion of a parcel of farmland of Statewide importance currently used for agricultural production is located in the area of direct impacts adjacent to the east side of I-5, south of San Dieguito Lagoon. The protection and value of agricultural land in San Diego are discussed in the Conservation Element of the General Plan. Agricultural lands represent a valuable resource; however, it is recognized that agricultural lands are also a prime target for urbanization within the rapidly growing region. The City of San Diego General Plan addresses agricultural resources within the Conservation Element. While it states its goal as "retention of premium agriculturally productive lands" within the City, it acknowledges that urbanization pressures within the City may require conversion of productive lands.

Del Mar

There are currently no designated agricultural lands in Del Mar. Though Del Mar once contributed to the agricultural production of the region, rapid growth has led to the subsequent development of these agricultural lands for residential uses.

Solana Beach

Although Solana Beach has a very small amount of greenhouse and nursery agriculture, there are no designated Farmland Mapping and Monitoring Program (FMMP) agricultural lands in Solana Beach. Though Solana Beach once contributed to the agricultural production of the region, rapid growth has led to the subsequent development of these agricultural lands for residential uses.

Encinitas

As compared to other cities in the North Coast Corridor, a relatively large amount of land within Encinitas is devoted toward some form of agricultural production, some of which lies adjacent to I-5. The majority of agricultural operations within Encinitas are in the form of nurseries or greenhouses. Several such operations are located adjacent to the existing I-5 corridor and are designated as unique farmland (California Department of Conservation [CDC] 2004).

As shown in *Figure 3-3.1b*, east of I-5 at Manchester Avenue is a parcel of active agricultural land designated as prime farmland, which is often cultivated with strawberries and flowers. Anderson's La Costa Nursery and West Coast Nurseries are designated as unique farmland and are located south of Batiquitos Lagoon, approximately 220 ft west of I-5 north of La Costa Avenue. This land, however, is designated for residential uses of 2.01 to 3.00 du/ac by the City. Four garden/nursery businesses are also designated unique farmland, and are all located east of I-5 in the quadrant north of Leucadia Boulevard. These include Weidners' Gardens, Samia Rose Topiary, Leucadia Nursery, and Emerald M. Growers. Two unique farmland parcels that house greenhouse and nursery operations (Florabunda and Pacific Verde Nursery) are located east of, and adjacent to, I-5 at Union Street. Paul Ecke Ranch, the world's largest poinsettia producer, consists of unique, prime, and Statewide farmland, as well as lands under Williamson Act Contracts. It is located 0.25 mi east of I-5 south of Puebla Street. Sunshine Gardens, a nursery and greenhouse operation designated as unique farmland, is located 0.25 mi east of I-5 at Encinitas Boulevard.

Three greenhouse operations located near the proposed project are not designated as important farmland. These include the Cal Pacific Orchid Farm west of I-5 on Orpheus Avenue, the Jungle Music Nursery immediately west of I-5 on Ocean View Avenue, and a greenhouse located north of Puebla Street.

In recent years, much of this agricultural land has been lost due to development, and remaining agricultural lands may still be under pressure to develop. The protection of agricultural lands in Encinitas is outlined in the Resource Management Element of the General Plan and the Encinitas Ranch Specific Plan. Goal 11 of the Resource Element recognizes the important contribution of agricultural and horticultural land uses in the local economy and places emphasis on the need to maintain these activities. Goal 12 states the City would encourage the preservation of "prime" agricultural lands within the Encinitas Ranch Planning Area west of El Camino Real.

The Encinitas Ranch Specific Plan (last updated in 2010) is intended to preserve and promote agricultural uses by establishing Section 6.2, the Agricultural Zone. The Agricultural Zone identifies permitted uses within the 130 agriculturally designated acres east of I-5. Much of the agricultural land in the planning area and Encinitas is maintained for greenhouse flower production, which supplies a large portion of the Statewide market for cut flowers.

Carlsbad

A sizeable quantity of agricultural land occurs within Carlsbad. As shown in *Figure 3-3.1b*, two greenhouse and agricultural operations designated as unique farmland are located in north Carlsbad. East of I-5 and south of Jefferson Street is a greenhouse and agricultural operation, south of Buena Vista Lagoon. Approximately 0.4 mi east of I-5 is the Miles Pacific Nursery, which is located north of Carlsbad Village Drive.

Larger parcels of agricultural land in Carlsbad are located south of Agua Hedionda Lagoon. The Flower Fields is located 0.25 mi east of I-5 between Legoland and the Carlsbad Company Stores. The Flower Fields cover approximately 50 ac and is open seasonally for tourism. The Flower Fields is notable in that it is the only Williamson Act reserve in Carlsbad and is designated as prime and unique farmland by the CDC (2002). A contiguous section of agricultural land is located south of Agua Hedionda Lagoon bound by I-5 to the west, Cannon Road to the south, and open space to the east. This portion of land is used primarily for strawberries but also supports flower production. It is designated as prime farmland and farmland of Statewide importance (CDC 2004). Adjacent to the west side of I-5 along Avenida Encinas is a parcel of farmland of local importance, which houses greenhouses and some agricultural uses.

Policies in the General Plan and the Local Coastal Program (LCP) support existing agriculture resources while planning for possible future transition of land to more urban uses. The LCP includes an Agricultural Mitigation Fee Program and Coastal Agricultural Overlay Zone, which designate certain properties within the Coastal Zone as subject to a mitigation fee if the agricultural land is converted to urban uses. This is designed to prevent premature conversion of agricultural resources by enforcing mitigation measures, establishing guidelines for determining agricultural feasibility, and creating agricultural conversion mitigation fees. While agricultural lands and their economic viability are an important resource in Carlsbad, it is noted that the projected development trends may limit the amount of lands required for economic agricultural operations.

Oceanside

There are no designated agricultural lands in the study area within Oceanside. However, the entire northeast corner of Oceanside is designated for agricultural uses. The agriculture industry in Oceanside is valued at approximately $12 million annually, which accounts for approximately 10 percent of San Diego County's agricultural output. Major crops within Oceanside, as well as the region, include tomatoes, avocadoes, citrus, and nursery stock.

There are two primary areas of large agricultural production in Oceanside: Morro Hills and Rancho del Oro. The Morro Hills agricultural area is the location of a master planned community and golf course located near Vandegrift Boulevard and Douglas Drive. Avocadoes are the primary crop and production contributes to the North County avocado output of over 90 percent of all avocadoes in California. Rancho del Oro, also the location of a master planned community, is located between Mission Avenue and Oceanside Boulevard. Planting began here in 1967, and it now contains the largest lime grove in California numbering more than 10 percent of the State's total lime plantings. There are also large numbers of lemons, oranges, tangelos, and avocadoes. In total, there are over 41,500 trees on 2,200 ac at Rancho del Oro.

The protection and value of agricultural land in Oceanside are discussed in the Land Use and Environmental Resource Management Elements of the 2002 City General Plan. The Land Use Element defines agricultural areas as being characterized by their primary function to farm, graze, or conduct animal husbandry. Agricultural areas typically involve large contiguous tracts of agricultural land uses with little intrusion of nonagricultural uses.

Land Use Policy 2.5A in the Oceanside General Plan states that residential development is permitted in agricultural areas, provided it does not interfere with existing agricultural operations, and that the open space character of the area remains intact.

Coastal Zone Management Act/California Coastal Act

As noted above, the Coastal Act specifies California's coastal zone management program for purposes of complying with the CZMA of 1972 (16 USC 1451, et seq.). The coastal zone is depicted on *Figures 3-3.2a* through *2e*. In addition to local jurisdiction planning policies related to agriculture noted above, the CCC ensures that projects conform to prime agricultural land standards specified in Section 30241 of the Coastal Act, and therefore the CZMA. In accordance with prime agricultural land standards per Coastal Act Section 30241, farmland within the coastal zone must meet one of the following in order to be defined as prime agricultural land: (1) soil classification (Class I or II soils as defined by the NRCS); (2) Storie Index Rating of 80 through 100; (3) ability to support livestock (at least one animal-unit per acre as defined by the U.S. Department of Agriculture [USDA]); and/or (4) planted with fruit- or nut-bearing trees, vines, bushes, or crops that meet fallow/bearing and annual commercial return requirements. None of the parcels abutting I-5 meet the definition of prime agricultural land under Coastal Act Section 30241.

Even if agricultural properties do not meet the requirements of Coastal Act Section 30241, Coastal Act Section 30242 requires that the maximum amount of agricultural land be maintained in agricultural production, and that conflicts between urban and agricultural land uses be minimized. Minimization can include means such as establishing stable urban-rural boundaries, limiting conversion of agricultural lands on the periphery of urban areas to those lands where the viability of existing agricultural use is already severely limited, permitting the conversion of agricultural land surrounded by urban uses where the conversion of the land would be consistent with Section 30250, assuring that public service and facility expansions do not impair agricultural viability (e.g., through increased assessment costs or degraded air and water quality), and assuring that development adjacent to prime agricultural lands does not diminish the productivity of those lands. In addition, Section 30242 of the Coastal Act protects non-prime agricultural lands from conversion to non-agricultural use unless continued agricultural use is not feasible, or the conversion would preserve prime agricultural land or concentrate development consistent with Section 30250. Section 30250 allows development "within, contiguous with, or in close proximity to, existing developed areas able to accommodate it." In other words, any permitted conversion of agricultural land is required to be compatible with continued agricultural use on surrounding lands.

3.3.3 Environmental Consequences

Proposed *I-5 NCC Project* improvements within Del Mar, Solana Beach, and Oceanside would not result in encroachment or edge impacts along the existing I-5 highway corridor to designated or active agricultural lands. Therefore, I-5 improvements would not adversely affect the productivity, nor preclude continued agricultural activities, of agricultural lands in these cities. Depending on the alternative, impacts to designated or active agricultural lands from proposed I-5 improvements could occur in the Cities of San Diego, Encinitas, and Carlsbad.

As depicted on *Table 3.3.1, Farmland Conversion Impact Rating,* NRCS conversion impact ratings for the proposed build alternatives ranged from 101.73 to 101.81. All four alternatives rated less than the 160-point threshold established for further evaluation for adverse effects, even before the project was refined between 2010 and 2012. Therefore, effects on farmlands under the FMMP for the four build alternatives are not considered substantial. Impacts to existing farmlands that would occur within each community are discussed in more detail in those individual sections below. No Williamson Act contract lands would be affected by the proposed project.

Table 3.3.1: Farmland Conversion Impact Rating

Alternative	Prime and Unique Farmland (ac)	Percent of Farmland in County	Farmland Conversion Impact Rating
10+4 Barrier	27	1%	101.81
10+4 Buffer	25	1%	101.74
8+4 Barrier	26	1%	101.76
8+4 Buffer	24	1%	101.73

Source: Form NRCS-CPA-106 (Farmland Conversion Impact Rating for Corridor-Type Projects); NRCS August 1, 2007

Temporary construction-related impacts to agricultural resources throughout the North Coast Corridor could result from conversion of important agricultural lands or other disruption of agricultural activities due to construction/assembly and construction staging areas that may be proposed within an area currently used for agricultural production.

City of San Diego

The area of designated farmland of Statewide importance is located directly south of San Dieguito Lagoon and is currently in production. The proposed alternatives could result in encroachment that consists of up to two ac of edge impacts along the existing I-5 corridor, but impacts would be restricted to the western edge of the operation and would not adversely affect the productivity of the site.

Encinitas

All four build alternatives include the proposed San Elijo Multi-use Facility and DAR at Manchester Avenue, which would affect active agricultural fields east of and adjacent to I-5. The multi-use facility would encroach into prime agricultural land that is actively farmed. The prime farmland totals approximately 30.5 ac. The proposed facility could affect up to 18.5 ac on the western portion of the agricultural land. There is potential that the remaining 12 ac, which are located on a more eastern slope of the parcel, could continue agricultural production. Coordination between SANDAG, Caltrans, and the landowner is under way to determine the possibility of continuing agricultural operations and/or purchase of the property (or partial purchase) for habitat restoration purposes. Two unique farmland parcels that house greenhouse and nursery operations (Florabunda and Pacific Verde Nursery) are located east of, and adjacent to, I-5 at Union Street. The west edge of these greenhouses and nurseries would be impacted by the roadway widening, but the encroachments would only affect the edge of the facilities and would not preclude agricultural activities on the remainder of the parcels. No other designated or active farmlands would be impacted by the proposed project. A corner of the growing area of a greenhouse not designated as important farmland would be directly impacted by the roadway but would not preclude continued operations of the business at the site.

Carlsbad

The 10+4 Barrier alternative potentially would directly impact an estimated 16.08 ac of agricultural land within Carlsbad, 13.99 ac of which are prime and 2.06 ac of which are unique. Adjacent to the east side of I-5 south of Jefferson Street and south of Buena Vista Lagoon is a greenhouse and agricultural operation. The west edge of the facility would be directly impacted by the expansion of the roadway, but it is a small portion of the site and would not preclude continued agricultural operations.

South of Agua Hedionda Lagoon, prime farmland and farmland of Statewide importance currently in cultivation for strawberries and/or flowers would be impacted. The impact is linear in nature and does not bisect or preclude continued agricultural operation of the larger parcel.

Adjacent to the west side of I-5 along Avenida Encinas is a parcel of farmland of local importance, which houses greenhouses and some agricultural uses. The proposed project would encroach into the eastern edge of existing agricultural fields. The greenhouses and other structures located to the north of the parcel would not be displaced and agricultural operations could continue on the site.

Policies in the General Plan and the LCP support existing agriculture resources while planning for possible future transition of land to more urban uses. Linear impacts to farmlands and agricultural lands for this project would occur for improvements to the existing I-5 freeway, but would not preclude continued operations of the agricultural businesses on affected sites.

10+4 Barrier

The FMMP impact rating for the 10+4 Barrier alternative is 101.81. This alternative is less than the 160-point threshold for further evaluation to determine adverse effects. Therefore, this alternative would not have an adverse effect on farmlands. Throughout the six municipalities, the 10+4 Barrier alternative would impact a total of 27 ac of farmlands and agricultural lands.

10+4 Buffer

Throughout the six municipalities, the 10+4 Buffer alternative would impact a total of 25 ac of farmlands and agricultural lands. As depicted in *Table 3.3.1*, the NRCS has given a Farmland Conversion Impact rating of 101.74 to the 10+4 Buffer alternative. This rating is less than the 160-point threshold established to determine whether further evaluation of adverse effects is necessary, and is not considered an adverse effect.

8+4 Barrier

Throughout the six municipalities, the 8+4 Barrier alternative would impact a total of 26 ac of farmlands and agricultural lands. As depicted in *Table 3.3.1*, the Farmland Conversion Impact rating for the 8+4 Barrier alternative is 101.76, less than the 160-point threshold established for further evaluation for adverse effects. No adverse impacts to farmlands would occur.

8+4 Buffer (Preferred Alternative)

Throughout the six municipalities, the 8+4 Buffer alternative was projected to impact a total of 24 ac of farmlands and agricultural lands. Based on project refinement since the Draft EIR/EIS was circulated in 2010, 10.9 acres would be impacted (less than half of acreage originally assumed). *Table 3.3.1* depicts the Farmland Conversion Impact rating for the 8+4 Buffer alternative, as determined by the NRCS, as 101.73 points. The refined 8+4 Buffer alternative would have a lower score than this number, with a correspondingly even lesser effect. Even without refinement, this rating is below the 160-point threshold for further determining adverse effects; therefore, no adverse effect is identified.

Within the City of Encinitas, the refined 8+4 Buffer alternative includes the smallest project footprint for I-5 improvements, and, together with redesign of the DAR as an undercrossing, would affect approximately 8.4 ac of the western portion of the prime farmland adjacent to I-5 rather than 18.5 ac. The remaining 22.1 acres, which are located on a more eastern slope of the parcel, could continue in agricultural production. As noted above, coordination is ongoing to determine the possibility of continuing agricultural operations and/or purchase of the property (or partial purchase) for habitat restoration purposes.

Proposed highway improvements also would affect approximately 0.2 ac along the western edge of unique farmland properties that house greenhouse and nursery operations (e.g., Pacific Verde Nursery) located east of, and adjacent to, I-5 at Union Street. Project encroachments would only affect the edge of the facilities and would not preclude agricultural activities in the greenhouses or nursery on the remainder of the parcels.

In the City of Carlsbad, the refined 8+4 Buffer alternative has been modified since public review to eliminate the DAR at Cannon Road as discussed above, and has the smallest build alternative footprint. As a result of these modifications, the *I-5 NCC Project* would directly affect approximately 2.3 ac of agricultural land within Carlsbad, currently in cultivation for strawberries and/or flowers. This parcel, designated as prime farmland and farmland of Statewide importance, is located south of Agua Hedionda Lagoon and are edged by I-5 to the west, Cannon Road to the south, and open space to the east. These impacts are linear in nature, however, along the western edge of the property, and would not bisect or preclude continued agricultural operation of the larger parcel.

Coastal Zone Management Act/California Coastal Act

As described above, I-5 improvements would affect existing agricultural parcels. Details as to farmland within the coastal zone are shown on *Figures 3-3.2a* through *2e*. Caltrans is also currently pursuing opportunities to acquire properties in the corridor for purposes of implementing a Resource Enhancement Program to help restore, enhance, and expand coastal wetlands, freshwater wetlands, and upland areas. The mitigation sites would be acquired and restored or preserved for purposes of habitat enhancement and/or preservation to offset potential resource impacts of the proposed highway improvements and, where feasible, to improve already degraded resources. Potential biological mitigation sites could include properties designated, or currently or previously used, for agricultural purposes. As noted in *Section 3.3.2*, above, none of the affected agricultural parcels meets Coastal Act Section 30241 standards for prime agricultural land.

As the existing location of the highway facilities requires that some improvements would occur in areas directly adjacent to or within agricultural lands and/or operations, it is infeasible to avoid all impacts to agricultural resources. As stated above, however, none of the identified agricultural parcels meet the Coastal Act standards for prime agricultural land. Coastal Act Section 30241 allows "the conversion of agricultural land surrounded by urban uses where the conversion of the land would be consistent with Section 30250." Section 30250, in turn, allows development contiguous with, or in close proximity to, existing developed areas; this condition exists along I-5.

Project impacts to agricultural lands may raise potential consistency issues with Sections 30241 and 30242 of the Coastal Act regarding continued agricultural viability at two locations. This includes agricultural lands adjacent to I-5 at Manchester Avenue in Encinitas (approximately 8.4 ac) where approximately 28 percent of the current acreage would be impacted by the Preferred Alternative, and south of Jefferson Street in Carlsbad (approximately 2.3 acres) where approximately 2 percent of the current acreage would be impacted by the Preferred Alternative. Strictly comparing these parcels to the overall County average of parcel size and production viability, the answer of continued agricultural viability is positive. The impacts of the Preferred Alternative would not impair the viability of the parcels to remain in active agricultural production. Determination of profitability would be speculative; however, anecdotal evidence indicates that the grower would remain in production given the fact that historical crop production rotates on the site and that crop production has changed over time consistent with the prevailing trends. Historical evidence also supports the viability of the parcel and products in their proximity to large markets and articulated transportation networks with access to even larger distribution centers.

All impacts to agricultural resources in the corridor would be limited to conversion of agricultural land or operations surrounded by urban uses. The proposed improvements and associated impacts also would be necessary to concentrate and maintain anticipated development growth within and/or contiguous to the existing developed corridor, consistent with Section 30250 of the Coastal Act. Based on this analysis and the minimization as reflected in the refined 8+4 Buffer alternative, the I-5 improvements would provide the least environmentally damaging, feasible highway alternative to avoid or reduce impacts to coastal resources.

Proposed improvements that would directly affect agricultural resources are necessary to maintain a critical coastal access corridor and public service while concentrating and maintaining anticipated development within and/or contiguous with the existing developed facility, consistent with Coastal Act Section 30250. In addition to maintaining the primary coastal access corridors in the North Coast Corridor, the proposed improvements are critical to goods movement, which has a direct effect on the viability of agricultural operations in the region and the State. The majority of agricultural product in California is transported from farms to markets via ground transportation. Because of this, the ability to transport local agricultural commodities via I-5 is also critical to the preservation and continued viability of agricultural operations in the North Coast Corridor and throughout the coastal zone. Moreover, close proximity of I-5 to these agricultural areas reduces costs associated with transport, and the reliability of this transportation corridor is necessary to ensure distribution of agricultural product and associated compensation to producers.

In summary, the *I-5 NCC Project* does not appear to conflict with the Coastal Act's policies regarding agricultural resources.

Should the project be found inconsistent with the Coastal Act's agricultural resource protection policies due to the impacts to agricultural lands described in this section, the Coastal Act's conflict resolution provisions would be implemented. The PWP/TREP is the document prepared for the CCC to support permitting activities within the coastal zone. Details as to the procedural Issues associated with potential conflicts with Sections 30241 and 30242 of the Coastal Act are evaluated in detail in the PWP/TREP (EIR/EIS Appendix R) in Section 5.10, Coastal Act Policy Conflict Resolution.

No Build Alternative

Under the No Build alternative, the proposed improvements to I-5 would not occur. As such, there would be no project-related impact to farmlands and agricultural lands.

3.3.4 Avoidance, Minimization, and/or Mitigation Measures

Designs of the build alternatives for the proposed project are a result of extensive research, technical studies, and community input. The amount of right-of-way required for each build alternative is a reduced amount of land required to fulfill the purpose and need of the project as well as meet operational requirements of the roadway. Wherever possible, the proposed build alternatives followed the existing I-5 alignment to avoid and/or minimize impacts to farmlands and agricultural lands.

Design detail, including a reduced project footprint throughout the corridor and for the Manchester Avenue DAR, removal of the Cannon Road DAR, and other corridor-wide auxiliary lane reconfigurations and/or removals, reduced overall projected impacts to agricultural lands to 10.9 ac under the refined 8+4 Buffer alternative (Preferred Alternative). Implementation of the refined 8+4 Buffer alternative would avoid all impacts to agricultural lands in the City of San Diego, would reduce potential project impacts from 18.5 to 8.6 ac in Encinitas, and would reduce potential project impacts from 16 to 2.3 ac in Carlsbad.

Coastal Zone Management Act/California Coastal Act

The paragraph immediately above shows the substantial nature of footprint minimization that has occurred during refinement of the 8+4 Buffer alternative (Preferred Alternative).

Temporary impacts to agricultural resources due to construction/assembly and construction staging areas, including temporary conversion of important agricultural lands or other temporary disruption of agricultural activities, would be addressed by returning any affected area to pre-existing agricultural use after project construction is completed. Temporary impacts to agricultural resources due to construction/assembly and construction staging areas should not cause long-term reduction in productivity or conversion of the subject lands to non-agricultural use, which would result in a significant economic loss to the County's agricultural economy.

Additional offset or minimization of adverse agricultural effects is included as part of project description and design to keep effects under the CZMA less than substantial and to ensure that the project remains consistent with Coastal Act provisions for agriculture. This includes the following four provisions:

- Permanent impacts to active coastal agricultural land within the City of Encinitas and City of Carlsbad would be addressed on a site-specific basis, utilizing a tiered approach. The first tier would be for implementation of in-kind, project-specific action located within the affected jurisdiction, and could include specific activities such as implementation of school or community gardens. Should a project within the affected jurisdiction not be feasible, the second tier would be implemented, which includes payment of an Agricultural Resource Impact Mitigation Fee, pursuant to an approved in-lieu fee program. The fee should be based on net acreage of affected coastal agricultural lands and should reflect the approximate cost of preserving coastal agricultural lands elsewhere in the North Coast Corridor Coastal Zone. Fees would be handled by the affected jurisdiction, and expended in the following order of priority:
  - Purchase of agricultural lands and/or agricultural improvements that would aid in continuing agricultural production within the North Coast Corridor Coastal Zone.
  - Committing to specific activities that support "urban agriculture," such as farm to school programs, farm to fork restaurants, buy local, farm to grocery stores, vertical farming, farmers markets, innovative approaches to "urban agriculture" that help to create a demonstration project, re-tooling existing agricultural operations to allow for vertical farming, innovative approaches to farming, or substantial reduction in water usage, and/or endowments to programs of study in agricultural sciences in the North Coast Corridor Coastal Zone.
  - If determined feasible and desirable by the County of San Diego, coordinating with the County to establish a fund to offset loss of Williamson Act subvention funds from the State for 2009/2010.

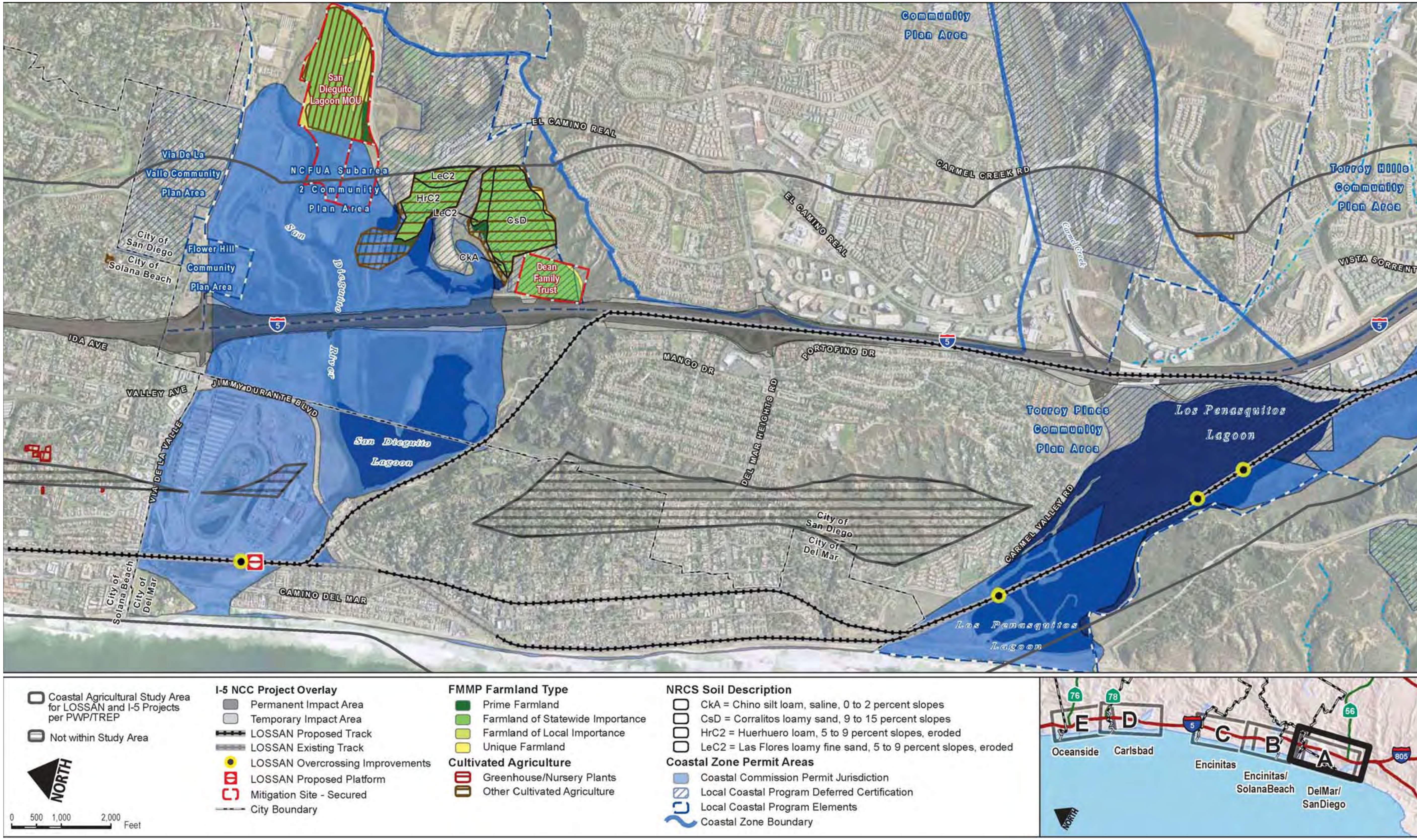
- Construction staging and phasing plans should be prepared and submitted with each notice of impending development (NOID) for all project-related transportation improvement and associated community enhancement projects and should include information that specifies and quantifies any coastal agricultural resource areas that may be impacted by temporary project construction activities. Analysis of temporary impacts from construction activities should be conducted for each NOID submittal in order to determine any loss of income or coastal agricultural production incurred as a result of the proposed construction activities, and appropriate action/compensation should be applied in the event that impacts are identified.

- Plans for habitat restoration on properties supporting existing coastal agricultural uses should be prepared and submitted with the applicable NOID for restoration activities, and should include information that specifies and quantifies any important coastal agricultural resource areas that may be impacted by restoration activities.

- An economic feasibility study should be conducted for any proposed specific project that would result in permanent impacts to coastal agricultural resources in order to determine whether or not continued coastal agricultural production would be possible after the project-related impacts have occurred.

Figure 3-3.1a: Important Farmlands – South

Figure 3-3.1b: Important Farmlands – North

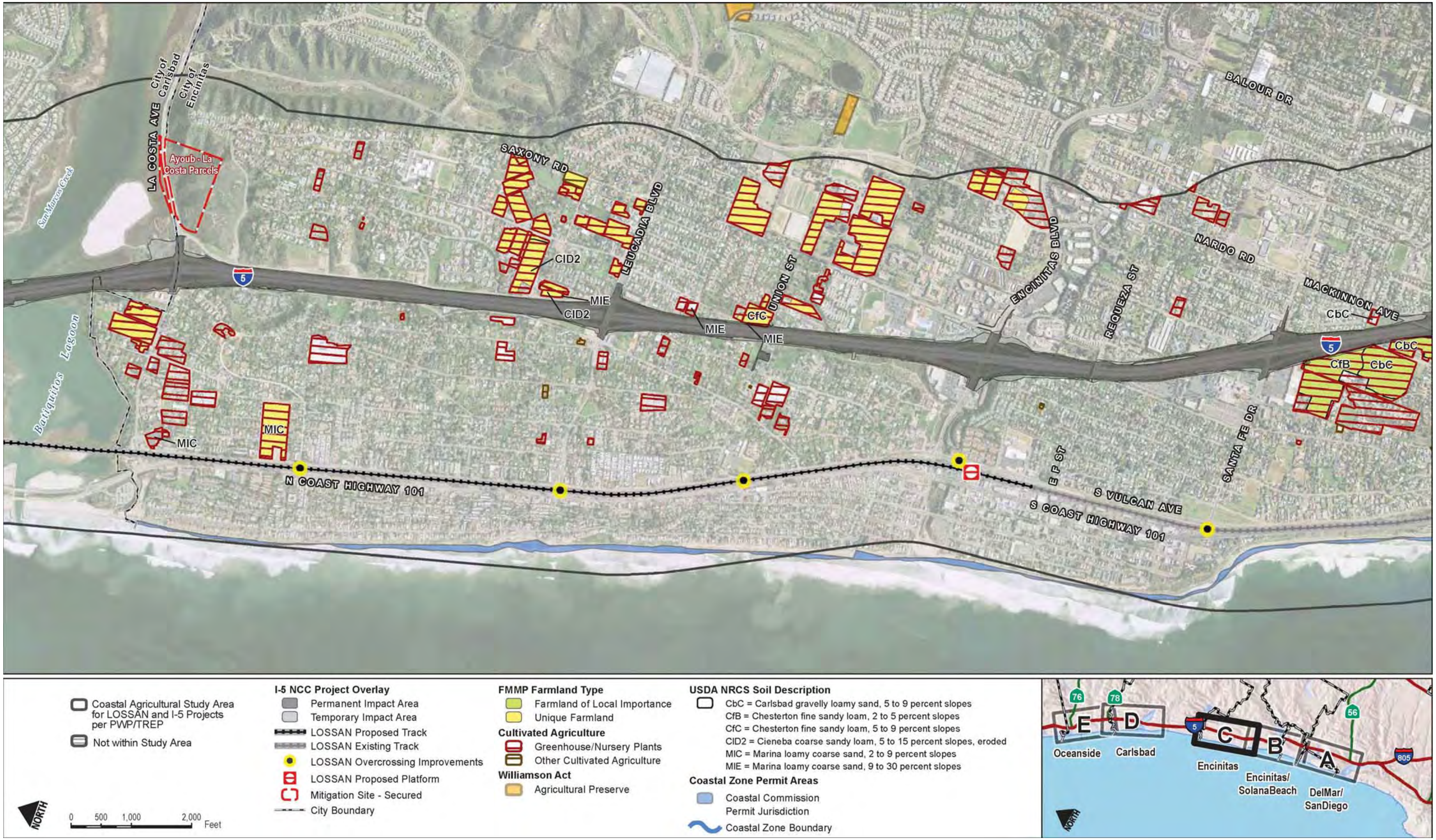


Source: North Coast Corridor PWP/TREP Updated March 2013

Figure 3-3.2a: Coastal Agricultural Resources (Cities of Del Mar / San Diego)

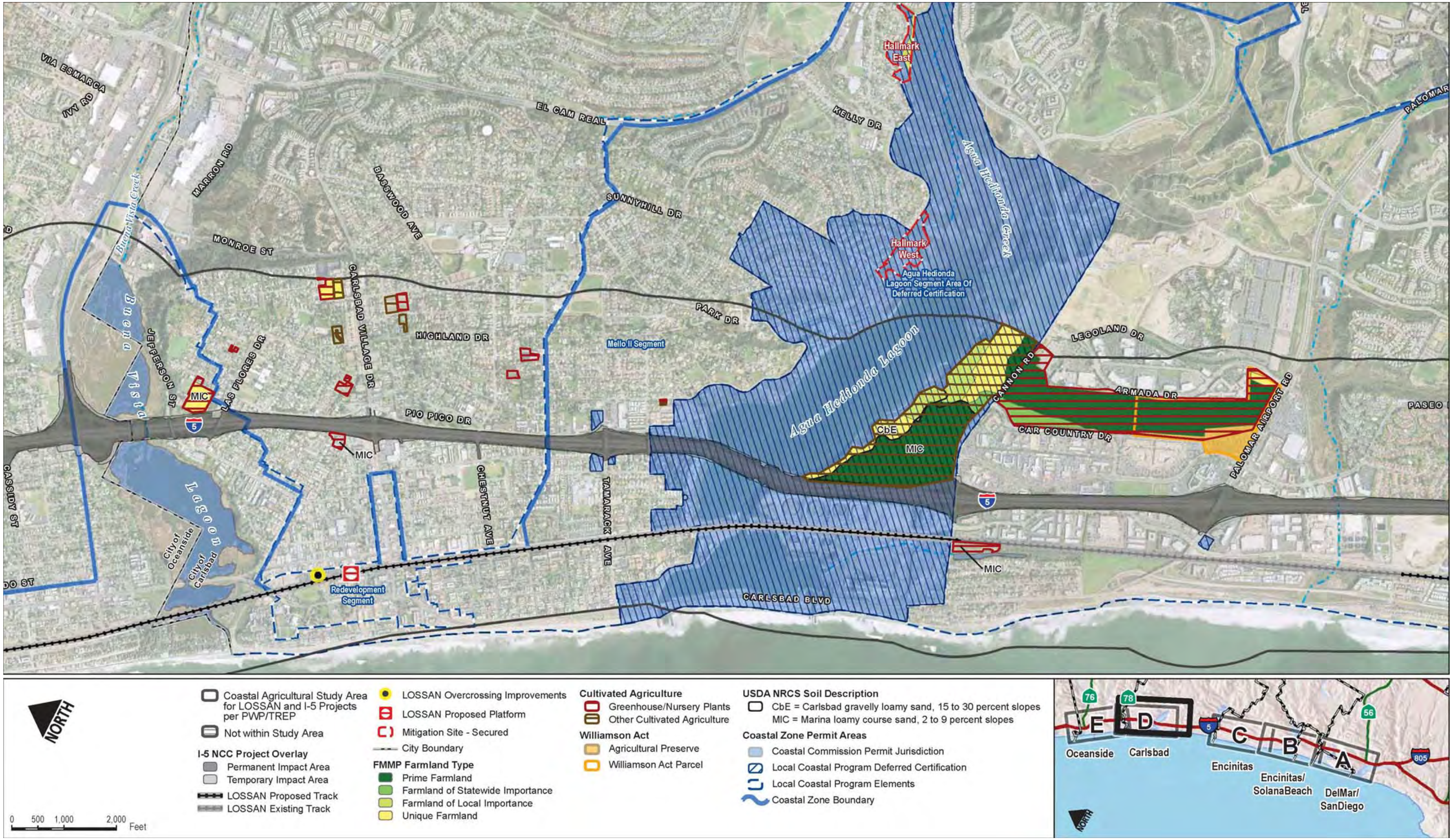
Source: North Coast Corridor PWP/TREP Updated March 2013

Figure 3-3.2b: Coastal Agricultural Resources (Cities of Encinitas / Solana Beach)



Source: North Coast Corridor PWP/TREP Updated March 2013

Figure 3-3.2c: Coastal Agricultural Resources (City of Encinitas)



Source: North Coast Corridor PWP/TREP Updated March 2013

Figure 3-3.2d: Coastal Agricultural Resources (City of Carlsbad)

Source: North Coast Corridor PWP/TREP Updated March 2013

Figure 3-3.2e: Coastal Agricultural Resources (City of Oceanside)

3.4 Community Impacts

This section is based largely on the October 2007 CIA, as amended, and June 2008 Barrio Carlsbad Community Cohesion Report, separate technical studies that were prepared for the proposed project and are incorporated by reference, as well as updates to census data based on the 2010 Census. This section discusses whether the proposed project would have impacts to communities and includes:

- Community Character and Cohesion
- Relocations and Real Property Acquisition
- Environmental Justice

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.4.1 Community Character and Cohesion

3.4.1.1 Regulatory Setting

NEPA established that the federal government use all practicable means to ensure all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings [42 USC 4331(b)(2)]. FHWA in its implementation of NEPA [23 USC 109(h)] directs that final decisions regarding projects are to be made in the best overall public interest. This requires taking into account adverse environmental impacts, such as, destruction or disruption of human-made resources, community cohesion, and the availability of public facilities and services.

Under CEQA, an economic or social change by itself is not to be considered a significant effect on the environment. However, if a social or economic change is related to a physical change, then social or economic change may be considered in determining whether the physical change is significant. Since this project would result in physical change to the environment, it is appropriate to consider changes to community character and cohesion in assessing the significance of the project’s effects.

3.4.1.2 Affected Environment

Due to the linear nature of the proposed project, which traverses six municipalities, the CIA established a study area in which community character traits were analyzed. The CIA study area includes in whole or in part the municipalities of San Diego, Del Mar, Solana Beach, Encinitas, Carlsbad, and Oceanside. Within each of these municipalities, distinct communities exist. The CIA used available census information and field visits to document community character qualities within the study area, and to develop a community profile. Cohesive communities have been regularly linked to certain social characteristics, including high ratios of owner-occupied single-family residences, frequent interpersonal contact, ethnic homogeneity, and shared goals. Neighborhoods with residential stability (i.e., length of tenure) are also indicative of areas with high community cohesion. The continued relationship between residents, neighbors, and the community typically enhance levels of cohesion within a community. For those areas with high proportions of minority residents and/or cultural homogeneity (explored in this section through an analysis of linguistic isolation), relatively high levels of community cohesion can result from a shared ethnic and/or cultural background.

The CIA study area is composed of a highly urbanized part of northern San Diego County, generally characterized by its coastal location, ethnic diversity, established neighborhoods, resident and visitor-serving commercial centers and activities, and preserves associated with coastal lagoons.

City of San Diego

San Diego is the largest city in the CIA study area. The portion of the City within the study area itself is composed of a number of communities, including La Jolla, University, Torrey Pines, Torrey Hills, and Carmel Valley. While land use within each of these communities is discussed in detail in *Section 3.1* of this EIR/EIS, a brief summary of community land uses is included here. Primary land uses in the portion of the City within the CIA study area are residential, commercial, and industrial, with some land occupied by UCSD. Within the San Diego segment of the CIA study area, the northern reach is primarily residential and open space, while the southern segment has primarily residential and commercial/industrial uses.

Located west of I-5, La Jolla is the southernmost community in the CIA study area and is bounded by the University community to the north and Pacific Beach to the south along the Pacific Ocean. La Jolla is characterized by stable neighborhoods with high proportions of owner-occupied single-family homes and long-term owners and residents. The areas southwest of La Jolla Village Drive also have some of the highest proportions of senior citizens for the San Diego CIA study area. The high level of senior citizens is considered an indication of strong community cohesion since they are often long-standing residents in the area, generally engage in community planning and civic activities, and represent a higher owner occupancy rate.

The University community is located between Torrey Pines and La Jolla and is primarily composed of the UCSD campus and Medical Center, with residential, parks and open space, commercial, and industrial uses. Portions of the community have a relatively high proportion of Asian language speakers. Due to their common language and culture, this type of population characteristic can enhance community cohesion. UCSD is a central destination in the area for students, instructors, and employees in the University community. The campus shared by local residents also contributes to high community cohesion.

Torrey Pines is located west of I-5, with Del Mar to the northwest and Los Peñasquitos Lagoon along the south. It is primarily composed of parks and open space (42 percent), with residential uses north of Carmel Valley Road and industrial and commercial uses near Genesee Avenue. This area generally has a high proportion of owner-occupied homes and long residency tenures, and access to shared recreational areas contributes to the cohesion within the community.

Torrey Hills is located east of I-5 between Carmel Valley and Los Peñasquitos Creek and consists largely of the open space of Los Peñasquitos Canyon Preserve. Access to shared recreational areas enhances cohesion within the community.

Carmel Valley is a master planned community bordered by Carmel Valley Road on the north, I-5 on the west, and Los Peñasquitos Canyon Preserve on the south. It has designated residential areas and job centers along with parks and open space, commercial, public service, and public utility buildings. The Carmel Valley community has a high proportion of owner-occupied homes and certain sections of the area have long-standing residents.

Del Mar

Del Mar is the smallest city in the CIA study area, although it is not directly impacted by the project. Del Mar is composed of mostly high-end residential areas, which can range from large estates to multi-family residential units. The commercial land uses in Del Mar are generally concentrated along Camino Del Mar, an area known as "Del Mar Center." This area serves tourists and residents alike and is a focal point of the community.

Del Mar encompasses a number of stable neighborhoods with high owner occupancy and tenure. East of Camino Del Mar also has the highest proportion of senior citizens in Del Mar and is considered an area of high community cohesion.

Solana Beach

Solana Beach, one of the smallest municipalities in the CIA study area, is almost entirely developed with residential and commercial land uses. Residential developments range from large estates to high-density multi-family housing. Commercial uses are along major transportation corridors including Highway 101, Cedros Avenue, Lomas Santa Fe Drive, and Stevens Avenue. Solana Beach has no officially designated neighborhoods within the City but is generally divided by Lomas Santa Fe Drive, running east to west, and I-5, running north to south.

The Cedros Design District is an unofficial neighborhood in Solana Beach, located on Cedros Avenue between Via de la Valle and Lomas Santa Fe Drive. The area is home to approximately 85 shops and has a distinctly artistic character. It is an area of Solana Beach that has attracted residents with a common interest in design and shared goals within the neighborhood.

Eden Gardens is another unofficial neighborhood and is known to tourists for its specialty restaurants featuring Mexican cuisine. It is one of the oldest residential areas in Solana Beach, located southwest of Lomas Santa Fe Drive and adjacent to I-5, and was a community formed by Mexican farmers originally known as La Colonia. Eden Gardens is composed of predominantly Spanish speakers and has a high level of community cohesion because of residents who share language and cultural backgrounds.

There are two specific plans that cover portions of Solana Beach, including the Highway 101 Corridor Specific Plan and the City of Solana Beach Eden Gardens Master Streetscape Plan of 1995). The Highway 101 Corridor Specific Plan stretches along Highway 101 through the entire city, including some target revitalization areas east and west of the highway.

New developments in Solana Beach on the west side of I-5 have increased the number of residents who own homes in the neighborhood. Areas east of I-5 generally have higher proportions of senior citizens, and these areas generally also reflect continued association in their neighborhoods and elevated levels of community cohesion. Residents in northern Solana Beach have generally resided in the area for longer periods of time.

Encinitas

Encinitas is the fourth most populous city in the study area and is composed of five distinct communities: Leucadia, Old Encinitas, Cardiff, New Encinitas, and Olivenhain. Leucadia, Old Encinitas, and Cardiff are located entirely within the project study area. Boundaries of the defined neighborhood areas generally follow major intersections and thoroughfares. These neighborhoods are largely residential, with other land uses being commercial, open space, and some agriculture mainly in the form of greenhouses. Historically, the economy of Encinitas was based upon agriculture, with poinsettias and other flowers and nursery crops, and avocados as the primary crops. The coastal area of Encinitas is characterized by a casual village atmosphere with an emphasis on surfing and the coastal lifestyle. Generally, Encinitas has a high proportion of residents who own their homes. Along the coastline, residents have lived in their houses for many years, contributing to community cohesion. Senior citizens are present throughout the Encinitas study area, particularly east of I-5. These are cohesive communities that have residential stability associated with long ownership tenures.

Cardiff is mostly composed of single-family and multi-family residential buildings. There are also a few public service and public utility buildings, scattered commercial buildings, some agricultural lands, and two industrial buildings. Cardiff Reef and the small Cardiff business district are focal points within the community. This area also has an important agricultural history, with greenhouses and agricultural land interspersed with residential uses. Cardiff generally has long-term residents, particularly along the coast.

Leucadia is bordered by Batiquitos Lagoon to the north, the beachfront to the west, and El Camino Real to the east. It contains Encinitas Ranch, which is mostly parks and open space, golf courses, and single-family residential development. The remainder of Leucadia is mostly single-family and multi-family residential buildings, with some agriculture and scattered commercial buildings. Many of the families have resided in Leucadia for a long time and have created connections with neighbors and the community itself.

Old Encinitas is bordered by Santa Fe Drive on the south, Crest Drive on the east, and the beachfront on the west. It is generally more urbanized, with several public utility buildings, some small industrial buildings, and a strip of commercial buildings near the beachfront. The remainder of the Old Encinitas community is made up of single-family and multi-family residential buildings, many of which are occupied by residents who have lived in the area for extended periods of time. A portion of Old Encinitas has a high proportion of Spanish language speakers, and their shared culture is indicative of high community cohesion.

A portion of New Encinitas is within the CIA study area. The area extends from Manchester Avenue on the south to Olivenhain Road to the north and Crest Drive to the west. The land use within this area is mixed-use consisting of residential, commercial, vacant/undeveloped, and parks and open space. There are a few industrial buildings as well. The portion of New Encinitas within the CIA study area has a high level of resident-owned homes. The residents in this area share a common interest in maintaining a high quality of life, and this shared goal is conducive to strong community cohesion.

Carlsbad

Carlsbad is third-largest city in the CIA study area by land area. Largely urbanized, Carlsbad is composed of large residential areas and some commercial centers interspersed with large open space areas and agricultural fields. Currently, Carlsbad continues to support agriculture and resort tourism but also has developed a diverse economic portfolio that includes a large golf equipment manufacturing sector, as well as a large number of biomedical and multimedia companies (Carlsbad Chamber of Commerce 2005). Agriculture remains important to the economy, and the Flower Fields located east of I-5 are a major tourist attraction. Other attractions include Legoland, La Costa Spa and Resort, a large shopping mall, and the Carlsbad Company Stores. Due to residential development restrictions, land around the McClellan-Palomar Airport has become a commercial and industrial center. In addition, the beaches are consistently a popular destination.

Unofficially defined specific areas also exist, including the Barrio, Mariners Point, and Promenade-La Costa. The Barrio is a center for the Hispanic community. It is thought to be the first settled neighborhood in Carlsbad in the 1920s and one of the oldest neighborhoods in Carlsbad. The Barrio is the site of the City's Centro de Información, a Spanish division of the Carlsbad City Library. A portion of the Barrio has residents with the longest residency tenure, along with large groups of Spanish speakers and owner-occupied homes in Carlsbad. The area of the Barrio is generally considered west of I-5 to Washington Street and between Carlsbad Village Drive and Tamarack Avenue, as seen on *Figures 2-2.3, Sheets 54* and *55.*

Mariners Point is in the Southwest Quadrant of the City and is a residential area with parks and open space, and small pockets of commercial, industrial, and public services. Promenade-La Costa also is in the Southwest Quadrant of the City and is characterized by golf courses, parks and open space, and single-family residential units. Along the coast, these areas have residents that have lived in the area for quite some time. Many residents are senior citizens and these areas generally reflect residents that continue to be engaged with their neighbors and the local area, demonstrating a high level of community cohesion.

Oceanside

Oceanside is second to San Diego in both land area and population of those municipalities within the CIA study area. Oceanside has some of the most established residential areas in the CIA study area and is one of the oldest of the six municipalities discussed in this document. Currently, the western portions of Oceanside are relatively urbanized, while the eastern portions are relatively rural, which is also true of Carlsbad. The City of Oceanside General Plan (2002) identifies 17 neighborhoods within the City. The neighborhoods within the study area include Townsite, South Oceanside, East Side Capistrano, Loma Alta, and Fire Mountain. Boundaries of the defined neighborhood areas generally follow census tract boundaries.

Townsite is west of I-5, bordered by Oceanside Boulevard on the south and MCB Camp Pendleton on the north. It is generally composed of a mix of single-family and multi-family residential units, and many of the families in this area are long-term residents. There are a small number of offices and store front properties, and a few scattered public service buildings, schools, industrial buildings, community commercial buildings, and commercial recreation buildings.

South Oceanside is located west of I-5, with Oceanside Boulevard on the north and Carlsbad on the south. It is primarily composed of single-family residential units with a school and scattered multi-family residential units, parks and open space, industrial buildings, neighborhood shopping, store front properties, and a commercial recreational building. Many residents in portions of South Oceanside have long residency tenure.

East Side Capistrano is east of I-5 with MCB Camp Pendleton on the north and Mission Avenue on the south. It is a mix of single-family residential and multi-family residential units, parks and open space, and schools. There are scattered regional commercial buildings, store front properties, and industrial buildings. East Side Capistrano has the highest percentage of non-English speakers and also has areas of the longest residency tenure in Oceanside. The residents in these minority areas may or may not have similar languages, but when contrasted with the majority of Oceanside citizens are considered to be their own community. Their shared experiences as minority residents are linked to high levels of community cohesion, particularly as many families have lived in the area for a long time.

Loma Alta is east of I-5 between Mission Avenue and Oceanside Boulevard, bordered by El Camino Real to the east. It is primarily composed of commercial recreational property with a mix of neighborhood shopping, community commercial, single-family and multi-family residential units, a school, offices, and industrial development. It has a high proportion of owner-occupied homes, as well as a small amount of parks and open space.

Fire Mountain is located east of I-5 between Oceanside Boulevard and Carlsbad, with El Camino Real as its eastern border. It is primarily composed of single-family residential units and includes a high proportion of senior citizens. There is a roughly even mix of community commercial property, industrial buildings, schools, and neighborhood shopping, with a small amount of office property as well as parks and recreational property. Many families in this area own their own homes and have lived in the area for a long time.

Unofficially defined specific areas also exist, such as the Eastside (part of East Side Capistrano) and Crown Heights (part of Townsite). Eastside is bordered by I-5 to the west, Mission Avenue to the south, the San Luis Rey River to the north, and North Canyon Drive to the east. The area is predominantly Hispanic and is bordered by I-5 on the east, Horne Street on the west, Center Avenue on the north, and Minnesota Avenue on the south. Crown Heights has been characterized as "Oceanside's most densely populated and lowest-income neighborhood" (San Diego Union Tribune 2004). This area has the highest minority percentage, population over 65, housing density, and population density (U.S. Bureau of the Census 2000) within Oceanside.

3.4.1.3 Environmental Consequences

The proposed project would not worsen existing conditions with respect to community character or cohesion, with the exception of the 10+4 Barrier alternative in the community of Barrio Carlsbad. These impacts are described in detail below. Overall, the project is anticipated to improve existing community character and cohesion by incorporating various design features into the project. Additionally, community enhancement features, if implemented, would further improve and facilitate connectivity between communities east and west of I-5 that were bisected when I-5 was originally constructed. All design features and candidate enhancement opportunities are common to all build alternatives, and for the purpose identifying the consequences of the proposed action, are included in the following discussion.

Construction-Related Impacts

Construction-related impacts to communities in the vicinity of the proposed project would potentially include periodic vehicular and pedestrian access disruptions, increased noise, dust generation, reduced visual quality, and economic impacts. Construction activities also would potentially result in disruptions to residents, businesses, and commuters in the vicinity. Lane closures throughout construction areas are anticipated. Access to various intersections may include temporary stoppages, reduced lane widths, reduced speed, rough surfaces, or locations where there is a need for detours around localized construction activities. Where possible, closures requiring extended periods of time would be completed in the evening, early morning, and other appropriate times when traffic volumes would likely be lower. Any disruptions and impacts related to construction activities would be temporary.

10+4 Barrier

City of San Diego

The proposed project would include community enhancement features in four general locations within the City of San Diego, including: a trail connection at Los Peñasquitos Creek: pedestrian and bicycle trail connections at Carmel Valley Road and Old Sorrento Valley Road, as well as an enhanced park and ride at Carmel Valley Road; a pedestrian and bicycle enhanced trail and bridge at San Dieguito Lagoon; and a pedestrian overpass connection north of Del Mar Heights Road. The trail elements would be segments of the proposed NC Bike Trail, as described in *Section 2.3*, *I-5 North Coast Regional and Community Enhancement Projects,* of this Final EIR/EIS. In addition to the reconfigured interchanges, overpasses, and underpasses (all of which would be constructed with pedestrian and bicycle facilities) the proposed community enhancement features, if implemented, would increase connectivity between neighborhoods east and west of I-5 and provide residents with the ability to reach community facilities with greater ease, thereby positively affecting their quality of life.

Implementation of the 10+4 Barrier alternative in San Diego would not result in any substantial land use impacts that would affect adjacent communities. No residential or business properties would be directly affected within the community. The visual perspective of the proposed project would potentially be altered from nearby communities as discussed in *Section 3.7, Visual/Aesthetics*. However, the increased roadway surfaces and landform modification would be within a developed urban area. Overall, because the project would not adversely affect uses within recreational facilities, and would enhance access within the community, the implementation of new project features is not expected to have an adverse effect on community character.

Impacts to community cohesion from operation of the proposed project in San Diego are likely to be positive. Overall, this alternative would result in increased access and flow to and from residential and business communities in San Diego. Additionally, the four community enhancement features would improve pedestrian circulation between communities east and west of I-5.

Del Mar

Del Mar differs from other municipalities in the CIA study area because the proposed project does not directly traverse the City. As such, many features associated with the proposed project (e.g., soundwalls, community enhancement features, increased traffic volumes, possible noise increases) are not expected to directly affect Del Mar residents. However, residents of Del Mar, specifically those who live east of Camino Del Mar, could be affected by changes to existing access and circulation.

Many Del Mar residents leave the City daily for work, school, or errands and would benefit directly from increased capacity on I-5. Improvements to overcrossings, undercrossings, and interchanges in the surrounding municipalities would also improve circulation for those living in Del Mar. These improvements have the possibility of increasing connectivity between neighborhoods in Del Mar with those outside of the municipal boundaries.

Because the project does not pass through Del Mar, no direct impacts to local businesses or residences are anticipated. Peripheral improvements to traffic and circulation could benefit the local economy. While the City of Del Mar is only two square mi in size, residents could benefit from the proposed community enhancement features in adjacent communities. *Section 3.7* looks at partial views at the Del Mar Heights Road Interchange and identifies moderately high adverse visual impacts. However, the increased roadway surfaces and landform modification would be within a developed urban area. Overall, because the project would not affect uses within recreational facilities, and would enhance access within the community, the implementation of new project features is not expected to have an adverse effect on community character or cohesion.

Solana Beach

A positive impact to community cohesion in Solana Beach would be the construction of the community enhancement features. If implemented these features include the construction of a trailhead at Solana Hills Drive (also a part of the NC Bike Trail) and streetscape enhancements on Ida Avenue. The streetscape enhancements along Ida Avenue would greatly improve the aesthetic quality along this stretch of road, which would be visually affected by a large retaining wall. The proposed new trailhead at Solana Hills Drive for the San Elijo Lagoon Ecological Reserve would be a beneficial impact to community character. According to *Section 3.7*, there would be some moderately high to adverse impacts to visual quality depending on the key view. However, the increased roadway surfaces and landform modification would be within a developed urban area and would not adversely affect community character or cohesion. In addition to the reconfigured interchanges, overcrossings, and undercrossings (all of which would be constructed with pedestrian and bicycle facilities), the proposed community enhancement features, if implemented, would greatly increase connectivity between neighborhoods and provide citizens with the ability to reach community facilities with greater ease.

The proposed project would allow for more efficient vehicular access to Solana Beach businesses by improving traffic circulation and making businesses easier to visit. The additional lanes of this alternative may allow for slightly faster public service response times. The implementation of community enhancement features would allow for easier pedestrian and bicycle access to local businesses. While the 10+4 Barrier alternative would likely affect existing office and street parking and relocation impacts may occur as described in *Section 3.7*, the project would be located in an urban area and would enhance overall access within the community. Therefore, the implementation of new project features is not expected to have an adverse effect on community character or cohesion.

Encinitas

Within Encinitas, community cohesion would be improved with the construction of community enhancement features. If implemented, these features would include a pedestrian bridge and trail at Manchester Avenue and park and ride enhancements at Birmingham Drive; improvements to Villa Cardiff Drive and MacKinnon Bridge; a trail connecting Hall Property Park Trail to Santa Fe Drive; a trail connecting Santa Fe Drive to Requeza Street; a trail connecting Requeza Street to Encinitas Boulevard; a pedestrian overpass and trail connection at Union Street; and a trail connection from Cottonwood Creek Park to Union Street. Most of the trail elements would be segments of the proposed NC Bike Trail, as described in *Section 2.3* of this Final EIR/EIS. In addition to the reconfigured interchanges, overpasses, and underpasses (all of which would be constructed with pedestrian and bicycle facilities), the proposed community enhancement features would greatly increase connectivity between neighborhoods both east and west of I-5 and provide citizens with the ability to reach community facilities on both sides of the freeway with greater ease.

The pedestrian overpass at Union Street would serve to connect two neighborhoods on either side of I-5 that were historically divided decades ago by the initial construction of the freeway. The new connection at Union Street would allow the neighborhoods on either side of the freeway to interact and strengthen community cohesion in the area.

The access improvements to the highway and surface streets would benefit local businesses by decreasing long wait times to travel on surface streets through the areas and reducing congestion to and from I-5. Overall, because the project would not affect uses within recreational facilities, and would enhance access within the community, and due to the urban nature of the impact area, the implementation of new project features is not expected to have an adverse effect on community character or cohesion.

Carlsbad

The displacement of residents associated with the 10+4 Barrier alternative in northern Carlsbad would occur in an area identified as exhibiting traits of elevated community cohesion—namely, a relatively high concentration of linguistically isolated Spanish-speaking households, as well as a high proportion of minority populations. This social contact and interdependency is established in a range of places throughout the barrio, including Lola's, St. Patrick's Church, on the fields of Pine Park and Holiday Park, the Boys and Girls Club, Jefferson Elementary School, the Centro de Información, the Carlsbad Senior Center, and the neighborhood clinic. As a substantial number of Barrio Carlsbad residents work within the immediate area, other businesses provide context for interaction as even the most simple transaction may involve people who live in close proximity. This interaction is fueled by the walkable nature of the community and its short distance to shops, restaurants, and the beach.

As discussed in *Section 3.4.2* and *Table 3.4.1,* below, relocating displaced residents may be difficult as the availability of apartments within Carlsbad with similar rental rates is not adequate for relocating 47 units. If relocation is not feasible in Carlsbad and families are relocated outside of the community, this may adversely impact community cohesion in the area. Proposed streetscape enhancements along Chestnut Avenue are located in proximity to the displaced units and would improve visual cohesion through the construction of an aesthetically pleasing pedestrian space. The loss of up to 47 families from the community, however, may still adversely affect cohesion in the immediate area.

If implemented, the community enhancement features (the proposed pedestrian and bike trails at the west side of Batiquitos Lagoon and at the east side of Agua Hedionda Lagoon) would enhance pedestrian access to important community recreational facilities. Both of these trails would be segments of the proposed NC Bike Trail, as described in *Section 2.3* of this Final EIR/EIS. In addition to the reconfigured interchanges, overpasses, and underpasses (all of which would be constructed with pedestrian and bicycle facilities), the proposed community enhancement features would greatly increase connectivity between neighborhoods and provide citizens with the ability to access community facilities both east and west of I-5 with greater ease and safety. It also would result in the removal of some parking on Pio Pico Drive, but would not affect the recreational facilities within Holiday Park. Generally, impacts to community cohesion from operation of the proposed project in Carlsbad are likely to be positive. Due to the urban nature of the impact area, the implementation of new project features is not expected to cause an adverse effect to community character. However, for the Barrio Carlsbad community in northern Carlsbad involving the potential to displace the 47-unit apartment complex, community cohesion may be adversely affected. The refined 8+4 Buffer alternative (Preferred Alternative) would not impact this community. *Figure 3-4.1* (located at the back of this section) shows the differences between the four build alternatives on an aerial photo of this area.

Oceanside

Perhaps the greatest beneficial impact to community cohesion within Oceanside would be construction of the community enhancement features, which includes construction of a pocket park and pedestrian trail at California Street; bike and pedestrian streetscape enhancements along Oceanside Boulevard; enhancements to the Division Street overpass; an enhanced bike and pedestrian overpass connection on Mission Avenue (which would connect to Oceanside High School); an enhanced bike and pedestrian overpass connection on Bush Street; community open space park and gardens near Horne Street; construction of SR-76 pedestrian underpass improvements at the San Luis Rey River; and pedestrian and bike enhancements at Harbor Drive/Camp Pendleton (the latter of which would also be part of the NC Bike Trail, as described in *Section 2.3* of this Final EIR/EIS). Most of the community enhancement features, if implemented, would occur in areas with high minority populations, which tend to have high levels of community cohesion. In addition to the reconfigured interchanges, overpasses, and underpasses (all of which would be constructed with pedestrian and bicycle facilities), the proposed community enhancement features would increase connectivity between neighborhoods and provide citizens with the ability to reach and enjoy community facilities on both sides of the freeway with greater ease. Public monuments, such as the regional gateway feature at Harbor Drive constructed as part of project design, and streetscape enhancements, could potentially instill a sense of pride in nearby communities and enhance community cohesion.

Improved access efficiency to the highways and surface streets would positively impact businesses throughout the City. The project is not expected to have an adverse effect on community character or cohesion. It would not affect uses within recreational facilities and would enhance access within the community, and due to the urban nature of the impact area, the implementation of new project features.

10+4 Buffer

While the 10+4 Buffer alternative would impact slightly less area, the CIA study area for the municipalities remains the same since community cohesion and character are issues that are analyzed at a community-wide scale. The impacts for this alternative are similar to those described in the 10+4 Barrier alternative, except for the community of Carlsbad. This alternative would not affect the 47-unit apartment building in Carlsbad, identified within a cohesive community, and therefore would not result in an adverse effect to community cohesion.

As discussed in *Section 3.4.2*, below, residential units and businesses would be impacted to varying degrees. Economic activity is expected to improve in the area due to improved access efficiency and circulation. Impacts to San Dieguito River Park and San Elijo Lagoon, and minor impacts to Batiquitos, Agua Hedionda, and Buena Vista lagoons, would occur. Parking adjacent to (but not within) Holiday Park would be acquired. Overall, because the project would not affect uses within recreational facilities, and would enhance access within the community, and due to the urban nature of the impact area, the implementation of new project features is not expected to have an adverse effect on community character or cohesion.

8+4 Barrier

The impacts to community character and cohesion for this project alternative are similar to the 10+4 Barrier alternative. This alternative would impact 10 units of the 47-unit apartment building in Barrio Carlsbad. Since there are adequate relocation opportunities in this area, implementation of the project is not expected to have an adverse effect on community character or cohesion.

8+4 Buffer (Preferred Alternative)

The impacts to community character and cohesion for this project alternative are similar to the 10+4 Buffer alternative. The overall right-of-way required for the project is less than that discussed under the 10+4 Buffer alternative, but because community character and cohesion are analyzed at a community scale, the differences in impacts are not discernible. This alternative would not affect the 47-unit apartment building in Carlsbad, identified within a cohesive community, and therefore would not result in an adverse effect to community cohesion.

No Build Alternative

The No Build alternative would not result in construction along the I-5 corridor as proposed in the build alternatives. Existing congestion on this segment of I-5 would further intensify impacts to the community as traffic is forecasted to increase in the coming years. The positive effects to community character and cohesion as a result of the community enhancement features would not be implemented by Caltrans, but could be constructed by others. The No Build alternative would further intensify impacts to the community as traffic is forecasted to increase in the coming years.

3.4.1.4 Avoidance, Minimization, and/or Mitigation Measures

Caltrans is aware of the unique nature of the proposed project with six distinct municipalities, as well as the San Diego County region as a whole, affected by improvements to I-5. To avoid and/or minimize impacts to community character and cohesion, the proposed project has been designed with input from the community. Since 2003, Caltrans has conducted and participated in a number of community outreach meetings with the general public entities, and interested stakeholders in a comprehensive effort to gather input and comments from the surrounding communities.

The following measures would be incorporated into the project design to minimize potential impacts to the community during construction and operation of the proposed project.

- Landscape and streetscape improvements would be provided in affected areas, where possible, and would be consistent with the visual atmosphere, historic architecture, and native vegetation in the area.

- Reconfiguration of interchanges, overcrossings, and undercrossings along the project corridor would improve pedestrian and bicycle facilities, provide linkages, and allow for improvements to public transit. Most notably, project features would serve to improve and facilitate connectivity between communities east and west of I-5 in locations that have been previously bisected by the freeway.

In addition to the measures mentioned above, measures specified in other issue areas of this Final EIR/EIS may also serve to minimize impacts to the community. Such issue areas with additional measures include, but are not limited to noise abatement (*Section 3.15*), traffic and transportation (*Section 3.6*), and visual/aesthetics (*Section 3.7*).

The proposed community enhancement opportunities would expand on the measures mentioned above, and would be implemented only upon agreement with each local agency regarding maintenance in perpetuity.

As discussed throughout this document, ongoing efforts to minimize potential project footprint also are part of the project. The refined 8+4 Buffer alternative has now been identified as the Preferred Alternative. This alternative has the smallest footprint of any evaluated alternative, and would have the least effect on community character and cohesion.

Construction-Related Measures

The following measures would help to minimize impacts to communities during construction activities:

- TMP would be prepared to minimize traffic delays and closures through the use of various traffic handling practices
- Public awareness program would be developed to inform the public of upcoming detours and construction schedules
- Traffic impacts around schools would be noted in the TMP
- Equipment would have sound-control devices to minimize noise, and other specifications to turn off idling equipment and installing temporary acoustic barriers around stationary construction noise sources would be implemented
- Construction equipment and truck staging and maintenance areas would be located as far as feasible and nominally downwind of schools, active recreation areas, and other communities of high-population density
- In the event any hazardous materials are located within the vicinity of any Oceanside Unified School District school, including but not limited to the Oceanside High School, Caltrans shall immediately notify the District and provide an explanation of the remediation measures to address the discovery of any hazardous materials during the construction of the project
- The project would implement Caltrans' Standard Specifications related to temporary dust and emissions, as well as noise control

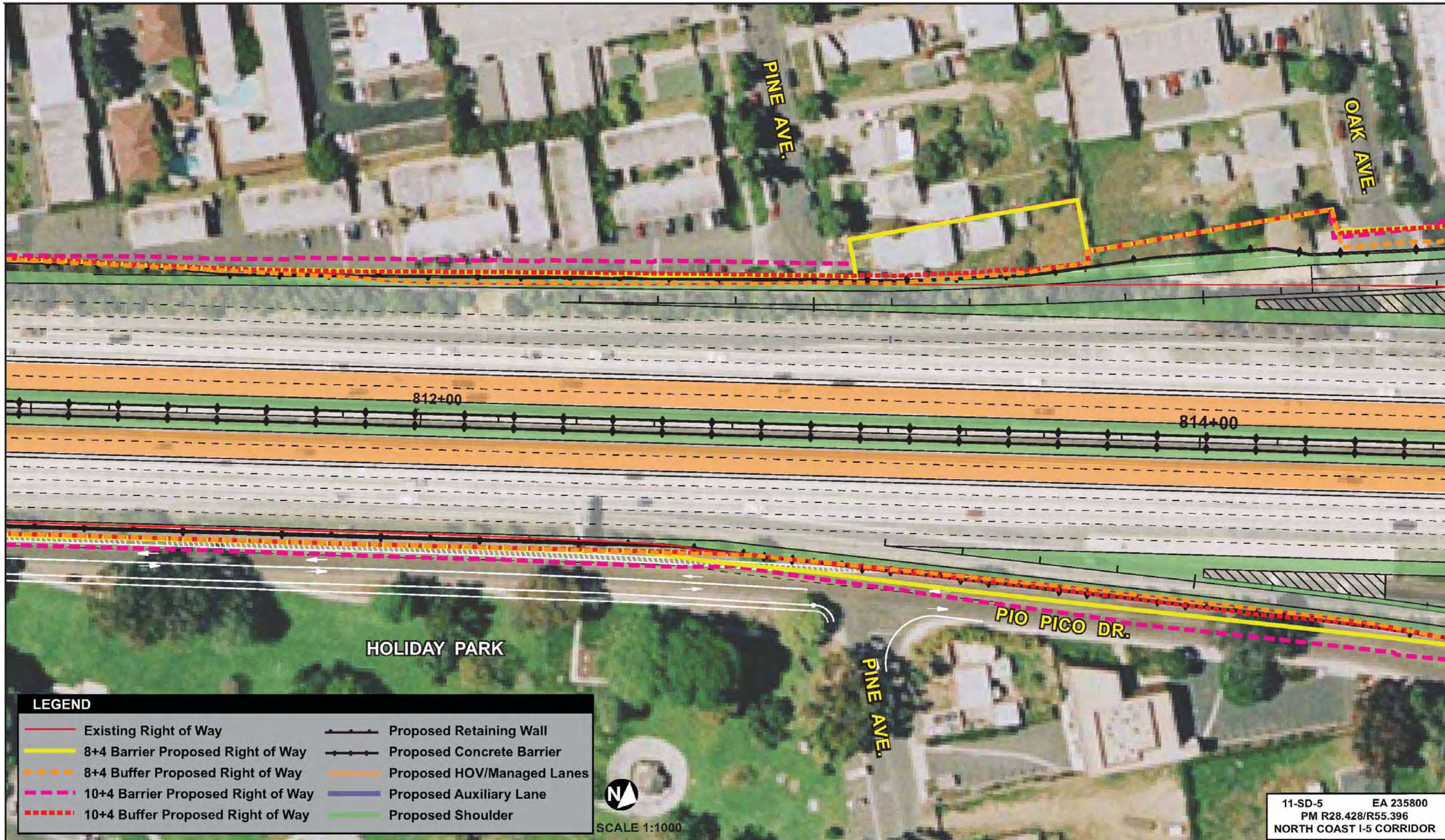


Figure 3-4.1: Build Alternatives Right-of-Way Comparison: South of Carlsbad Village Drive

3.4.2 Relocations and Real Property Acquisition

3.4.2.1 Regulatory Setting

Caltrans' Relocation Assistance Program (RAP) is based on the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and 49 CFR Part 24. The purpose of RAP is to ensure that persons displaced as a result of a transportation project are treated fairly, consistently, and equitably so that such persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole. A summary of the RAP is located in Appendix C.

All relocation services and benefits are administered without regard to race, color, national origin, or sex in compliance with Title VI of the Civil Rights Act (42 USC 2000d et seq.). Please see Appendix B for a copy of Caltrans' Title VI Policy Statement.

3.4.2.2 Affected Environment

This section is based on the project Draft Relocation Impact Report (DRIR) and Final Relocation Impact Study (FRIS 2013), separate technical studies that were prepared for the proposed project and are incorporated by reference. This section also is based upon the CIA, as amended, and Barrio Carlsbad Community Cohesion Report*,* June 2008, also incorporated by reference. The proposed project traverses a highly urbanized portion of northwest San Diego County. The majority of land surrounding the proposed project is considered to be developed with urban uses with a few vacant developable parcels of land remaining in the immediate vicinity of I-5. The proposed project traverses five municipalities, beginning with San Diego at the southern end of the proposed project and ending with Oceanside at the project's northern terminus. However, relocation impacts could only occur in Solana Beach, Encinitas, Carlsbad, and Oceanside. Consequently, a brief discussion of the land uses surrounding the proposed project is provided for these four municipalities.

Land uses in the portion of Solana Beach within the area of direct impacts are mainly a mixture of single-family and multi-family residential developments, as well as commercial, light industrial, office, school, and open space land uses. Residential uses are located throughout the direct impact area with single-family residential developments to the north and south, and multi-family residential developments along Lomas Santa Fe Drive as well as in the southern part of the City. Land uses within Encinitas surrounding the proposed project are residential, commercial, office uses, schools, agricultural land, and open space. Residential is the dominant land use, with each residential area serviced by neighborhood and mixed-use shopping areas, schools, and parks.

Land uses within Carlsbad surrounding the proposed project are primarily a mixture of residential, commercial, industrial, agriculture, and public services. The central portion of Carlsbad, between Agua Hedionda Lagoon and Poinsettia Lane, is composed primarily of open space, industrial, and commercial uses, while the portions of Carlsbad to the north and south of this area primarily feature residential uses. Land uses within Oceanside surrounding the proposed project are primarily a mixture of single-family and multi-family residential areas, as well as general and community commercial centers, open space, and light industrial uses. The majority of the land surrounding the proposed project is developed and urban in nature.

3.4.2.3 Environmental Consequences

As described above, implementation of the four build alternatives could result in displacements in four municipalities: Solana Beach, Encinitas, Carlsbad, and Oceanside. A discussion of the displacements for each project alternative is provided below. These displacements would be in accordance with Title VIII of the Civil Rights Act of 1968, also known as the Fair Housing Act.

10+4 Barrier

Relocation impacts associated with the 10+4 Barrier alternative are shown in *Table 3.4.1*. As described in the DRIR, no impacts to any residential or business properties within the San Diego portion of the alignment and no business relocation impacts would occur in Solana Beach with the 10+4 Barrier alternative. Similarly, no residential or business displacements would occur within Del Mar, as the I-5 alignment does not actually pass through the city limits.

Table 3.4.1: Relocation Associated with the10+4 Barrier Alternative

Relocated Units	Solana Beach	Encinitas	Carlsbad	Oceanside	Total
Single-Family Residence (SFR)	0	2 SFRs	10 SFRs	13 SFRs	25
Duplex/Triplex (Multi-Res)	0	0	1 Triplex (3 units)	1 Duplex and 1 Triplex (5 units)	8
Apartments/Condos (Multi-Res) 4 or more	6	0	47 units	26 units	79
Total Residential Units	6	2	60	44	112
Businesses	0	1	9	3	13

The 10+4 Barrier alternative would result in the displacement of six condominiums in Solana Beach within the Eden Gardens community. Additionally, the 10+4 Barrier alternative would result in the displacement of two single-family residences in Old Encinitas and one commercial business in Leucadia. Adequate relocation opportunities were identified in the DRIR for these residential and business displacements. As discussed in detail in the DRIR, residents and businesses displaced as the result of a given project are potentially eligible to be compensated in accordance with the Uniform Relocation Assistance Act of 1970, as amended.

The 10+4 Barrier alternative would displace 10 single-family homes, a 47-unit apartment complex, and one triplex within Carlsbad, as seen in *Figure 3-4.1*, which shows the differences between the four build alternatives. These residences are located north of Agua Hedionda Lagoon, directly adjacent to the freeway. Adequate relocation opportunities have been determined to exist for the single-family residences and triplex, but there may be some difficulty finding adequate relocation resources for the 47-unit apartment complex. The apartment complex is composed of 47 two-bedroom units, and lies within a cohesive community. With rents estimated at $1,050 a month, it is unlikely that current residents would be able to relocate in Carlsbad and maintain similar rents. The DRIR suggests that Caltrans may need to utilize the State's relocation program or Last Resort Housing (LRH) Program payments to relocate those displaced.

In addition to residential displacements, nine commercial businesses in northern Carlsbad could require relocation as part of the 10+4 Barrier alternative. The DRIR identified adequate relocation opportunities for the majority of these businesses. Residents and businesses displaced as the result of a given project are potentially eligible to be compensated in accordance with the Uniform Relocation Assistance Act of 1970, as amended.

The 10+4 Barrier alternative would displace 13 single-family and 31 multi-family units in Oceanside. Nine of the single-family units are located in South Oceanside, with 3 single-family units and 31 multi-family units located in Townsite, and 1 single-family unit in East Side Capistrano. One of the single-family residential units in South Oceanside displaced by the 10+4 Barrier alternative is an eight-bedroom home. Due to the lack of equivalent housing in the Oceanside area, as described in the DRIR, relocation of this residence could require utilization of the State's relocation program or LRH Program. Adequate relocation opportunities exist for the remaining residences, as identified in the DRIR.

Three businesses in Loma Alta would require relocation within Oceanside. While adequate relocation opportunities exist for two of these sites, it may be difficult to identify an appropriate relocation site for a specialty sports business that focuses on scuba training and currently has an on-site pool. Residents and businesses displaced as the result of a given project are potentially eligible to be compensated in accordance with the Uniform Relocation Assistance Act of 1970, as amended.

Caltrans' RAP and State's relocation program would be implemented to ensure adequate treatment for those directly impacted by the 10+4 Barrier alternative. Therefore, relocation impacts are not anticipated to be adverse.

10+4 Buffer

Relocation impacts associated with the 10+4 Buffer alternative are shown in *Table 3.4.2*. As described in the DRIR, the 10+4 Buffer alternative would not result in any residential or business displacements within the San Diego portion of the alignment and no adverse relocation impacts would occur. Similarly, no residential or business displacements would occur within Del Mar or Solana Beach, and no adverse relocation effects would occur.

Table 3.4.2: Relocation Associated with the10+4 Buffer Alternative

Relocated Units	Solana Beach	Encinitas	Carlsbad	Oceanside	Total
Single-Family Residence (SFR)	0	1 SFR	8 SFRs	13 SFRs	22
Duplex/Triplex (Multi-Res)	0	0	0	1 Duplex and 1 Triplex (5 units)	5
Apartments/Condos (Multi-Res) 4 or more	0	0	0	26 units	26
Total Residential Units	0	1	8	44	53
Businesses	0	0	7	3	10

The 10+4 Buffer alternative would result in the displacement of one single-family residence in Old Encinitas. Adequate relocation opportunities were identified in the DRIR for the residential displacement. As discussed in detail in the DRIR, residents and businesses displaced as the result of a given project are potentially eligible to be compensated in accordance with the Uniform Relocation Assistance Act of 1970, as amended.

The 10+4 Buffer alternative would displace eight single-family residences in Carlsbad. Adequate relocation opportunities have been determined to exist for these single-family residences in the DRIR. The 10+4 Buffer alternative would also displace seven of the nine commercial businesses in northern Carlsbad displaced by the 10+4 Barrier alternative. The DRIR has identified adequate relocation opportunities for the majority of these businesses. It may be difficult to locate an appropriate relocation site for the gas and automotive service station, however, due to the requirement of finding a site that allows those services to occur. Residents and businesses displaced as the result of a given project are potentially eligible to be compensated in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

Relocation impacts within Oceanside would be identical to those identified for the 10+4 Barrier alternative, consisting of 13 single-family residences, 31 multi-family residences, and three businesses. While adequate relocation opportunities exist for the majority of these displacements, it may be difficult to identify an appropriate relocation site for the eight-bedroom home and the specialty sports business that focuses on scuba training, and currently has an on-site pool. Due to the lack of equivalent housing in the Oceanside area, as described in the DRIR, relocation of this residence could require utilization of the State's relocation program or LHR Program. Both residents and businesses displaced as the result of a given project are potentially eligible to be compensated in accordance with the Uniform Relocation Assistance Act of 1970, as amended.

Caltrans' relocation program would be implemented to ensure adequate treatment for those directly impacted by the 10+4 Buffer alternative. Therefore, relocation impacts are not anticipated to be adverse.

8+4 Barrier

Relocation impacts associated with the 8+4 Barrier alternative are shown in *Table 3.4.3*. As described in the DRIR, the 8+4 Barrier alternative would not result in any residential or business displacements within the San Diego portion of the alignment and no adverse relocation impacts would occur. Similarly, no residential or business displacements would occur within Del Mar or Solana Beach, and no adverse relocation effects would occur.

Table 3.4.3: Relocation Associated with the 8+4 Barrier Alternative

Relocated Units	Solana Beach	Encinitas	Carlsbad	Oceanside	Total
Single-Family Residence (SFR)	0	1 SFR	9 SFRs	13 SFRs	23
Duplex/Triplex (Multi-Res)	0	0	1 Triplex (3 units)	1 Duplex and 1 Triplex (5 units)	8
Apartments/Condos (Multi-Res) 4 or more	0	0	10 units	26 units	36
Total Residential Units	0	1	22	44	67
Businesses	0	1	7	3	11

The 8+4 Barrier alternative would result in the displacement of one single-family residence in Old Encinitas and one commercial business in Leucadia. Adequate relocation opportunities were identified in the DRIR for the residential and business displacements. As discussed in detail in the DRIR, residents and businesses displaced as the result of a given project are potentially eligible to be compensated in accordance with the Uniform Relocation Assistance Act of 1970, as amended.

The 8+4 Barrier alternative would also displace the 10 units within a 47-unit apartment complex, a triplex, and 9 single-family residences in Carlsbad. The apartment complex is composed of 47 two-bedroom units, and is within the Barrio Carlsbad community. The DRIR identified that adequate relocation opportunities were available in Barrio Carlsbad for the 10 units of the apartment complex. The DRIR suggests that Caltrans may need to utilize the State's relocation program or LRH Program payments to relocate those displaced.

The 8+4 Barrier alternative also would displace seven of the nine commercial businesses in northern Carlsbad displaced by the 10+4 Barrier alternative. The DRIR has identified adequate relocation opportunities for the majority of these businesses. Residents and businesses displaced as the result of a given project are potentially eligible to be compensated in accordance with the Uniform Relocation Assistance Act of 1970, as amended.

Relocation impacts within Oceanside would be identical to those identified for the 10+4 Barrier alternative, consisting of 13 single-family residences, 31 multi-family residences, and 3 businesses. While adequate relocation opportunities exist for the majority of these displacements, it may be difficult to identify an appropriate relocation site for the eight-bedroom home and the specialty sports business that focuses on scuba training and currently has an on-site pool. Due to the lack of equivalent housing in the Oceanside area, as described in the DRIR, relocation of this residence could require utilization of the State's relocation program or LRH Program. Both residents and businesses displaced as the result of a given project are potentially eligible to be compensated in accordance with the Uniform Relocation Assistance Act of 1970, as amended.

Caltrans' RAP and State's relocation program would be implemented to ensure adequate treatment for those directly impacted by the 8+4 Barrier alternative. Therefore, relocation impacts are not anticipated to be adverse.

8+4 Buffer (Preferred Alternative)

Relocation impacts associated with the 8+4 Buffer alternative and refined 8+4 Buffer alternative are shown in *Tables 3.4.4a and 3.4.4b*. The relocation impacts for the 8+4 Buffer alternative from the Draft EIR/EIS are included here for reference and comparison with the other build alternatives. As described in the FRIS, the refined 8+4 Buffer alternative would not result in any residential or business displacements within the San Diego or Solana Beach portions of the alignment and no adverse relocation impacts would occur.

Table 3.4.4a: DRIS - Relocation Associated with the 8+4 Buffer Alternative

Relocated Units	Solana Beach	Encinitas	Carlsbad	Oceanside	Total
Single-Family Residence (SFR)	0	0	3 SFRs	13 SFRs	16
Duplex/Triplex (Multi-Res)	0	0	1 Triplex (3 units)	1 Duplex and 1 Triplex (5 units)0	8
Apartments/Condos (Multi-Res) 4 or more	0	0	0	26units	26
Total Residential Units	0	0	6	44	50
Businesses	0	0	7	3	10

Table 3.4.4b: FRIS - Relocation Associated with the 8+4 Buffer Alternative (Preferred Alternative)

Relocated Units	Solana Beach	Encinitas	Carlsbad	Oceanside	Total
Single-Family Residence (SFR)	0	2 SFRs	1 SFRs	5 SFRs	8
Duplex/Triplex (Multi-Res)	0	0	0	1 2-unit duplex 0	2
Apartments/Condos (Multi-Res) 4 or more	0	0	0	1 10-unit	10
Total Residential Units	0	2	1	17	20
Businesses	0	0	7	0	7

The 8+4 Buffer alternative identified potential relocations for two single-family residences in Encinitas, one single-family residence in Carlsbad, and five single-family residences in Oceanside. There are also one duplex (2 units) and one apartment/condominium complex (10units) identified for relocation in Oceanside, totaling 12 units. Adequate relocation opportunities were determined to exist for these single-family and multi-family residences. The 8+4 Buffer alternative also would displace seven commercial businesses in Oceanside. The FRIS identified adequate relocation opportunities for the majority of these businesses. Residents and businesses displaced as the result of a given project are potentially eligible to be compensated in accordance with the Uniform Relocation Assistance Act of 1970, as amended. Anticipated property relocations are shown in *Table 3.4.5* for the 8+4 Buffer alternative (Preferred Alternative).

In Oceanside, it may be difficult to identify an appropriate relocation site for an eight-bedroom home (which is more than the average number of bedrooms in a single-family home) and a cocktail lounge (in terms of timing relative to transfer of this specific business license to another location). It is also unknown at this time whether any of the displacees have special needs that might require special handling.

Due to the lack of equivalent housing in the Oceanside area, as described in the FRIS, relocation of this residence could require utilization of the State's relocation program or LRH Program. Both residents and businesses displaced as the result of a given project are potentially eligible to be compensated in accordance with the Uniform Relocation Assistance Act of 1970, as amended. Having sufficient lead time to assist in replacement sites for continuation of business is expected to greatly enhance the efforts to find appropriate replacement sites for these businesses.

Table 3.4.5: Potential Relocations Associated with the 8+4 Buffer Alternative (Preferred Alternative)

Assessor Parcel Number	Land Use
261-210-21	2 Single-Family Residence
204-111-01	Single-Family Residence
203-320-31	Business/Commercial
153-242-28	Single-Family Residence
153-154-24	Single-Family Residence
153-154-26	Single-Family Residence
150-245-11	Multi-Family Residence
150-245-12	Single-Family Residence
150-245-02	Multi-Family Residence
148-064-14	Single-Family Residence

Caltrans' RAP relocation program would be implemented to ensure adequate treatment for those directly impacted by the 8+4 Buffer alternative. Therefore, relocation impacts are not anticipated to be adverse.

3.4.2.4 Avoidance, Minimization, and/or Mitigation Measures

The proposed project has been designed to minimize impacts, where possible, by taking the reduced amounts of right-of-way and limiting the grading footprint in order to minimize impacts to existing structures while still meeting project objectives. The DRIR concluded that adequate relocation resources existed for the majority of displacees. Additionally, displacees that may face difficulty finding suitable relocation resources would be eligible for assistance from Caltrans through the State's relocation program or LRH Program options, including LRH payments.

As discussed throughout this document, ongoing efforts to minimize potential project footprint also are part of the project. The refined 8+4 Buffer alternative is identified as the Preferred Alternative. This alternative has been evaluated in the FRIS. It has the smallest footprint of any evaluated alternative, and would have the least effect on relocations.

3.4.3 Environmental Justice

3.4.3.1 Regulatory Setting

All projects involving a federal action (funding, permit, or land) must comply with EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, signed by President Clinton on February 11, 1994. This EO directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and/or low-income populations to the greatest extent practicable and permitted by law.

All considerations under Title VI of the Civil Rights Act of 1964 and related statutes have also been included in this project. Caltrans' commitment to upholding the mandates of Title VI is evidenced by its Title VI Policy Statement, signed by the Director, which can be found in Appendix B of this document.

Populations are defined as "minority" using U.S. Census racial and ethnic categorizations. Utilizing U.S. Census 2000 data, minority individuals are defined as all persons other than "white, non-Hispanic" in origin.

Persons living with income below poverty are identified as "low-income," utilizing the annual statistical poverty thresholds established by the U.S. Bureau of the Census. The U.S. Bureau of the Census estimated that the nationwide weighted-average poverty level for a family of four in 2006 (the most recent year for which data are available) to be $20,614. Department of Health and Human Services (HHS), which maintains its own, simplified poverty guidelines, estimated the poverty level in 2007 for a family of four in California to be $20,650. For the analysis presented in this document, however, U.S. Bureau of the Census thresholds for 1999 (used for the 2000 tabulation) would be used. The weighted-average poverty threshold for a family of four in California in 1999 was $17,029.[1] In practical terms, it is not likely that low-income population patterns in the study area have shifted dramatically since the 2000 census.

3.4.3.2 Affected Environment

This section is based largely upon the 2007 CIA, as amended, and Barrio Carlsbad Community Cohesion Report, June 2008, in addition to the I-5 North Coast Managed Lanes Value Pricing Study from La Jolla Village Drive to Vandegrift Boulevard, Concept Plan Volumes I and II, April 2006, separate technical studies that were prepared for the proposed project and are incorporated by reference. This analysis of potential Environmental Justice impacts identifies whether minority or low-income populations exist within the area potentially affected by the proposed project. It uses U.S. Census data for the year 2000 and identifies those block groups that have higher proportions of minority and/or low-income populations. A minority and/or low-income population may be present in an area if the proportion of the populations in the area of interest are "meaningfully greater" than that of the general population, or where the proportion exceeds 50 percent of the total population. For the purposes of this analysis, minority and/or low-income populations of individual census block groups (a subunit of a census tract) were compared against the general population of the municipalities as a whole, and the larger region (San Diego County). A meaningfully greater proportion is twice that of the municipality as a whole or the larger region of San Diego County, whichever was less (CEQ's guidance document, Environmental Justice Guidance under the National Environmental Protection Act, December 1997*)*. In either of these cases, these block group minority and/or low-income populations are then considered populations subject to EO 12898. Environmental and community impacts are then analyzed to determine whether those low-income and/or minority populations are disproportionately affected by the proposed project. *Figures 3-4.2* and *3-4.3* illustrate the racial and ethnic composition of potentially affected census block groups within each jurisdiction in the CIA study area, and *Tables 3.4.6* (found at the end of this section)*, 3.4.7,* and *3.4.8,* below, provide a comparison with each jurisdiction as a whole and the County of San Diego.

Minority Populations in the Study Area

City of San Diego

There are a total of 33 block groups in the San Diego portion of the CIA study area, and the proportions of total minority populations ranged from 8.8 percent to 50.4 percent. The entirety of San Diego within the CIA study area has a total minority percentage of 34.1 percent, as shown in *Table 3.4.6*. The block group that had the highest total minority percentages was 83.43.1. While this block group had a minority population percentage only 12 percent higher than the overall total minority percentage for the City of San Diego (45.0 percent), this block group did exhibit a total minority percentage over 50 percent and, therefore, is considered an area of potential Environmental Justice concern. As illustrated in *Figure 3-4.3*, this block group

[1] While the use of the two, more recent, poverty levels may be preferable, their use is not tenable for a number of reasons. First, the application of HHS guidelines to U.S. Bureau of Census data would result in inaccurate numbers of people living in poverty due to the subtle differences in their respective tabulation methodologies. Second, the more recently collected U.S. Bureau of the Census data (i.e., the American Community Survey) are not detailed enough to determine proportions of people living below poverty within the narrowly defined study area; 2000 data are the most comprehensive, most complete, and most customizable dataset available for all six municipalities within the study area and San Diego County. Third, U.S. Bureau of the Census 2000 data are used throughout this report to analyze socioeconomic conditions, and their use in this section creates an internal consistency for the document.

is located east of I-5 and west of Genesee Avenue, along Regents Road. No other populations within San Diego are of concern with respect to Environmental Justice.

Del Mar

As of 2000, the proportions of total minority populations ranged from 7.4 percent to 10.1 percent in census block groups for Del Mar. When taken as a whole, Del Mar had a total minority percentage of 9.1 percent, as summarized in *Table 3.4.6*. There are a total of four block groups within Del Mar, none of which have a meaningfully greater minority population than the population of the City as a whole. Therefore, Del Mar is not considered to contain minority populations within the meaning of this analysis.

Solana Beach

A total of 13 block groups are located in Solana Beach. The proportions of total minority populations ranged from 4.6 percent to 63.0 percent in census block groups within the Solana Beach portion of the CIA study area. The entirety of the CIA study area located in and around Solana Beach had a total minority percentage of 19.9 percent as outlined in *Table 3.4.6*. Those block groups having the highest total minority percentages were 173.04.1 and 173.04.4, at 63.0 and 56.1 percent, respectively. The total minority percentage for Solana Beach is 21.0 percent. As illustrated in *Figure 3-4.3*, 173.04.1 is located adjacent to and west of I-5, between Lomas Santa Fe Drive and Via de la Valle. Block group 173.04.4 is located west of Coast Highway 101, adjacent to the Pacific Coast, and is more than 0.5 mi from I-5. Therefore, two block groups exhibited a total minority percentage meaningfully greater within Solana Beach.

Encinitas

A total of 35 block groups are located in Encinitas. The proportions of total minority populations ranged from 9.6 percent to 57.7 percent within the Encinitas portion of the CIA study area. The entirety of Encinitas within the CIA study area had a total minority percentage of 23.3 percent as shown in *Table 3.4.6*. Block groups having the highest total minority percentages were 174.04.1, 175.02.3, 176.03.2, and 177.01.5. As illustrated in *Figure 3-4.2*, three of these block groups are located adjacent to the proposed project. Two block groups are located both north and south of Lomas Santa Fe Drive. Block group 176.03.2 is located east of I-5, between Leucadia Boulevard to the north and Encinitas Boulevard to the south. Block group 177.01.5 is located less than 0.5 mi west of I-5. Therefore, four block groups exhibited a total minority percentage meaningfully greater within Encinitas.

Carlsbad

Carlsbad contains a total of 25 block groups. The proportions of total minority populations ranged from 6.6 percent to 74.3 percent in census block groups within the Carlsbad portion of the CIA study area. As summarized in *Table 3.4.6*, the entirety of Carlsbad within the CIA study area had a total minority percentage of 23.4 percent. The total minority percentage for Carlsbad is 19.5 percent. As illustrated in *Figure 3-4.2*, these block groups are located adjacent to the proposed project, west of I-5, with Buena Vista Lagoon to the north and Tamarack Avenue to the south. Block groups 179.00.3, 179.00.4, and 179.00.2 are located less than 0.5 mi from I-5. These three block groups exhibit a total minority percentage meaningfully greater within Carlsbad.

Oceanside

The proportions of total minority populations ranged from 17.1 percent to 95.2 percent in census block groups within the Oceanside portion of the CIA study area. As shown in *Table 3.4.6*, the entirety of Oceanside within the CIA study area had a total minority percentage of 53.9 percent.

Of the 36 block groups, 17 were considered to contain meaningfully greater minority populations, including 182.00.1, 182.00.2, 184.00.1, 184.00.2, 184.00.3, 184.00.4, 185.09.1, 185.09.2, 185.09.3, 185.09.4, 185.10.2, 185.11.1, 185.11.4, 186.01.1, 186.03.1, 186.03.2, and 186.03.3. As illustrated in *Figure 3-4.2*, these block groups are generally located on both the west and east sides of the proposed project, from the northern boundary of Oceanside, to Oceanside Boulevard. Block groups 185.09.3, 185.09.4, 185.10.2, 185.11.1, 185.11.4, and 186.03.1 are located more than 0.5 mi from I-5. These 17 block groups exhibit total minority percentages meaningfully greater within Oceanside.

Minority Populations in the Project Area (updated with Census 2010 data)

Census 2010 data have become available since circulation of the Draft EIR/EIS. The analysis using Census 2000 included block group level data; however, due to the new methodology used in Census 2010 (using a substantially smaller sample size), it was determined that 2010 census tract data would provide better accuracy for purposes of this analysis. Census tracts that directly border I-5 were used for the discussion below (a discussion on the City of Del Mar is thus omitted). *Table 3.4.7* provides a comparison with each jurisdiction as a whole and the County of San Diego.

City of San Diego

The City of San Diego census tracts adjacent to this corridor have a minority population ranging from 17.5 to 67.3 percent, compared to 54.9 percent for the City of San Diego itself. Those census tracts having the highest total minority percentages were 83.63, 83.46, 83.41, 83.39, and 83.05 at 67.3, 55.4, 55.3, 54.7, and 58.5 percent, respectively. These tracts show a high Asian population, and may reflect the demographics of the UCSD campus, which is located in the near vicinity. The high (22 percent) Asian population discussed in the Draft EIR/EIS for this study area (which is a subset of these census tracts) is consistent with the Census 2010 data, as shown in *Table 3.4.7*.

Solana Beach

The City of Solana Beach census tracts located adjacent to this corridor have a minority population ranging from 14.3 to 33.2 percent, compared with 22.7 percent itself. The census tract having the highest total minority percentage was 173.04. This census tract is also known as Eden Gardens or La Colonia, a neighborhood that is composed of predominantly Spanish speakers and has a high level of community cohesion because of residents who share language and cultural backgrounds. This is discussed in more detail in *Section 3.4.1.2*. The high (13.6 percent) Hispanic population discussed in the Draft EIR/EIS for this study area (which is a subset of these census tracts) is consistent with the Census 2010 data, as shown in *Table 3.4.7*.

Encinitas

The City of Encinitas census tracts located adjacent to this corridor have a minority population ranging from 13.2 to 41.4 percent, compared to 21.2 percent for the City of Encinitas itself. The census tract having the highest total minority percentage was 175.02. This census tract is Hispanic. The high (17.3 percent) Hispanic population discussed in the Draft EIR/EIS for this study area (which is a subset of these census tracts) is consistent with the Census 2010 data, as shown in *Table 3.4.7*.

Carlsbad

The City of Carlsbad census tracts located adjacent to this corridor have a minority population ranging from 17.1 to 43.1 percent, compared to 17.2 percent for the City of Carlsbad itself. The census tract having the highest total minority percentage was 179.00. This census tract is

Hispanic, and was identified in the Draft EIR/EIS and further analyzed in the Barrio Carlsbad Community Cohesion Report (June 2008). The high (16.0 percent) Hispanic population discussed in the draft environmental document for this study area (which is a subset of these census tracts) is consistent with the Census 2010 data, as shown in *Table 3.4.7*.

Oceanside

The City of Oceanside census tracts located adjacent to this corridor have a minority population ranging from 29.6 to 76.2 percent, compared with 34.8 percent for the City of Oceanside itself. The census tract having the highest total minority percentage was 186.03. This census tract is Hispanic, and was identified in the Draft EIR/EIS. The high (42.0 percent) Hispanic population discussed in the draft environmental document for this study area (which is a subset of these census tracts) is consistent with the Census 2010 data, as shown in *Table 3.4.7*.

Table 3.4.7: Income, Poverty Level, and Minority Information for Project Area (updated with Census 2010 Data)

Geographic Area/Census Tracts (CT)	Median Household Income (2009 current dollars)	% of Individuals below the Poverty Level	% Minority
City of San Diego	**$61,118**	**14.6%**	**54.9%**
CT 83.64	$62,500	25.2%	45.6%
CT 83.63	$55,858	28.9%	67.3%
CT 83.62	$70,132	19.4%	35.2%
CT 83.61	$53,071	55.1%	40.1%
CT 83.46	$133,045	5.0%	55.4%
CT 83.43	$45,317	30.9%	57.6%
CT 83.41	$60,421	35.0%	55.3%
CT 83.39	$73,793	35.3%	54.7%
CT 83.33	$138,225	3.1%	42.3%
CT 83.29	$89,023	16.5%	37.2%
CT 83.27	$115,823	5.6%	30.5%
CT 83.24	$140,046	2.8%	17.5%
CT 83.13	$121,057	1.5%	21.7%
CT 83.12	$142,553	5.2%	18.2%
CT 83.05	$37,759	32.5%	58.5%
City of Solana Beach	**$91,139**	**7.7%**	**22.7%**
CT 173.06	$126,364	1.9%	14.3%
CT 173.05	$94,472	2.6%	14.4%
CT 173.04	$70,139	9.3%	33.2%
CT 173.03	$119,462	11.5%	15.3%
City of Encinitas	**$84,894**	**8.7%**	21.2%
CT 177.01	$79,830	14.0%	24.2%
CT 176.03	$89,980	12.8%	27.9%
CT 176.01	$97,586	7.9%	13.2%
CT 175.02	$67,005	9.2%	41.4%
CT 175.01	$71,925	5.6%	14.3%
CT 174.04	$86,120	6.0%	23.2%
CT 174.01	$88,000	8.5%	14.1%

Table 3.4.7 (cont.): Income, Poverty Level, and Minority Information for Project Area (updated with Census 2010 Data)

Geographic Area/Census Tracts (CT)	Median Household Income (2009 current dollars)	% of Individuals below the Poverty Level	% Minority
City of Carlsbad	**$79,303**	**8.4%**	**17.2%**
CT 179.00	$46,408	19.4%	43.1%
CT 178.13	$88,147	4.9%	17.1%
CT 178.11	$84,970	3.8%	22.3%
CT 178.10	$81,537	7.1%	19.2%
CT 178.09	$78,672	18.6%	21.4%
CT 178.08	$112,866	3.4%	18.2%
CT 178.01	$61,987	6.5%	23.9%
City of Oceanside	**$62,958**	**10.9%**	**34.8%**
CT 186.03	$45,701	15.1%	76.2%
CT 186.01	$85,311	4.5%	46.9%
CT 185.09	$40,263	27.0%	71.4%
CT 185.04	$79,600	11.1%	32.6%
CT 184.00	$40,841	11.4%	51.3%
CT 182.00	$36,618	29.1%	63.3%
CT 181.00	$66,277	9.8%	29.6%
County of San Diego	**$44,772**	**13.0%**	**35.9%**

Low-Income Populations in the Study Area

Table 3.4.8 illustrates economic indicators including the median household income, per capita income, and proportion of individuals living below the poverty threshold within the CIA study area of San Diego, the City of San Diego, and San Diego County in 1999.

City of San Diego

The proportions of people living in poverty ranged from 0.0 percent to 40.4 percent in census block groups within the CIA study area for the City of San Diego. The entirety of San Diego within the CIA study area had a proportion of individuals living in poverty of 10.9 percent. Of the 33 block groups in San Diego, 3 had a meaningfully greater number of individuals living below the poverty level, including 83.39.1, 83.41.1, and 83.43.2. The total minority percentage for the City of San Diego County is 12.4 percent. As illustrated in *Figure 3-4.3*, block group 83.39.1 encompasses a large area and contains within it much of the land adjacent to I-805 and I-5 to the west, from Carmel Valley to Miramar Road. Block group 83.41.1 is located at the southeast corner of the intersection of I-5 and La Jolla Village Drive. Block group 83.43.2 is located west of Genesee Avenue at the extreme southern end of the CIA study area and is more than 0.5 mi from I-5. It should be noted that block groups 83.15.5 and 83.15.6 both also demonstrated large proportions of people living in poverty; however, they are not considered meaningfully greater. Therefore, a total of three block groups exhibit meaningfully greater populations living in poverty within San Diego.

Table 3.4.8: Study Area Population Below the Poverty Level (1999)

Geographic Area/ Block Group	Median Household Income	Per Capita Income	Percent Below Poverty Line	Number Below Poverty Line	Total Population
Study Area within San Diego	$28,821 - $130,539	$7,046 - $78,142	10.9%	7,539	69,232
City of San Diego	$45,733	$23,609	14.6%	172,527	1,181,612
Study Area within Del Mar	$77,174 - $102,426	$36,660 - $90,243	8.7%	383	4,389
City of Del Mar	$81,001	$62,425	8.7%	383	4,389
Study Area within Solana Beach	$31,250 - $189,629	$20,577 - $76,182	6.4%	916	14,353
City of Solana Beach	$71,774	$48,547	6.7%	856	12,793
Study Area within Encinitas	$31,675 - $101,476	$13,470 - $53,113	9.0%	3,805	42,352
City of Encinitas	$63,954	$34,336	7.3%	4,220	57,590
Study Area within Carlsbad	$24,569 - $128,197	$11,082 - $79,743	7.3%	2,972	40,989
City of Carlsbad	$65,145	$34,863	5.9%	4,576	77,217
Study Area within Oceanside	$15,159 - $77,307	$8,117 - $40,875	19.3%	9,707	50,182
City of Oceanside	$46,301	$20,329	11.6%	18,492	159,599
San Diego County	$47,067	$22,926	12.4%	338,399	2,722,408

Source: U.S. Bureau of the Census 2000

Del Mar

The proportions of individuals living in poverty ranged from 1.2 percent to 13.1 percent in census block groups for Del Mar. When taken as a whole, Del Mar had a proportion of individuals living in poverty of 8.7 percent. Of the four block groups in Del Mar, none had a meaningfully greater proportion of people living in poverty than the general population of the City as a whole. Therefore, the CIA study area within Del Mar and the City of Del Mar are not considered to contain any low-income populations within the meaning of this analysis.

Solana Beach

The proportions of individuals who were living in poverty ranged from 1.3 percent to 27.9 percent in census block groups for Solana Beach. The entirety of Solana Beach, including the neighboring block group largely located in San Diego County, had a proportion of people living in poverty of 6.4 percent.

Of the 13 block groups in Solana Beach, those having the highest proportions of people living below the poverty level were 173.04.1 and 173.04.4. As illustrated in *Figure 3-4.3*, block group 173.04.1 is located adjacent to the west side of I-5, with Lomas Santa Fe Drive forming the northern border, and Via de la Valle to the south. Block group 173.04.4 is located west of Coast Highway 101 and south of Lomas Santa Fe Drive. These two block groups exhibit meaningfully greater populations living below poverty levels compared to Solana Beach as a whole.

Encinitas

The proportions of individuals living in poverty range from 0.0 percent to 27.2 percent in census block groups for Encinitas. The entirety of Encinitas within the CIA study area had a proportion of individuals living below poverty of 9.0 percent. Of the 35 block groups in Encinitas, 175.01.1, 175.02.3, 177.01.3, and 177.01.4 exhibited percentages over twice as high as the proportion for the City of Encinitas (7.3 percent). As illustrated in *Figure 3-4.2*, three of these four block groups are not adjacent to the proposed project and are located more than 0.5 mi west of I-5. Of these, block groups 175.01.1 and 177.01.4 are along the coast, generally west of Vulcan Avenue. Only block group 175.02.3 is adjacent to the proposed project, located at the northeast corner of the Santa Fe Drive entrance to I-5. These four block groups exhibit meaningfully greater populations living below poverty levels within Encinitas when compared with the City as a whole.

Carlsbad

The proportions of individuals living in poverty range from 0.7 percent to 40.2 percent in census block groups for Carlsbad. The entirety of Carlsbad within the CIA study area had a proportion of individuals living below poverty of 7.3 percent. Those block groups having the highest proportions of individuals living below the poverty threshold were 179.00.2, 179.00.3, and 180.00.2. These block groups exhibited percentages over twice as high as the proportion for the City of Carlsbad (5.9 percent). As illustrated in *Figure 3-4.2*, the three block groups that exhibited high proportions are located in the northern portion of Carlsbad. Two block groups, 179.00.2 and 179.00.3, are located adjacent to the proposed project to the west, on either side of Carlsbad Village Drive. The third block group, 180.00.2, is located directly east of Carlsbad Boulevard and directly south of Carlsbad Village Drive.

These three block groups exhibit meaningfully greater populations living in poverty within Carlsbad when compared to the City as a whole are considered to be of potential Environmental Justice concern if impacted.

Oceanside

The Oceanside study area showed 19.3 percent of the population lived below the poverty level. Those block groups with the highest proportions of individuals were 182.00.1, 182.00.2, 182.00.4, 182.00.5, 184.00.1, 184.00.4, 185.09.1, 186.03.2, and 186.03.3. These block groups are largely concentrated in the northern part of Oceanside, bounded by the San Luis Rey River and Oceanside Boulevard. As illustrated in *Figure 3-4.2,* seven of the block groups are directly adjacent to the proposed project. Two block groups are located farther to the west, near Coast Highway 101. It should be noted, however, that block group 185.11.1 has a relatively large proportion of individuals living in poverty (22 percent) when compared with other block groups. Therefore, nine block groups exhibited meaningfully greater populations living below poverty levels within Oceanside.

Low Income Populations in the Project Area (updated with Census 2010 data)

Census 2010 data have become available since the circulation of the Draft EIR/EIS. The analysis using Census 2000 included block group level data; however, due to the new methodology used in Census 2010 (using a substantially smaller sample size), it was determined that 2010 census tract data would provide better accuracy for purposes of this analysis. Census tracts that directly border I-5 were used for the discussion below (a discussion on the City of Del Mar is thus omitted). Data for this section were derived from the U.S. Census Bureau's American Community Survey, for the year 2011. *Table 3.4.7* provides a comparison with each jurisdiction as a whole and the County of San Diego.

Table 3.4.7 illustrates economic indicators including the median household income and proportion of individuals living below the poverty threshold within census tracts that directly border I-5: the Cities of Oceanside, Carlsbad, Encinitas, Solana Beach, and San Diego, as well as San Diego County.

City of San Diego

The proportions of people living in poverty ranged from 1.5 to 55.1 percent in census tracts adjacent to I-5. Of the 15 census tracts analyzed in San Diego, 7 had a meaningfully greater number of individuals living below the poverty level, including 83.64, 83.63, 83.61, 83.43, 83.41, 83.39, and 83.05 with poverty levels of 25.2, 28.9, 55.1, 30.9, 35.0, 35.3, and 32.5 percent, respectively. This is compared with the total percentage of individuals living in poverty for the City of San Diego (14.6 percent) and the San Diego region (13.0 percent).

Solana Beach

The proportions of individuals who were living in poverty ranged from 1.9 to 11.5 percent. Of the four census tracts analyzed in Solana Beach, those having the highest proportions of people living below the poverty level were 173.03 and 173.04, with poverty levels of 11.5 percent and 9.3 percent, compared with Solana Beach as a whole, which has 7.7 percent of individuals living in poverty.

Encinitas

The proportions of individuals living in poverty ranged from 5.6 to 14.0 percent. Of the seven census tracts analyzed in Encinitas, 177.01, 176.03, and 175.02 exhibited percentages higher (at 14.0, 12.8, and 9.2 percent, respectively) than the overall proportion for the City of Encinitas (8.7 percent).

Carlsbad

The proportions of individuals living in poverty ranged from 3.4 to 19.4 percent. The census tract having the highest proportion of individuals living below the poverty threshold was 179.00. At 19.4 percent, this tract exhibited a percentage twice as high as the proportion for the City of Carlsbad (8.4 percent). Census Tract 179.00 is located west of, and adjacent to, the proposed project, on the south side of Carlsbad Village Drive. It exhibits a meaningfully greater population living in poverty within Carlsbad when compared with the City as a whole and is considered to be of potential Environmental Justice concern if impacted.

Oceanside

The proportions of individuals living in poverty ranged from 4.5 to 29.1 percent. Those census tracts with the highest proportions of individuals were 185.09 and 182.00. These census tracts are largely concentrated in the northern part of Oceanside, bounded by the San Luis Rey River and Oceanside Boulevard. It should be noted, however, that these census tracts have a relatively large proportion of individuals living in poverty when compared with the City of Oceanside as a whole (10.9 percent).

Minority and/or Low Income Populations in the Study Area

While Environmental Justice does not specifically call for the analysis of block groups that share both high proportions of minorities in addition to a high percentage of people living in poverty (the presence of one or the other is sufficient to be included in analysis), the inclusion of a short description can help identify particularly sensitive neighborhoods and areas.

There are several locations in the CIA study area that contain both meaningfully greater minority and low-income populations. Meaningfully greater minority and/or low-income populations are both present in 12 block groups within the project study area. As illustrated in *Figures 3-4.2* and *3-4.3*, all but one of these block groups are directly adjacent to the proposed project, with the majority of block groups present in the northern part of Oceanside. San Diego has no block groups that have both a high proportion of total minorities and individuals living in poverty within them, while Solana Beach, Encinitas, and Carlsbad have two, one, and two block groups, respectively, within their boundaries that have meaningfully greater low-income and/or minority populations within both analytical categories. Seven block groups in Oceanside have both a high proportion of total minorities and individuals living in poverty, generally located north of Oceanside Boulevard adjacent to the freeway.

The Census Bureau's Fact Finder Estimates for 2011 show a total of 11 census tracts adjacent to I-5 that have meaningfully greater minority and/or low-income populations. San Diego has three census tracts that have both a high proportion of total minorities and individuals living in poverty within them, while Solana Beach, Encinitas, and Carlsbad have one, three, and one, respectively. Three census tracts within Oceanside have both a high proportion of total minorities and individuals living in poverty.

3.4.3.3 Environmental Consequences

As discussed throughout the document, the proposed project would increase capacity and improve or maintain traffic flow through five municipalities. Interchanges, overcrossings, and undercrossings along the I-5 North Coast Corridor would be reconfigured and renovated in most cases to allow for improved vehicular flow. A number of community enhancement features, if implemented, would create and/or improve pedestrian or bicycle corridors, connect pedestrian or bicycle routes with public transit centers, enhance connectivity across I-5, and create trailheads and other recreational opportunities. The proposed HOV/Managed Lanes project would have adverse visual impacts as described in *Section 3.7.* These impacts are not localized, but occur throughout the project corridor.

In total, there are 12 block groups that have populations of meaningfully greater populations of minority and/or low-income individuals, based on the 2000 census data. The project design for the proposed alternatives reflects the minimum amount of roadway along the existing I-5 alignment required to meet the purpose and need of the project. While every effort was taken to minimize the incursion and displacement of residents, impacts would disproportionately affect a minority population in the project area under the 10+4 Barrier alternative. The impacts associated with construction and operation of the proposed project are generally not isolated to communities or areas with minority and/or low-income populations and are present along the entirety of the proposed project through communities and areas that exhibit a wide demographic range. Potential temporary construction-related impacts to public transportation facilities would be minimized through the implementation of a TMP and are not considered measurably worse in areas with low-income and/or minority populations, nor are these impacts expected to be experienced to a greater degree by minority populations and/or low-income populations.

Operational impacts also are generally not expected to be experienced to a greater degree by minority and/or low-income populations. Additionally, impacts related to the construction and operation of the proposed project within areas with minority and/or low-income populations do not have a magnifying effect on conditions already present in those communities.

The proposed project would have some beneficial effects, particularly as it encompasses a range of community enhancement features that if implemented would create more efficient connections between neighborhoods both east and west of I-5, and provide greater access to recreational areas. As described above, impacts associated with the project would also affect communities along the corridor in similar ways and is generally not anticipated to disproportionately impact low-income and/or minority populations. However, specific encroachments required through right-of-way expansion along the corridor may affect isolated low-income and/or minority populations. Specific differences between each of the alternatives are described below.

Value Pricing

As discussed in *Chapter 2, Project Alternatives*, this project proposes a Value Pricing Program, where excess capacity in the Managed Lanes would be sold to SOVs, allowing SOVs to use the lanes for all build alternatives. The Value Pricing program would implement tolls for SOV users. This proposed program was assessed for potential environmental justice impacts. In April 2006, an I-5 Managed Lanes Value Pricing Study was prepared. This planning study was one of various parallel investigations involving an examination of the environmental, design, and traffic benefits and impacts associated with the proposed project, which is partially funded under the countywide TransNet transportation program. Goals and objectives associated with this project include the ability to manage some of the added roadway capacity along I-5 to ensure that mobility to all stakeholders can be assured. Based on regional and State transportation policies, use of the Managed Lanes is given highest priority to transit and other HOVs (vanpools and carpools) so as to promote moving more people in fewer vehicles. However, much if not all of this project would have available capacity for all potential users, at least during its early years of operation. To accommodate these users, value pricing is being considered as a means of managing demand so as to allow all potential stakeholders to equitability benefit.

Tolling as a traffic management tool is considered in conjunction with access controls and eligibility to achieve real-time demand management of the HOV/Managed Lanes during varying operating conditions. Access would be restricted to designated locations, including openings to adjacent general purpose freeway lanes and DARs connecting to transit facilities and local streets. In keeping with regional policy that requires maintenance of a high level of service on HOV and Managed Lanes in San Diego, there would be a requirement to maintain this high level of service, defined as Level of Service (LOS) C or better, at all times. This equates to about 1,650 vehicles per lane per hour, or 1,300 vehicles per hour directionally. Regionally, HOVs carrying two or more persons are allowed free use of Managed Lanes.

The goal from the I-5 North Coast Managed Lanes Value Pricing Study Community Outreach Program was to accurately gauge public reactions to and support for a variety of value pricing and lane management options under consideration on I-5 north of the City of San Diego. The importance of understanding early in the planning process what design, pricing, and operations elements were favorably and unfavorably received by the public ultimately helped to shape the final recommendation of the study. This included four distinct methods for gathering and gauging public opinion:

- Stakeholder Interviews, November and December 2004
- Focus Groups, Set #1 November 2004 and Set # 2 May 2005
- Intercept Interviews, February 2005
- Telephone Surveys, February 2005

Stakeholder Interviews documented key leader attitudes and opinions about the value-pricing component of the project. Topics covered in the interviews included:

- Current traffic conditions on I-5
- Experience with, and attitudes about, I-15 Express Lanes
- Operational issues associated with Managed Lanes on the I-5 Corridor
- Willingness to pay for Managed Lanes
- Use of toll revenues
- Pros and cons regarding pricing strategies proposed for I-5
- Environmental and fairness concerns
- Ideas for other public outreach and market research

The Stakeholder Interviews most frequently identified the following benefits of the project:

- Managed Lanes with value pricing would provide an effective new alternative for moving people on I-5, and decrease travel time for transit and HOV users
- New capacity would ease burdens on the main lanes, including trucks, which may be excluded from the lanes themselves
- Project would marginally reduce air pollution
- The lanes would preserve right-of-way for future high-capacity transit
- Project would improve quality of life by providing people with dependable trip times
- The lanes would maximize corridor capacity

Focus group participants were selected to balance age, gender, and employment levels, and screened for those who used I-5 three or more days per week; the first group of participants appeared to be more likely to commute longer distances to work on a daily basis. The second group had a higher proportion of participants that worked at home or close to their home, and used the freeway for shorter distance trips. Initial reactions to the project were mixed in both groups. Some felt that the addition of Managed Lanes to I-5 was a positive proposal, while others felt the project was not fair or the best use of space or funds. The focus groups identified the following:

- There was no clear preference voiced by either group for direct access ramps or slip access and egress points. A wide range of perspectives was provided, but it appears that in general, focus group participants currently do not have enough information to have a strong preference for either one. Some think that DARs are safer and easier because they do not require crossing lanes. Others think that slip access ramps are safer and easier because they could be more frequent, and there is less of an issue about getting up to speed to enter the Managed Lanes. Participants generally felt that DARs did not justify traveling further or paying a higher toll. The results from this discussion favor providing DARs at the heaviest volume intersections and slip access in-between at lower volume access/egress points.

- For shorter distance travelers, there was no clear preference for fixed or variable tolls. However, a majority of the longer distance travelers in the second group preferred variable tolling, and appeared to be more in touch with the concept of using tolls to maintain free flow conditions in the Managed Lanes.

- Both groups agreed that the toll price and method of calculation must be clear enough for travelers to easily understand it and for people to feel comfortable using the lanes.

Participants also recommended posting the time savings that would be achieved if they used the Managed Lanes.

- The groups generally agreed that free or drastically reduced tolls are necessary to effectively motivate the formation of carpools and vanpools. Focus group participants generally are against raising the number of carpool occupants from two to three, saying that establishing a carpool is already difficult. Participants in both focus groups mentioned concerns about fairness and affordability of the toll lanes to all freeway users. The project is more likely to be positively received if it is presented as HOV lanes that would be available to SOVs that are willing to pay, so that the new lanes would be used to maximize capacity while maintaining free flow conditions.

- The way the toll is communicated also could be presented as being reduced when lanes are not at full capacity, rather than increased as needed to maintain free flow conditions. This focuses on the positive aspect of reducing costs when possible, rather than the negative aspect of increasing costs to reduce demand for the Managed Lanes.

- The participants that are long-distance travelers appear to better understand and support the concept of congestion-based variable tolling. They are likely to both support and be heavier users of the system. The short-distance travelers (which appear to be at least half of all I-5 users) are not as likely to see a clear benefit for the new facility. Clear communications that show how the facility is designed to encourage car/vanpooling (and even Coaster and express bus service), and to pull as much traffic as possible off of the general purpose lanes would generate a more positive perspective among this large constituency. The difference in group composition may have been a factor in the differences in discussion between the two groups. Some participants in both focus groups mentioned concerns about fairness and affordability of the toll lanes to all freeway users.

The intercept surveys were conducted onboard the Coaster, express bus service, and at park and ride lots to capture alternative mode commuters. Thirty-four of the intercept survey respondents believe that a fee schedule set by time of day would encourage carpooling, while only 26 percent believe varying fees by traffic conditions would encourage carpooling. A fee schedule set by time of day would encourage transit usage, according to 39 percent of the respondents, while 26 percent of respondents believe fees that vary with traffic conditions would encourage transit usage.

In the telephone surveys, 52 percent of the respondents feel that variable tolling is not an equitable way to control congestion. However, 56 percent of respondents feel that fixed tolls are fair and equitable. Non-Caucasians are more likely to support the proposed project and are more in support of a fixed-versus-variable toll than the average. Although low-income respondents are somewhat more likely than general users to support the express lane project, they are more supportive of using closures rather than raising tolls to control flow. They are also more likely to say only general purpose lanes should be built.

Based on the above study findings regarding proposed HOV/Managed Lanes with the inclusion of the value pricing program; the surveys indicate that the project would not cause disproportionately high and adverse effects on any minority and/or low-income populations as discussed in EO 12898. In addition, the travel time resulting from the build alternatives would be beneficial to users of both managed and general purpose lanes.

10+4 Barrier

The 10+4 Barrier alternative would result in the displacement of six residential units in a Solana Beach neighborhood that is composed in part of block groups containing populations of Environmental Justice concern (both minority populations and low-income populations). The residential units in question are condominiums within a single gated complex located adjacent to the southbound (western) side of I-5. According to the DRIR, ample relocation properties for these displaced residences are available within the immediate area and within the same neighborhood as the displaced residences themselves. While no demographic or economic information is available for the specific individuals or families occupying the relevant units, these residences are not designated as affordable housing (and are valued above the median value for individual housing in San Diego County as a whole), so it is not likely that these residences serve low-income populations. Therefore, given the availability of relocation properties within the same neighborhood (such that it should be possible to find housing in a demographically similar area, if desired) and the apparent lack of confounding variables such as affordable housing designation, impacts related to these residential displacements are not likely to be disproportionately high to either minority and/or low-income populations.

There is one instance along the I-5 North Coast Corridor where a disproportionate impact may occur to both minority populations and low-income populations. This population is located in a 47-unit apartment complex within block group 179.00.3, located in Carlsbad, south of Carlsbad Village Drive and adjacent to southbound I-5. This block group was among the block groups described previously as having the highest proportions of individuals living below the poverty threshold. Rent for each two-bedroom unit is approximately $1,050 per month, which is a relatively low rate for a coastal community such as Carlsbad. The DRIR states that the availability of apartments within Carlsbad with similar rental rates may not be adequate to relocate 47 two-bedroom apartments, and that it may be necessary to utilize the State's relocation program or LRH Program payments to relocate those displaced (Caltrans 2007a). It is, therefore, highly likely that those people living in this apartment complex, many of whom are likely members of either a minority and/or low-income population, would not be able to relocate within the immediate area. This apartment complex is the only large multi-family residential parcel displaced by the proposed project in any city, or in any demographic or income range.

As discussed in *Section 3.4.1, Community Character and Cohesion*, the community within which the apartment complex that would be displaced by the 10+4 Barrier alternative is located also has a high proportion of Spanish-speaking households, which can be an identifying trait of an area with high community cohesion. This complex lies within the cohesive community of Barrio Carlsbad. The potential loss of up to 47 families from the community may have a substantial effect on community cohesion in that area. Operational impacts associated with relocations and community cohesion may be considered to be disproportionately high for this block group. Disproportionate impacts associated with the displacement of these residences could also affect travel patterns and accessibility for those who both live and work in this community and rely on public transportation or walk to work. Additionally, residents could experience an increase in rent and other cost of living expenses associated with relocation outside of the community.

Based upon this analysis, there is no indication that either the construction or operation of the proposed project would result in disproportionately high and adverse impacts to either minority populations and/or low-income populations relative to the general population of the CIA study area and surrounding region for the vast majority of the alignment. However, the displacement of a 47-unit apartment complex in Carlsbad associated with 10+4 Barrier alternative in an area with greater proportions of minorities and individuals living in poverty would be considered a disproportionate impact and would be subject to the provisions of EO 12898.

10+4 Buffer

The 10+4 Buffer alternative design would avoid impacts to the 47-unit apartment building in Barrio Carlsbad. Generalized impacts along the remainder of the corridor would be similar to those described above and would not result in an adverse Environmental Justice impact. No minority and/or low-income populations that would be adversely affected by this alternative have been identified, as determined above. Therefore, this alternative would not cause disproportionate adverse impacts to minority and/or low-income populations within the meaning of EO 12898.

8+4 Barrier

The 8+4 Barrier alternative would impact 10 units of the 47-unit apartment complex in Barrio Carlsbad identified as a low-income and minority population. Generalized corridor impacts would remain similar to those discussed under the 10+4 Barrier alternative described above and would not be considered a disproportionate Environmental Justice impact. Therefore, this alternative would not cause disproportionate adverse impacts to minority and/or low-income populations within the meaning of EO 12898.

8+4 Buffer (Preferred Alternative)

The refined 8+4 Buffer alternative design would avoid impacts to the 47-unit apartment building in Barrio Carlsbad, identified as a low-income and minority population. Generalized impacts along the remainder of the corridor would be similar to those described above, and would not result in a disproportionate impact. No minority and/or low-income populations that would be adversely affected by this alternative have been identified, as determined above. Therefore, this alternative would not cause disproportionate adverse impacts to minority and/or low-income populations within the meaning of EO 12898.

No Build Alternative

Under the No Build alternative, the proposed improvements to I-5 would not occur. As such, there would be no activities that would disproportionately affect minority and/or low-income populations. In addition, no minority and/or low-income populations have been identified that would be disproportionately impacted.

3.4.3.4 Avoidance, Minimization, and/or Mitigation Measures

The 10+4 Barrier alternative would require the relocation of low-income and/or minority populations residing in the 47-unit apartment complex in Barrio Carlsbad. This may create a disproportionate impact to this community, which may not be fully mitigable.

Implementation of the 10+4 Buffer alternative would avoid impacts to the low-income and/or minority populations associated with the 47-unit apartment complex. No disproportionate impacts would occur; therefore, no mitigation would be required.

Implementation of the 8+4 Barrier alternative would impact 10 units of the 47-unit apartment complex in Barrio Carlsbad. The DRIR prepared in support of the Draft EIR/EIS identified adequate relocation housing in this area and residents displaced as the result of a given project are potentially eligible to be compensated in accordance with the Uniform Relocation Assistance Act of 1970, as amended.

The Preferred Alternative is the refined 8+4 Buffer alternative, which would avoid impacts to the low-income and/or minority populations associated with the 47-unit apartment complex, as described above. This alternative has the smallest footprint of the evaluated build alternatives. No additional minimization or mitigation for this low-income and/or minority population would be required.

Table 3.4.6: Study Area Race, Ethnicity, and Proportion of Total Minority

Geographic Area/ Block Group	White	Black/African American	American Indian and Alaskan Native	Asian	Native Hawaiian/ Pacific Islander	Some Other Race	Two or More Races	Hispanic	Total Minority
Study Area within San Diego	69.9% (52,873)	1.4% (1,056)	0.2% (181)	22.1% (16,724)	0.2% (127)	2.3% (1,763)	3.8% (2,885)	6.8% (5,151)	34.1% (25,800)
City of San Diego	60.2% (736,207)	7.9% (96,216)	0.6% (7,543)	13.6% (166,968)	0.5% (5,853)	12.4% (151,532)	4.8% (59,081)	25.4% (310,752)	50.6% (619,508)
Study Area within Del Mar	94.1% (4,132)	0.3% (11)	0.3% (15)	2.9% (126)	0.1%(5)	0.6% (25)	1.7% (75)	3.9% (170)	9.1% (399)
City of Del Mar	94.1% (4,132)	0.3% (11)	0.3% (15)	2.9% (126)	0.1%(5)	0.6% (25)	1.7% (75)	3.9% (170)	9.1% (399)
Study Area within Solana Beach	87.6% (12,740)	0.5% (79)	0.4% (54)	3.6% (524)	0.1% (19)	5.0% (734)	2.7% (396)	13.6% (1,981)	19.9% (2,899)
City of Solana Beach	87.0% (11,293)	0.5% (65)	0.4% (54)	3.5% (449)	0.1% (18)	5.6% (725)	2.9% (375)	14.8% (1,922)	21.0% (2,729)
Study Area within Encinitas	85.2% (36,511)	0.6% (271)	0.5% (202)	2.9% (1,244)	0.1% (64)	7.7% (3,300)	2.9% (1,251)	17.3% (7,432)	23.3% (9,995)
City of Encinitas	86.6% (50,241)	0.6% (340)	0.5% (267)	3.1% (1,798)	0.1% (69)	6.3% (3,645)	2.9% (1,654)	14.8% (8,584)	21.0% (12,162)
Study Area within Carlsbad	84.3% (35,142)	0.9% (376)	0.5% (207)	3.9% (1,646)	0.2% (87)	7.0% (2,907)	3.2% (1,316)	16.0% (6,672)	23.4% (9,746)
City of Carlsbad	86.6% (67,723)	1.0% (753)	0.4% (329)	4.2% (3,315)	0.2% (155)	4.6% (3,636)	3.0% (2,336)	11.7% (9,170)	19.5% (15,234)
Study Area within Oceanside	64.0% (32,472)	5.0% (2,563)	1.2% (622)	3.2% (1,600)	1.0% (510)	20.4% (10,376)	5.2% (2,629)	42.0% (21,330)	53.9% (27,391)
City of Oceanside	66.4% (106,866)	6.3% (10,189)	0.9% (1,370)	5.5% (8,896)	1.3% (2,042)	14.5% (23,342)	5.2% (8,324)	30.2% (48,691)	46.4% (74,719)
San Diego County	66.5% (1,871,839)	5.7% (161,480)	0.9% (24,337)	8.9% (249,802)	0.5% (13,561)	12.8% (360,847)	4.7% (131,967)	26.7% (750,965)	45.0% (1,265,000)

The percentages for race may not equal 100% because individuals may report more than one race.
Source: U.S. Bureau of the Census 2000

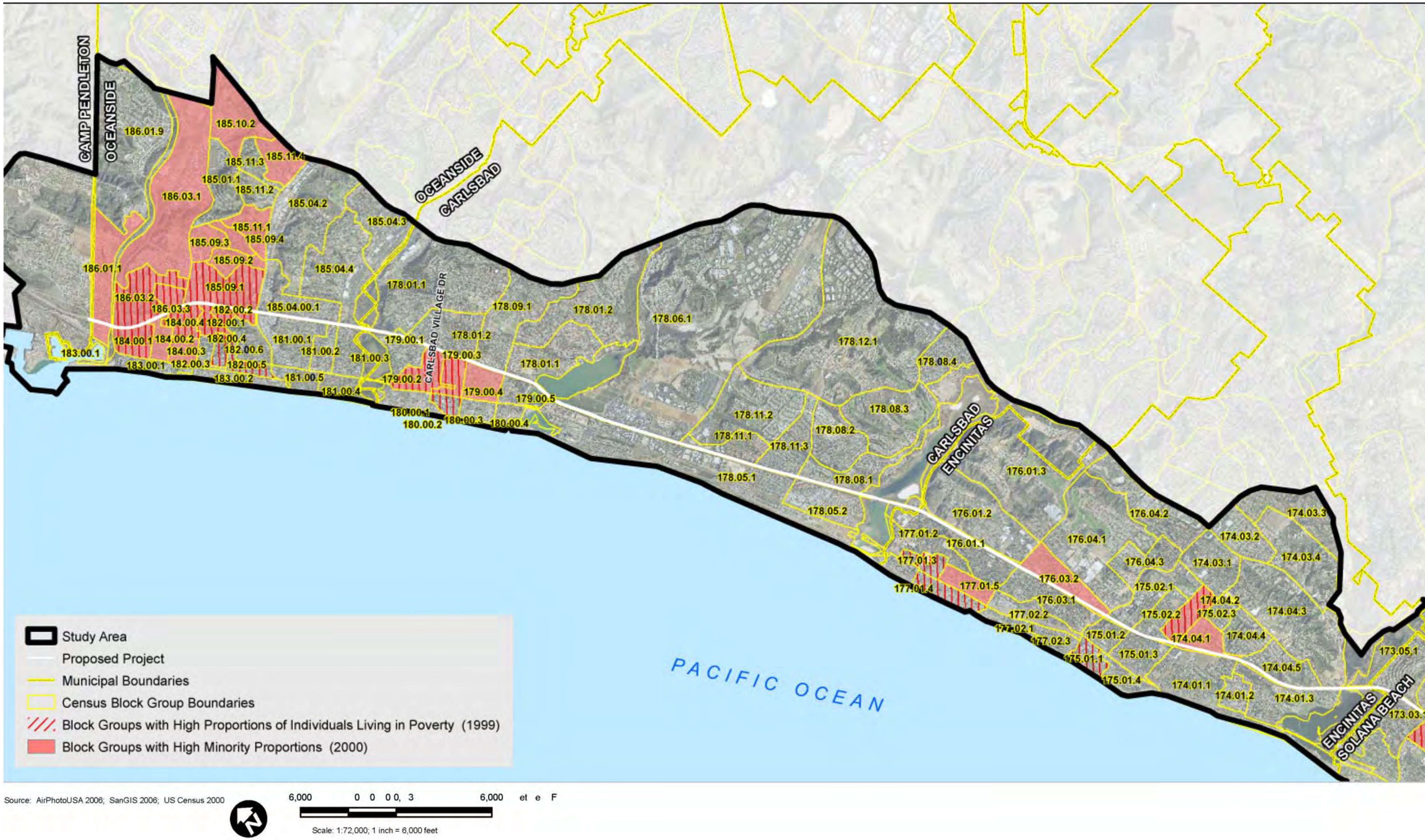


Figure 3-4.2: Block Groups Containing Low-Income and Minority Populations – North

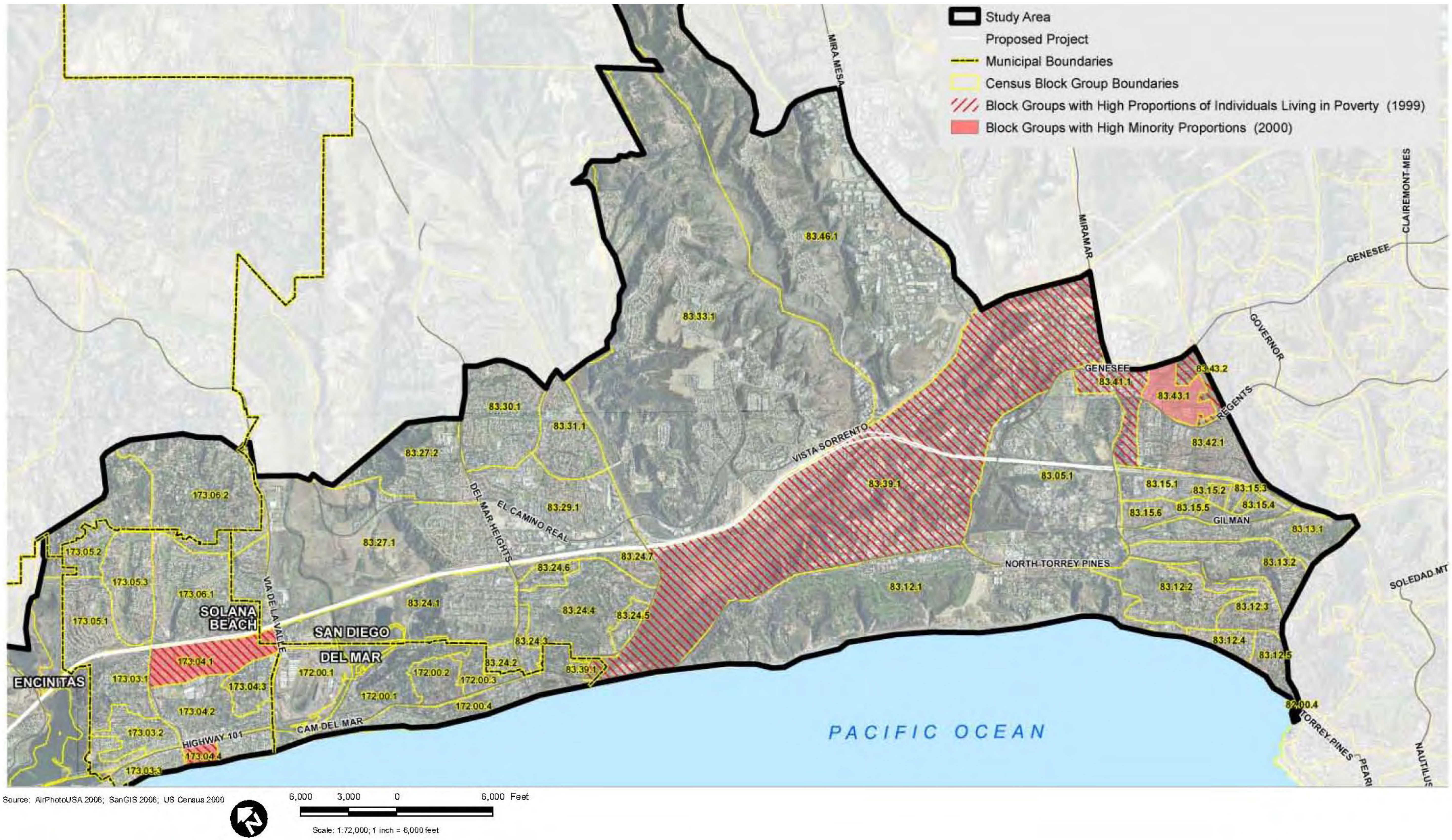


Figure 3-4.3: Block Groups Containing Low-Income and Minority Populations – South

3.5 Utilities and Emergency Services

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.5.1 Affected Environment

Utilities

Public utilities are located throughout the project limits. These utilities include existing gas, electric, television/cable, sewer, and water lines, and are often placed within public right-of-way.

A number of utility providers are located within the project limits. Gas and electric is provided by SDG&E. Water is supplied by the City of San Diego Water Department, San Dieguito Water District, City of Encinitas (Cardiff and Encinitas Sanitary Divisions), the San Elijo Joint Powers Authority, Santa Fe Irrigation District, City of Carlsbad (Carlsbad Municipal Water District [MWD], Olivenhain MWD, or the Vallecitos Water District), and City of Oceanside Water Utilities Department. Solid waste is provided throughout the project area by Waste Management Inc. (WM). Escondido Disposal, Inc. (EDCO) provides secondary recycling services throughout the County. Wastewater throughout the corridor is managed by the City of San Diego Metropolitan Wastewater Department, Del Mar Public Works Department, City of Solana Beach, Cardiff Encinitas Sanitary Division, City of Encinitas Water District, City of Escondido Municipal Encina Waste Water Authority, Leucadia Wastewater District, City of Carlsbad, La Salina Wastewater Treatment, and San Luis Rey Wastewater Plant. The Encina Power Station is located west of I-5, just north of Cannon Road. There is a brine line provided by the City of Oceanside. Also within these jurisdictions are cable lines, telephone lines, and fiber optic lines that allow multiple carriers to operate.

As discussed in *Section 1.3.7* of this Final EIR/EIS, other projects are planned along I-5, including two utility projects in Carlsbad; the Carlsbad Energy Center Project and the Carlsbad Desalination Project. The Carlsbad Energy Center Project would reconfigure approximately 23 ac of existing land zoned for public utilities at the Encina Power Station in the City of Carlsbad for a 558-MW natural gas-fired generating facility. Application for Certification was filed with the CEC and was accepted as complete on October, 31, 2007, and the CEC approved the project for construction on May 31, 2012. This facility is estimated to be online by 2016. The Carlsbad Desalination Project proposes a 50-million gallon per day seawater desalination plant and associated water delivery pipelines for high-quality water. The desalination plant would be located within a four-ac parcel at the Encina Power Station in the City of Carlsbad.

Emergency Services

CHP and emergency vehicles use the general purpose lanes, median, outside shoulders, and other areas within Caltrans' right-of-way.

3.5.2 Environmental Consequences

Utilities

The No Build alternative would not affect utilities, change the existing access for emergency services, nor would it include any improvements.

All build alternatives would require both above ground and below ground utility relocations in several locations. Please refer to the Project Features Maps in *Figures 2-2.3, Sheets 1* through *67*.

Numerous buried and overhead utilities are present in the project area. Existing utilities conflicting with proposed construction activities would require protection or relocation during construction. The location of all utilities would be verified prior to subsurface investigation or construction. Environmental effects anticipated as a result of the removal or relocation of these utility facilities, including SDG&E power lines, were assessed within the respective environmental issues sections with regard to land use, hydrology/water quality, air quality, biological and cultural resources, aesthetics, noise, traffic, and other environmental issues. For non-electrical utility relocations, or for those relocations less than 50 kV, no substantial conflicts are anticipated to existing or planned land uses; farmlands; hazardous materials; or hydrological, cultural, geological, or paleontological resources. The relocations would occur within existing utility easements, wherever possible, in order to avoid or minimize any potential additional environmental impacts.

There are several electrical utilities greater than 50 kV that would require relocation with the implementation of the project, as follow: eight relocations for 10+4 Barrier, seven relocations for 10+4 Buffer, seven relocations for 8+4 Barrier, and seven relocations for 8+4 Buffer. *Table 3.5.1* identifies the utilities over 50 kV within the project area. Most of these relocations would be minor relocations, such as relocating to housing within a bridge or relocating into non-sensitive or previously disturbed areas. Appendix J, Potential Utility Relocations, provides more detailed information.

The project currently proposes to avoid four high-voltage transmission towers and one distribution pole associated with the Encina Power Station located at the northwest quadrant of the I-5 / Cannon Road Interchange. To do so would require several design exceptions for narrowing the southbound lanes and shoulder widths in this area. Should it become necessary to relocate these towers, they would be relocated approximately 65 ft farther to the west and within the existing unpaved lot where they are currently located. No environmental impacts are anticipated should these towers require relocation. It is not anticipated that utility services would be interrupted during construction and utility relocation activities. Coordination between Caltrans and utility companies has been ongoing and would continue to occur throughout the project design process.

None of the proposed project alternatives would result in a need for new or permanent supplies of water. Nor would the proposed project affect any wastewater treatment facilities or landfill services during operation.

During construction, temporary utility relocations may be required at various locations along the corridor. All utility relocations would occur in coordination with the respective utility companies.

Emergency Services

Response time for emergency services and law enforcement would likely improve with the implementation of the build alternatives, due to an anticipated reduction in traffic congestion, and improved street and freeway access. During construction activities, there may be temporary, short-term increases in response times for emergency services due to detours and road closures.

Table 3.5.1: Utilities Over 50 kV

No.	Location	Str. #	Tie Line # ALL OH	KV	Project Considerations
1	Genesee Avenue West of NB off-ramp	203357	TL 6943	69	For all build alternatives, the existing temporary over-head transmission line would be housed within the new bridge for Genesee Avenue, and both the poles (west side and east side) would be eliminated. No environmental impacts are anticipated.
2	Via de la Valle Between NB off-ramp & HOV/Managed Lanes	91035	TL 667	69	For all build alternatives, the transmission pole may be protected in place or be relocated 65.6 ft to the east. No environmental impacts are anticipated.
3	Between Via de la Valle & Lomas Santa Fe Drive	22406	TL 660	69	For 10+4 Barrier only, the transmission pole would move further east on the southwest corner of the intersecting streets. No environmental impacts are anticipated.
4	Between Manchester & Birmingham Avenues	24511	TL 660	69	The transmission pole is within all build alternatives and is not impacted.
5	Between Manchester & Birmingham Avenues	24513	TL 660	69	The transmission pole is within the 10+4 Barrier project area only and would not be impacted.
6	Between Manchester & Birmingham Avenues	24515	TL 660	69	The transmission pole is within the 10+4 Barrier/Buffer and 8+4 Barrier project areas and would not be impacted.
7	South of Birmingham Avenue	24517	TL 660	69	The transmission pole is within the 10+4 Barrier/Buffer and 8+4 Barrier project areas and would not be impacted.
8	North of Cannon Road	124600	TL 23011 & 23012	230 & 230	For all build alternatives, the project currently proposes to avoid four high-voltage transmission towers. For all build alternatives, should relocation of transmission towers become necessary, all four structures on the west side would be relocated 65.6 ft to the west within the existing unpaved lot. No environmental impacts are anticipated.
9	North of Cannon Road	124590	TL 23003 & 13807	230 & 138	
10	North of Cannon Road	220564	TL 13804 &13806	138 & 138	
11	North of Cannon Road	124530	TL 13802 & 13803	138 & 138	
12	South of SR-76 Interchange	123637	TL 697	69	For all build alternatives, the pole would be relocated 65.6 ft to the west. No environmental impact is anticipated.

3.5.3 Avoidance, Minimization, and/or Mitigation Measures

Relocation of utilities would be coordinated with the appropriate utility owners during final design and construction. Impacts to resources would be avoided when utilities are relocated, and ESAs would be delineated when working near sensitive areas to prevent construction activities from impacting resources. Should it become necessary to relocate the high-voltage transmission towers at the I-5 / Cannon Road Interchange, no environmental impacts would be anticipated; therefore, no mitigation would be required.

During construction activities, the following strategies would be employed to aid in incident management, per Caltrans' standard practice:

- The Construction Zone Enhancement Enforcement Program (COZEEP) involves the presence of CHP to improve project safety by encouraging motorists to slow down and use care while driving through construction zones.

- The Freeway Service Patrol program is a cooperative effort between Caltrans, SANDAG, and the CHP to alleviate incident-related traffic congestion by operating tow services to aid stranded or disabled vehicles on urban freeways during morning and afternoon commuter periods. Common services performed include changing flat tires, jump-starting vehicles, providing gas, and towing disabled vehicles.

- A TMP would be developed to include various strategies to minimize delay during construction.

- Emergency providers and law enforcement officials would be informed of all detours to avoid or minimize increases in response times.

- The project would comply with all applicable solid waste regulations.

3.6 Traffic and Transportation/Pedestrian and Bicycle Facilities

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.6.1 Regulatory Setting

Caltrans and FHWA direct that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of federal-aid highway projects (see 23 CFR 652). They further direct that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users who share the facility.

In July 1999, the USDOT issued an Accessibility Policy Statement pledging a fully accessible multimodal transportation system. Accessibility in federally assisted programs is governed by the USDOT regulations (49 CFR part 27) implementing Section 504 of the Rehabilitation Act (29 USC 794). FHWA has enacted regulations for the implementation of the 1990 Americans with Disabilities Act (ADA), including a commitment to build transportation facilities that provide equal access for all persons. These regulations require application of the ADA requirements to federal-aid projects, including Transportation Enhancement Activities.

3.6.2 Affected Environment

Applicable Technical Reports

- I-5 North Coast Freeway Operations Report, prepared for the I-5 North Coast Corridor Project, June 2010
- Direct Access Ramps/Local Circulation System Impact Study, I-5 North Coast HOV/Managed Lanes Project, Technical Report No. 1, Area of Influence Analysis. Draft for Review and Comment, August 2, 2004
- Direct Access Ramps/Local Circulation System Impact Study, I-5 North Coast HOV/Managed Lanes Project, Technical Report No. 2, Existing Conditions Data Collection. Draft for Review and Comment, August 2, 2004
- Direct Access Ramps/Local Circulation System Impact Study, I-5 North Coast HOV/Managed Lanes Project, Technical Report No. 3, Traffic Analysis Methodologies and Standards. Draft for Review and Comment, July 28, 2004
- I-5 North Coast HOV/Managed Lanes Project, Technical Report No. 4, Existing Conditions Traffic Analysis, March 8, 2006
- I-5 North Coast Corridor Project, Technical Report No. 5, Traffic Demand Forecasting Report, August 2007
- I-5 North Coast Corridor Project, Draft Technical Report No. 6, Freeway Interchange Operations Report, August 2007

- I-5 North Coast Corridor Project, Draft Technical Report No. 7, Direct Access Ramps/Local Circulation System Operations Report, August 2007
- I-5 North Coast Traffic Report. A Summary of Traffic Reports, prepared for the I-5 North Coast Corridor Project, Revised June 2010

3.6.2.1 Traffic and Transportation

Traffic Fundamentals

Annual Average Daily Traffic (ADT) – The total volume of vehicle traffic in both directions of a highway or road for a year divided by 365 days.

Bottlenecks – The persistent drop in speed between two locations on a freeway. There are two kinds of bottlenecks, non-recurrent and recurrent. Non-recurrent bottlenecks occur from an unforeseen event, such as an accident. Recurrent bottlenecks occur in daily and predictable traffic patterns, like those occurring during rush hour when there is not enough capacity on the freeway for all the motorists wanting access.

Capacity – The maximum flow in vehicles per hour that can be expected on a particular segment during a given time period. It is the point immediately prior to traffic flow breakdown resulting in congested conditions.

Congestion – Congestion occurs when the traffic demand on a given segment surpasses available capacity.

Delay – The amount of additional travel time expressed as the total amount of hours all vehicles remain on the roadway due to congestion. For example, if 5,000 vehicles wait 30 minutes in congestion, the total amount of delay is 2,500 hours.

Level of Service (LOS) – LOS is a qualitative measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six LOS are defined, with letters designating each level, from A to F, with LOS A representing the best operating conditions and LOS F representing the worst in terms of motorist satisfaction. Each LOS represents a range of operating conditions and a description of those conditions. Safety is not included in the measures that establish service levels. *Figure 3-6.1* provides a general description of each LOS.

Travel Time – The amount of time to travel a defined distance.

Existing and Forecasted Conditions

The primary planning analysis tool that is used for a majority of the planning and project development studies in San Diego County is the SANDAG Regional Transportation Model (RTM). The RTM also is the primary analysis tool used in the development of the SANDAG Regional Transportation Plan (RTP). The RTM follows a four-step travel demand modeling process that produces estimates of current and future travel demand on the transportation system in San Diego. The *I-5 NCC Project* has relied on SANDAG's RTM to develop supporting traffic forecasts for the project.

The RTM provides scenarios of how the region's transportation network is anticipated to behave in the future for a defined set of improvements and assumptions. The *I-5 NCC Project* traffic forecasts were based upon the SANDAG socio-economic data used by the Series 10 model for the 2030 RTP (approved by SANDAG in March 2003).

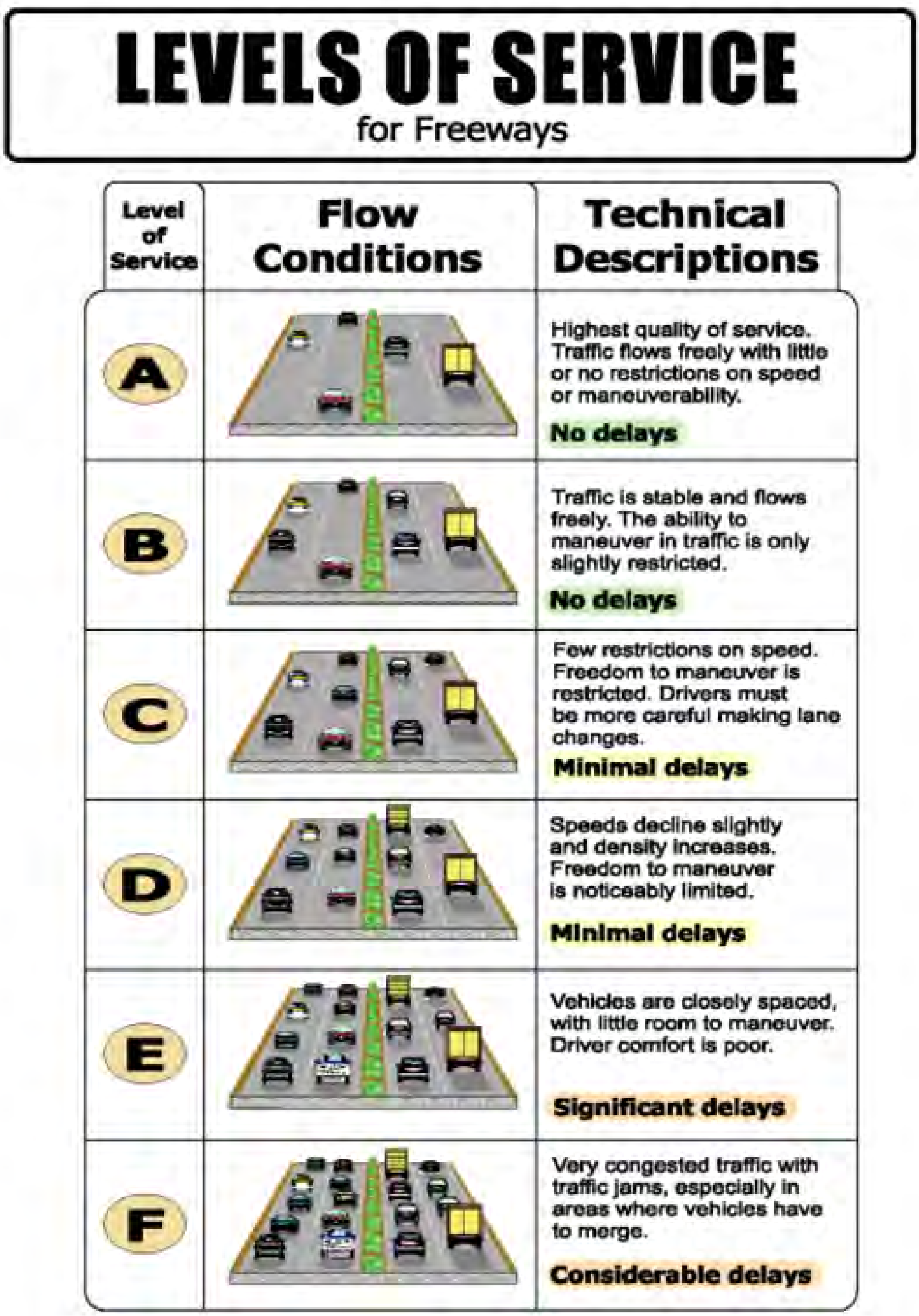


Figure 3-6.1: Level of Service

The previous list of technical reports for traffic analysis contains detailed background information on the traffic volume forecasting process and development of traffic methodologies. The reports also present the Year 2030/2015 forecast volumes and turning movements for mainline I-5, the HOV/Managed Lanes, the ramp interchange intersections, the DAR intersections, and intersections within the DAR areas of influence.

Below are the five traffic scenarios modeled for the purpose of producing future year traffic forecasts.

1. *No Build (Year 2030).* This scenario does not include any improvements to the I-5 North Coast Corridor other than those currently planned and programmed for implementation in addition to the *I-5 NCC Project*.

2. *10+4 without DARs (Year 2030).* This scenario includes 10 general purpose lanes on I-5 (south of SR-78) plus 4 HOV/Managed Lanes. DAR connections to HOV/Managed Lanes are not included as part of this scenario.

3. *10+4 with DARs (Year 2030).* This scenario includes 10 general purpose lanes on I-5 (south of SR-78) plus 4 HOV/Managed Lanes. DAR connections to HOV/Managed Lanes would be included at the following locations, from south to north:
   a. Voigt Drive (City of San Diego)
   b. Manchester Avenue (City of Encinitas)
   c. Cannon Road (City of Carlsbad)
   d. Oceanside Boulevard (City of Oceanside)

4. *8+4 with DAR Scenario (Year 2030).* This scenario includes eight general purpose lanes on I-5 plus four HOV/Managed Lanes. DAR locations are the same as the 10+4 Barrier/Buffer alternatives and DAR scenario.

5. *10+4 with DARs (Year 2015).* This scenario is identical to the Year 2030 10+4 Barrier/Buffer alternatives and DAR scenario, but the forecast horizon year is 2015.

As part of the development of the RTP, every three to five years SANDAG produces a new set of socio-economic data and land use forecasts for the San Diego Region. These are used by the RTM to generate regional traffic forecasts. Each new edition of the RTP also includes existing and planned transportation infrastructure, and the latest planning data and modal usage assumptions. During the course of the *I-5 NCC Project* development process, SANDAG released three RTMs, referred to as Series 10, Series 11, and Series 12. Successive versions of the SANDAG RTP are identified in *Table 3.6.1*. The *I-5 NCC Project* was modified from 10 mainlanes and 4 HOV/Managed Lanes (10+4) per the 2030 RTP approved in March 2003, using the Series 10 forecasts with a base year of 2000. The next modification was to eight mainlanes and four HOV/Managed Lanes (8+4) per the 2030 RTP approved in November 2007, using Series 11 forecasts with a base year of 2003. The 2050 (latest) RTP[1] retains the previous modification of eight mainlanes and four HOV/Managed Lanes. The 2050 RTP was approved in October 2011 and uses the Series 12 forecasts with a base year of 2008.

[1] On December 20, 2012, the San Diego Superior Court entered a judgment finding that the EIR for the 2050 RTP is legally inadequate with regard to greenhouse gas emissions. Although the judgment may be overturned on appeal, this Final EIR/EIS has been drafted to avoid the narrow alleged deficiencies found by the Court. Where this Final EIR/EIS relies upon 2050 RTP information, that information has not been challenged and is not part of the current lawsuit.

Table 3.6.1: Successive Versions of the SANDAG RTP

Series of Socio-Economic Data and Traffic Forecasts	SANDAG RTP	I-5 North Coast Corridor lane configuration per RTP version
Series 10	2030 RTP "Mobility 2030, The Transportation Plan for the San Diego Region" - approved March 2003	10 general purpose lanes and 4 HOV/Managed Lanes (10+4)
Series 11	2030 RTP "Pathways for the Future" – approved November 2007	8 general purpose lanes and 4 HOV/Managed Lanes (8+4)
Series 12	2050 RTP "Our Region. Our Future." – approved October 2011	8 general purpose lanes and 4 HOV/Managed Lanes (8+4)

Figure 3-6.2 presents the San Diego County "Revenue-Constrained" vehicle miles traveled (VMT) comparisons among Series 10, 11, and 12 forecasts. The North Coast Corridor traffic growth forecasts from Series 10 and 11 were within one percent. The Series 12 model with the 2008 base year included the effects of the recession, and incorporated revised estimates for economic and development growth within the region. The results are seen in *Figure 3-6.2*, which shows that the previously forecasted 2030 VMT from Series 10 and 11 is forecasted to occur around year 2045 in Series 12. This trend is also seen with respect to regional population growth. Previous projections under Series 10 and 11 predicted that the region would add approximately one million people by 2030, while Series 12 predicts that this growth is to occur around 2040.

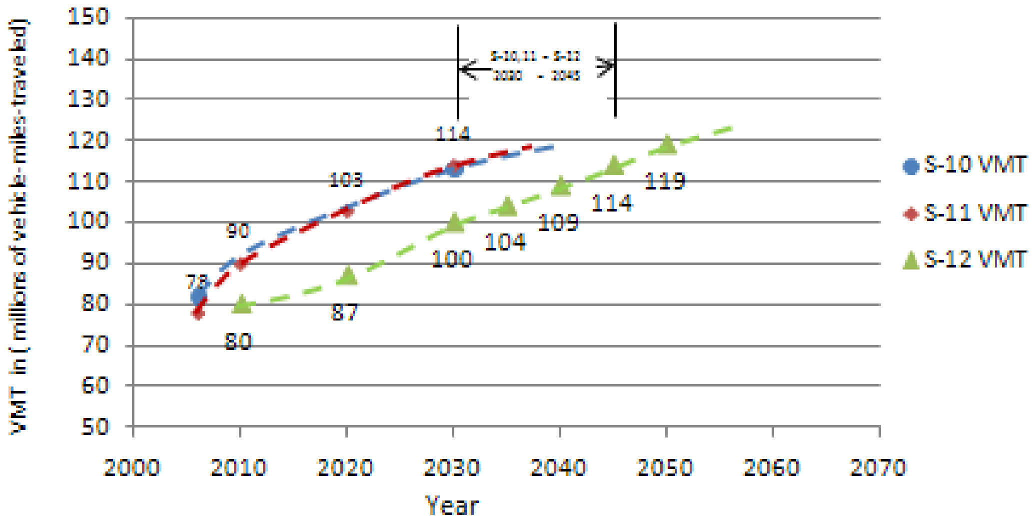


Figure 3-6.2: Regional "Revenue-Constrained" VMT Comparison Series 10, 11, and 12

A further comparison of the respective *I-5 NCC Project* models was undertaken by evaluating the total ADT for freeway segments along the I-5 North Coast Corridor for the different model years. Caltrans compared model outputs at various points, or "screenlines" along the freeway. These screenlines are often used in traffic analyses to determine how the traffic volume entering or exiting a particular segment as they capture all of the traffic that moves across the selected location. A sample of these screenline locations is illustrated in *Figure 3-6.3*. As shown in *Figure 3-6.3*, the findings of the comparisons among the Series 10, 11, and 12 traffic volume forecasts generally indicate that Series 12 forecasts for years 2030 and 2040 are lower than both Series 10 and 11 for year 2030. More specifically:

- Series 12 forecast traffic volumes for year 2030 are generally lower than Series 10 2030 forecast volumes by an overall average of 7.9 percent.

- Series 12 forecast traffic volumes for year 2035 are generally lower than Series 10 2030 forecast volumes by an overall average of 3.5 percent.[2]

- Series 12 forecast traffic volumes for year 2040 are generally lower than Series 10 2030 forecast volumes by an overall average of 2.8 percent.[3] Series 12 forecast volumes for year 2050 are generally higher that Series 10 2030 forecast volumes by an average of 6.1 percent.

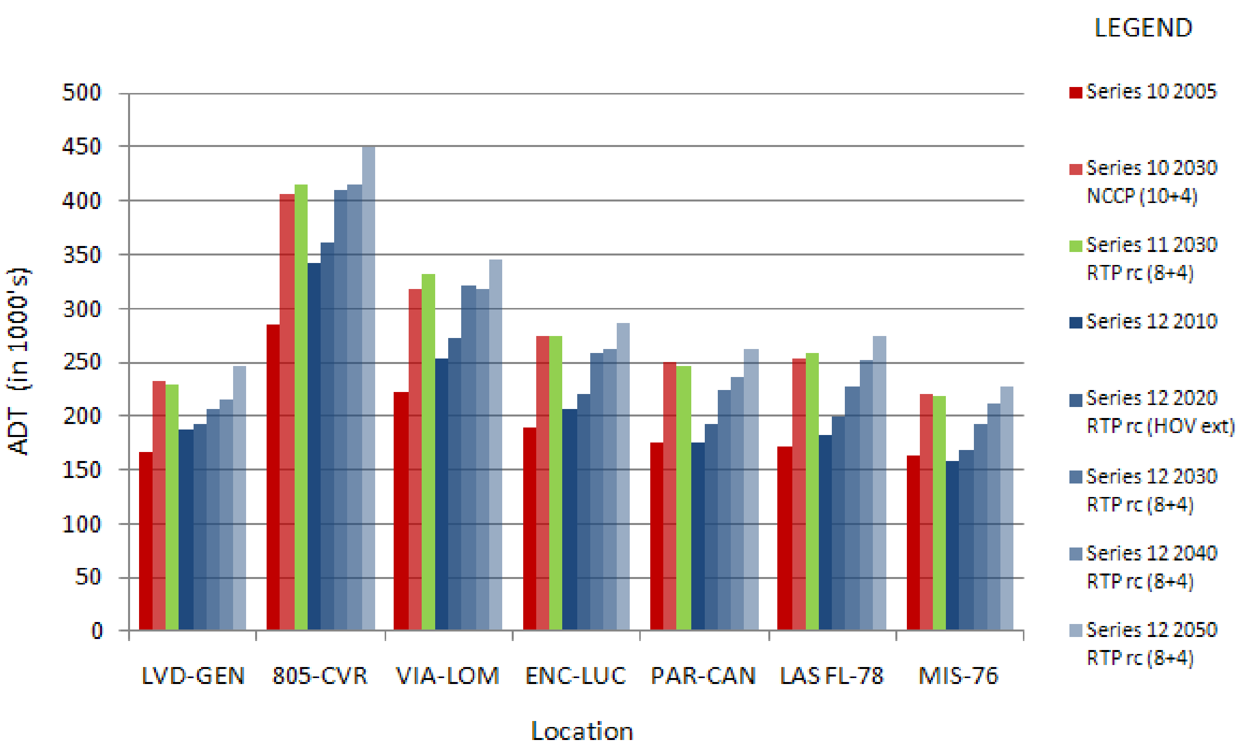


Figure 3-6.3: ADT (Unadjusted 24-hour Forecasted Volume [UVOL]) Comparison of Series 10, 11, and 12 Travel Models at Selected Screenline Locations on the I-5 North Coast Corridor

2 No single segment varies by more than 9.1 percent when comparing Series 12 forecast traffic volumes for year 2035 to Series 10 2030 forecast traffic volumes.

3 No single segment varies by more than 7.9 percent when comparing Series 12 forecast traffic volumes for year 2040 to Series 10 2030 forecast traffic volumes.

Upon review of these different data sets, the project team determined that the initial Series 10 2030 forecasted daily traffic demands, which were used as the basis of the original traffic studies, are generally equivalent to the Series 12 2035 forecast daily traffic volumes (within an average of 3.5 percent). These demand volume differences are considered minimal and updating the Series 10 travel forecasts to year 2035 at this time would not result in changes to the recommended geometric configurations of the project alternatives or alter the results of the associated studies. Therefore, travel volume forecasts and the associated technical studies presented in this Final EIR/EIS are based on the region's Series 10 travel forecast model and these analyses are considered representative of what is expected to occur within the 2040 to 2050 timeframe.

Corridor System Management Plan

Additional considerations in transportation planning include multimodal analysis. As noted in *Section 1.5, Other I-5 Considerations*, the Corridor System Management Plan (CSMP) for the travelshed along the I-5 North Coast Corridor addresses the transportation system as a whole, and focuses on how transit, local roadways, highways, pedestrian routes, and land use work together as a system. This promotes a strategy that prioritizes resources to phase in improvements across jurisdictions and transportation modes to achieve enhanced productivity, mobility, reliability, accessibility, and safety.

Average Daily Traffic

As the region continues to grow both economically and demographically, the ADT has increased along the I-5 corridor and would continue to do so without a project (No Build). The 2030 No Build shows less traffic using the freeway than the year 2030 build alternatives, because freeway demand would shift to routes parallel to I-5 (*Table 3.6.2* in *Section 3.6.3.1).* The reverse condition reflects an increase in freeway travel facilitated by improvements that make freeway travel more attractive or convenient than existing alternate routes. Additional traffic carried by a freeway facility is referred to as accommodating the “latent demand” to travel across the travelshed, and is reflected in the increased ADT volumes for the build alternatives.

Travel Time

The existing average travel time during free-flow conditions to travel the project area in the northbound or southbound direction is about 25 minutes, with an average speed of approximately 65 miles per hour (mph). The existing southbound average a.m. peak travel time is between 31 and 44 minutes and the p.m. peak travel time is between 27 and 32 minutes (*Table 3.6.3* in *Section 3.6.3.1*). The existing northbound travel time for the a.m. peak period is between 24 and 25 minutes. The p.m. peak travel time northbound is between 33 and 39 minutes.

Bottlenecks and Total Delay

Bottlenecks were calculated using weekdays, excluding holidays, when occurring 20 percent of the time or more in a calendar year. The tables below used 35 mph and the reference speed for the delay associated with bottlenecks. Manchester Avenue has been identified as both an a.m. and p.m. peak bottleneck in the southbound direction in 2006, causing an estimated daily average of 4,700 hours of delay for the general purpose lanes.

In the northbound direction, bottlenecks have been identified at Lomas Santa Fe Drive and Cannon Road, both in the p.m. peak. Combined, these two northbound locations cause an estimated daily average of 3,500 hours of delay for the general purpose lanes. Future delay is included within *Total Delay* in *Section 3.6.3.*

Duration of Congestion

On weekdays, the 2006 duration of congestion for the general purpose lanes in the northbound direction is approximately zero hours in the a.m. peak hours and five hours in the p.m. peak hours. In the southbound direction, the duration of congestion for the general purpose lanes is approximately five hours in the a.m. peak hours and zero hours in the p.m. peak hours (*Table 3.6.3*).

Weekend Congestion

The weekend trips on I-5 include regional and interregional motorists seeking access to the beach or ocean, and special events such as the San Diego County Fair or horse racing at the Del Mar Fairgrounds, etc. These motorists are experiencing increasing levels of weekend congestion. This weekend congestion is highly variable and is based on seasonality, weather, school schedules, and the scheduling of special events.

It has been observed that many weekend trips on I-5 include a high percentage of carpools. A vehicle occupancy study done for Caltrans in 2008 (Memo from Wilson and Company, Vehicle Occupancy Study, I-5 North Coast Special Traffic Studies, July 11, 2008) indicated that the overall percentage of HOV vehicles was about 55 to 60 percent. These types of vehicles are expected to provide much of the demand for HOV or Managed Lane usage during weekend time periods.

LOS

The northbound and southbound directional LOS for both the a.m. and p.m. peak hours are summarized in *Tables 3.6.6* and *3.6.7*, respectively, found in *Section 3.6.3.1*. LOS is based on the forecasted traffic volumes, which did not make distinctions for barrier versus buffer.

HOV/Managed Lanes

At the time this traffic study was written, I-5 had one northbound six-mi HOV lane between the I-5 / I-805 merge and the Via de la Valle undercrossing. The existing conditions represent the year 2006. The traffic counts taken during the months of October and November of 2006 indicated a weekday average a.m. peak hour volume of 400 vehicles per hour and average p.m. peak hour volume of 1,050 vehicles per hour. Additionally, observed field data indicate that more than 90 percent of the vehicles using this HOV lane in both the a.m. and p.m. peak hours are passenger cars. A list of select I-5 freeway segments within the project limits and their respective HOV volumes are compiled in *Tables 3.6.8* and *3.6.9* (in *Section 3.6.3.1*).

Park and Ride Lots

A park and ride lot is a group of parking spaces designated for the purpose of supplying people a place to park to transfer to their carpool, vanpool, or bus pool partners. This works not only with HOV/Managed Lanes, but can work with other transit options when the park and ride lots are also served by transit. The lots provide a convenient place to park your car. Along the project area there are six park and ride lots, located at Sorrento Valley Road in San Diego; Birmingham Drive (off Villa Cardiff Drive) and Calle Magdalena in Encinitas; La Costa Avenue in Carlsbad; and Moreno Street and Maxson Street in Oceanside.

3.6.2.2 Pedestrian and Bicycle Existing Facilities

Pedestrian facilities include sidewalks, handicap-access curb ramps, crosswalks, paths, pedestrian overcrossings and undercrossings, traffic islands, and other similar features applicable for pedestrian use. In addition, bicyclists also share pedestrian facilities, when permitted.

Bicycle facilities are generally classified as: Shared Roadway (no bikeway designation), Class I Bikeway (Bike Path), Class II Bikeway (Bike Lane), or Class III Bikeway (Bike Route).

Shared roadways are streets and routes without bikeway designations. Most bicycle travel within the State of California occurs along these routes.

Class I Bike Paths provide right-of-way for exclusive use of bicyclists and pedestrians. They minimize crossflow by motorists and also reduce the influence of parallel streets/highways. Bike paths are usually found along rivers, ocean fronts, canals, utility right-of-way, railroad right-of-way, within college campuses, within and between parks, and in other areas as applicable.

Class II Bike Lanes are established along streets where there is significant bicycle demand. Bike lanes are delineated with bike lane signs and pavement markings to separate them from lanes assigned to motorists. This results in a more predictable movement between bicyclists and motorists using the same street.

Class III Bike Routes are shared facilities with motorists on the street or with pedestrians on sidewalks. They are intended to provide continuity to other bicycle facilities and also designate preferred routes through high demand corridors. Bike routes are established by placing Bike Route signs along the roadway.

Pedestrian and bicycle access are offered primarily from local streets that pass over or under I-5. There are 37 such crossings within the project footprint. Caltrans provides pedestrians with facilities at most crossings. All three types of bikeways exist in the I-5 corridor, and cyclists are allowed at all freeway crossings. Bicycle access also is allowed on the I-5 freeway shoulders, specifically between Sorrento Valley Road and Genesee Avenue, and also from Vandegrift Boulevard to Las Pulgas Road north of Oceanside.

The entire California coastline includes the Pacific Coast Bicycle Route. For the nation's bicentennial independence celebration, Caltrans established a bikeway that extends between Oregon and the International Border at Mexico. It is over 900 mi in length, and has been a major attraction for bicycle riders worldwide. This bikeway serves many users: short segments serve as ideal commuter access between adjoining communities; longer segments serve to accommodate the recreational bicycle users, as well as some commuters; and the full length of this bikeway within San Diego County serves the interregional users.

In the San Diego Region, there is relatively convenient access to the Pacific Coast Bicycle Route. The SR-56 Class I Bicycle Path, which terminates just east of I-5 in Carmel Valley, is a nearly complete link to the coast and other regional bikeways, but it has an existing gap just east of I-5. This coast route, also known as the Coastal Rail Trail, serves the communities of north coastal San Diego County. Following construction of the proposed project, nearly all local city streets and regional roadways that cross I-5 and link up to Coast Highway 101 would be bicycle-friendly, meaning that Class II Bicycle Lanes would be striped on the shoulders and Class III Bicycle Routes would be signed to accommodate users to the coast route.

Local communities on the coast have coordinated to develop community plans and bicycle and pedestrian master plans that fully accommodate pedestrian and bicycle travel modes. Collectively, these plans propose to improve quality of life by offering safe transportation alternatives to the automobile. The common goals and principles of the various local community plans are detailed in *Section 3.2.1* under the subheading *Bicycle and Pedestrian Plans.*

AMTRAK interregional rail service and the COASTER (the regional commuter rail service) accommodate bicycles on their respective systems. All buses in the region, specifically NCTD and Metropolitan Transit System (MTS), are equipped to carry bicycles as well. In summary, the southern California coastline is reasonably well-equipped to accommodate non-motorized travel modes. Several bike routes are constricted, crossing over or under I-5. The project would improve bicycle access by providing Class II or Class III bicycle facilities wherever possible.

Other Existing/Planned/Proposed Pedestrian and Bicycle Facilities

Near I-5, there are several bicycle and pedestrian facilities that exist today, are planned for future construction, or are proposed to be developed. The following facilities affect how the current or planned network functions through the I-5 North Coast Corridor.

- Voigt Drive includes a Class II bike facility.

- As a component of the *I-5 NCC Project*, the North Coast (NC) Bike Trail would provide important community, regional, and interregional non-motorized transportation options. The NC Bike Trail is proposed to include Class I, Class II, and Class III bicycle facilities, as well as multi-use trails. Key features include trail crossings at most of the lagoons in the I-5 North Coast Corridor.

- I-5 freeway shoulders are opened to bicycle travel between Genesee Avenue and Sorrento Valley Road/Roselle Street. A project that is funded and will be constructed soon includes a paved bicycle trail that will connect Voigt Drive to Genesee Avenue and Genesee Avenue to Sorrento Valley Road. This will facilitate the removal of bicycles from the freeway shoulders and is anticipated to increase non-motorized mode share.

- Sorrento Valley Road includes a Class II bike facility.

- A portion of Sorrento Valley Road/Roselle Street is closed to vehicular traffic between Oleander Street and Carmel Valley Road. It is used exclusively by bicyclists and pedestrians and would be upgraded as a part of the NC Bike Trail project.

- Carmel Mountain Road includes is a Class II bike facility.

- The SR-56 Bike Path that parallels SR-56 on the south side begins at Sabre Springs Parkway (just east of I-15) and terminates just east of I-5 in Carmel Valley. As part of the NC Bike Trail project, a connection is proposed from the SR-56 bike path to Old

Sorrento Valley Road, providing a key gap closure in the regional bike network. Carmel Valley Road is used to access the coast from this bikeway.

- The Coastal Rail Trail, currently complete in some reaches, while in the developmental phase and construction phase in other reaches, begins in San Diego at Santa Fe Depot and terminates in Oceanside. (Solana Beach's section is finished. Carlsbad and Oceanside have several sections built and are planning others, but are encountering constrained areas. Encinitas and Del Mar have constraints that have delayed even the planning phases.) The Coastal Rail Trail would predominately lie within the railroad right-of-way between Oceanside and San Diego.

- Del Mar Heights Road includes a Class III bike facility as it crosses the freeway; otherwise, it is a Class II bike facility.

- The NC Bike Trail project proposes to connect Del Mar Heights Road to Via de la Valle as a paved bike trail. This would provide a new non-motorized connection over the San Dieguito Lagoon, adjacent to I-5.

- Via de la Valle includes a Class III bike facility as it crosses the freeway; otherwise, it is a Class II bike facility.

- Lomas Santa Fe Drive includes a Class I bike facility as it crosses under the I-5 freeway; otherwise, it includes a Class II bike facility.

- The NC Bike Trail project proposes to connect Solana Beach to Manchester Avenue in Encinitas as a paved bike trail. This would provide a new non-motorized connection over the San Elijo Lagoon, adjacent to I-5.

- Encinitas Boulevard includes a Class II bike facility.

- The Encinitas Grade Separated Pedestrian Crossings would construct separate railroad crossings for pedestrians and cyclists at Hillcrest Drive, El Portal Street, and Montgomery Avenue. A crossing at Santa Fe Drive has been completed. The crossings would improve safe connections for pedestrians and cyclists to beaches, schools, commercial areas, residential neighborhoods, and the planned Coastal Rail Trail.

- Leucadia Boulevard includes a Class III bike facility as it crosses the freeway; otherwise, it is a Class II bike facility.

- La Costa Avenue includes a Class II bike facility.

- The NC Bike Trail project proposes to connect La Costa Avenue to Avenida Encinas as a paved bike trail. This would provide a new non-motorized connection over the Batiquitos Lagoon, adjacent to I-5.

- Poinsettia Lane includes a Class II bike facility.

- Cannon Road includes a Class II bike facility.

- The NC Bike Trail project proposes to connect Cannon Road to the Coastal Rail Trail in Carlsbad as a paved bike trail and on-street facilities. This would provide a new non-motorized connection over the Agua Hedionda Lagoon, adjacent to I-5.
- Tamarack Avenue includes a Class II bike facility.
- Carlsbad Village Drive includes a Class III bike facility.
- Jefferson Street includes a Class II bike facility.
- California Street includes a Class III bike facility.
- Oceanside Boulevard includes a Class II bike facility.
- SR-76 includes a Class I bike facility on the San Luis Rey River Trail.
- The Inland Rail Trail is another rail trail that would extend from Oceanside to Escondido. Most of it has been planned, and several segments (in Escondido, San Marcos, and Vista) have either been constructed or are ready for construction.
- The San Luis Rey Bike Path is located within the SR-76 corridor. It parallels the San Luis Rey River, beginning at I-5 and ending just east of College Boulevard.
- In Oceanside, the Pier View Way Bicycle and Pedestrian undercrossing is located between Cleveland Street and Myers Street. It follows an alignment under the railroad tracks and provides access directly to the Oceanside Pier.
- The outside shoulders of I-5 north of Oceanside are opened to bicycle travel between Vandegrift Street and Las Pulgas Road. Bicycles are only intermittently permitted on the Camp Pendleton Marine Base during specific times.

In addition to the existing, planned, and proposed pedestrian and bicycle facilities listed above, the project would include a number of pedestrian and bicycle facilities potentially implemented as project enhancements. These are listed in *Section 3.6.3.2, Pedestrian and Bicycle Facilities*, below, and are described in *Section 2.3* of this Final EIR/EIS.

3.6.3 Environmental Consequences

3.6.3.1 Traffic and Transportation

Average Daily Traffic

Table 3.6.2 shows an increase in the amount of ADT for each alternative.

Table 3.6.2: Average Daily Traffic

Location		2006	2030 No Build	2030 8+4 Barrier/Buffer	2030 10+4 Barrier/Buffer
From	To				
La Jolla Village Drive	Genesee Avenue	169,900	249,590	255,250	262,150
I-5 / I-805 Merge	Carmel Valley Road	281,400	412,640	425,750	434,250
Via de la Valle	Lomas Santa Fe Drive	203,600	326,940	342,950	354,250
Encinitas Boulevard	Leucadia Boulevard	190,500	294,300	315,150	326,850
Palomar Airport Road	Cannon Road	188,500	290,100	309,850	320,350
SR-78	Oceanside Boulevard	192,900	303,800	319,150	323,300
Mission Avenue	SR-76	156,800	246,500	258,000	259,200

Travel Time

The No Build alternative average northbound travel time in 2030 during peak hours is forecasted to be between 29 and 37 minutes in the morning and between 67 and 69 minutes in the afternoon. The southbound peak travel time in 2030 is forecasted to be between 53 and 54 minutes in the morning and between 40 and 48 minutes in the afternoon (*Table 3.6.3*). The average general purpose lane peak travel time for northbound 10+4 Barrier/Buffer alternatives would decrease to between 25 and 27 minutes in the morning and between 30 and 36 minutes in the afternoon in 2030. The southbound 10+4 Barrier/Buffer alternatives travel time would be between 28 and 35 minutes at the morning peak and between 26 and 30 minutes at the afternoon peak for the general purpose lanes. The average general purpose lane peak travel time for northbound 8+4 Barrier/Buffer alternatives would decrease to between 27 and 29 minutes in the morning and between 45 and 50 minutes in the afternoon in 2030 and the southbound travel time would decrease to between 36 and 47 minutes in the morning and between 29 and 30 minutes in the afternoon.

Total Delay

Total weekday delay represents the general purpose lanes on an average weekday. The weekday delay for the 2006 existing conditions in the northbound and southbound directions are 3,500 and 4,700 vehicle hours, respectively. For the No Build alternative in the year 2030, the predicted total weekday delay in the northbound direction would be 13,700 vehicle hours. The total weekday delay in the southbound direction for the No Build alternative would be 14,000 vehicle hours. For the 10+4 Barrier/Buffer alternatives in the year 2030, the delay for the northbound direction would be 600 vehicle hours. Southbound delay in the year 2030 for the 10+4 Barrier/Buffer alternatives would be 3,700 vehicle hours. Northbound delay for the 8+4 Barrier/Buffer alternatives would be 9,600 vehicle hours. The southbound delay for the 8+4 Barrier/Buffer alternatives would be 8,000 hours (*Table 3.6.3*).

Table 3.6.3: Total Delay, Congested Hours, and Travel Time Per Day

Conditions	Year	Direction	Vehicle Hours of Delay	Congested Hours AM	Congested Hours PM	Travel Time Min AM	Travel Time Min PM
Existing	2006	NB	3,500	0.0	5.0	24-25	33-39
	2006	SB	4,700	5.0	0.0	31-44	27-32
No Build	2030	NB	13,700	3.5	6.0	29-37	67-69
	2030	SB	14,000	6.0	7.0	53-54	40-48
10+4 Barrier/Buffer	2030	NB	600	0.0	2.5	25-27	30-36
	2030	SB	3,700	5.0	2.0	28-35	26-30
8+4 Barrier/Buffer	2030	NB	9,600	0.0	6.0	27-29	45-50
	2030	SB	8,000	5.5	2.0	36-47	29-30

Duration of Congestion

By 2030, it is forecasted in the No Build scenario that the duration of congestion in the northbound direction would be approximately three-and-a-half hours in the a.m. peak hours and six hours in the p.m. peak hours. In 2030, the duration of congestion in the southbound direction is forecasted in the No Build to be six hours in the a.m. peak hours, and seven hours in the p.m. peak hours. The 10+4 Barrier/Buffer alternatives are forecasted to have no congestion northbound in the a.m. and two-and-a-half hours in the p.m. peak hours, while southbound would have five hours for a.m. and two hours for p.m. peak hours. The 8+4 Barrier/Buffer alternatives are forecasted to have no congestion northbound in the a.m. and six hours in the p.m. peak hours, while southbound would have five-and-a-half hours for a.m. and two hours for p.m. peak hours (*Tables 3.6.4* and *3.6.5*).

Table 3.6.4: Northbound AM and PM Weekday Peak Period Congestion Duration

Conditions	Year	AM Peak Hour			PM Peak Hour		
		Congestion		Duration (hrs)	Congestion		Duration (hrs)
		Begin	End		Begin	End	
Existing Conditions	2006	--	--	0	2:00	7:00	5
No Build	2030	7:30	11:00	3.5*	2:00	8:00	6
10+4 Barrier/Buffer	2030	-	--	0	4:00	6:30	2.5
8+4 Barrier/Buffer	2030	--	--	0	2:00	8:00	6

* Congestion would continue through the AM and PM hours.

Table 3.6.5: Southbound AM and PM Weekday Peak Period Congestion Duration

Conditions	Year	AM Peak Hour			PM Peak Hour		
		Congestion		Duration (hrs)	Congestion		Duration (hrs)
		Begin	End		Begin	End	
Existing Conditions	2006	6:30	11:30	5	--	--	0
No Build	2030	6:00	12:00	6*	12:00	7:00	7
10+4 Barrier/Buffer	2030	7:00	12:00	5*	4:00	6:00	2*
8+4 Barrier/Buffer	2030	6:30	12:00	5.5*	4:00	6:00	2

* Congestion would continue through the AM and PM hours.
** The PM peak hours are from 12:00 to 8:00.

LOS

In the No Build scenario for year 2030, northbound traffic conditions in the a.m. peak hour generally exhibit LOS ratings of D and E, with the exception of a few LOS ratings of F. The majority of the northbound traffic conditions in the p.m. peak hour exhibit a LOS rating of F. The majority of the southbound traffic conditions exhibit LOS ratings of F in the a.m. and p.m. peak hours (*Tables 3.6.6* and *3.6.7*).

In the 10+4 Barrier/Buffer alternatives for year 2030, the northbound traffic conditions in the a.m. peak hour generally exhibit LOS ratings of C and D, with the exception of a few LOS ratings of F. The majority of the northbound traffic conditions in the p.m. peak hour exhibit an LOS rating of D.

Table 3.6.6: Northbound I-5 Estimated General Purpose Lane LOS Summary

Freeway Segment		Existing LOS		2030 No Build LOS		2030 10+4 LOS		2030 8+4 LOS	
From	To	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
La Jolla Village Drive	Genesee Avenue	E	C	E	D	F	E	E	D
Genesee Avenue	Sorrento Valley Road / Roselle Street	D	D	D	C	D	D	C	D
Sorrento Valley Road / Roselle Street	I-5 / I-805 Merge	B	B	B	B	B	C	B	C
I-5 / I-805 Merge	Carmel Valley Road	C	C	C	C	C	D	C	C
Carmel Valley Road	Del Mar Heights Road	C	D	C	D	D	E	D	F
Del Mar Heights Road	Via de la Valle	C	D	F	F	E	F	D	F
Via de la Valle	Lomas Santa Fe Drive	D	F	E	F	D	F	E	F
Lomas Santa Fe Drive	Manchester Avenue	D	F	E	F	D	F	D	F
Manchester Avenue	Birmingham Drive	D	E	E	F	D	E	D	F
Birmingham Drive	Santa Fe Drive	D	E	E	E	D	E	D	F
Santa Fe Drive	Encinitas Boulevard	D	E	E	E	D	E	D	F
Encinitas Boulevard	Leucadia Boulevard	D	F	E	F	D	E	D	F
Leucadia Boulevard	La Costa Avenue	D	F	F	F	D	E	D	F
La Costa Avenue	Poinsettia Lane	D	F	F	F	D	E	D	F
Poinsettia Lane	Palomar Airport Road	D	E	F	E	D	E	D	F
Palomar Airport Road	Cannon Road	D	E	E	E	D	D	D	F

Table 3.6.6 (cont.): Northbound I-5 Estimated General Purpose Lane LOS Summary

Freeway Segment		Existing LOS		2030 No Build LOS		2030 10+4 LOS		2030 8+4 LOS	
From	To	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Cannon Road	Tamarack Avenue	D	F	E	F	C	E	D	F
Tamarack Avenue	Carlsbad Village Drive	D	F	D	F	C	E	D	F
Carlsbad Village Drive	Las Flores Drive	D	F	D	F	C	E	C	F
Las Flores Drive	SR-78	D	F	E	F	E	F	D	F
SR-78	California Street	C	C	D	D	E	F	D	D
California Street	Oceanside Boulevard	C	C	E	E	E	F	D	E
Oceanside Boulevard	Mission Avenue	D	D	E	D	E	E	D	D
Mission Avenue	SR-76	C	C	D	C	D	D	D	C
SR-76	Harbor Drive	D	C	E	C	E	C	D	C

Table 3.6.7: Southbound I-5 Estimated General Purpose Lane LOS Summary

Freeway Segment		Existing LOS		2030 No Build LOS		2030 10+4 LOS		2030 8+4 LOS	
From	To	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Harbor Drive	SR-76	B	C	C	D	C	D	C	D
SR-76	Mission Avenue	C	B	D	D	D	D	C	D
Mission Avenue	Oceanside Boulevard	C	C	E	E	D	E	D	D
Oceanside Boulevard	Cassidy Street	D	C	F	F	D	D	C	C
Cassidy Street	SR-78	D	C	F	F	F	E	E	D
SR-78	Las Flores Drive	D	C	F	F	D	D	E	D
Las Flores Drive	Carlsbad Village Drive	D	C	F	E	D	D	E	D
Carlsbad Village Drive	Tamarack Avenue	D	C	F	E	E	D	E	D
Tamarack Avenue	Cannon Road	E	D	F	F	F	D	F	F
Cannon Road	Palomar Airport Road	D	C	F	E	D	D	E	D
Palomar Airport Road	Poinsettia Lane	E	D	F	F	D	D	E	E
Poinsettia Lane	La Costa Avenue	E	D	F	F	D	D	E	E
La Costa Avenue	Leucadia Boulevard	E	D	F	F	E	D	F	E
Leucadia Boulevard	Encinitas Boulevard	F	D	F	F	E	D	F	E
Encinitas Boulevard	Santa Fe Drive	E	D	E	F	D	D	E	E

Table 3.6.7 (cont.): Southbound I-5 Estimated General Purpose Lane LOS Summary

Freeway Segment		Existing LOS		2030 No Build LOS		2030 10+4 LOS		2030 8+4 LOS	
From	To	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Santa Fe Drive	Birmingham Drive	E	D	E	F	D	D	E	E
Birmingham Drive	Manchester Avenue	F	D	F	F	E	D	F	E
Manchester Avenue	Lomas Santa Fe Drive	F	E	F	F	F	E	F	F
Lomas Santa Fe Drive	Via de la Valle	F	E	F	F	F	E	F	F
Via de la Valle	Del Mar Heights Road	E	D	E	E	F	E	F	D
Del Mar Heights Road	Carmel Valley Road	D	D	F	E	F	E	F	D
Carmel Valley Road	I-5 / I-805 Merge	D	D	F	E	F	D	E	D
I-5 / I-805 Merge	Roselle Street	C	C	D	B	D	B	B	B
Roselle Street	Genesee Avenue	D	D	E	D	E	D	D	D
Genesee Avenue	La Jolla Village Drive	C	D	C	F	F	F	D	F

The majority of the southbound traffic conditions exhibit LOS ratings of D, with the exception of a few LOS ratings of F in the a.m. and p.m. peak hours. The LOS ratings in the a.m. and p.m. peak hours for both the northbound and southbound directions would be very similar to the LOS ratings for the existing conditions, suggesting that the current LOS could possibly be maintained and possibly improved in a few locations *(Tables 3.6.6* and *3.6.7*).

In the year 2030 8+4 for the Barrier/Buffer alternatives, the northbound traffic conditions in the a.m. peak hour generally exhibit a LOS rating of D, while the majority of the p.m. peak hour exhibit a LOS rating of F (Del Mar Heights Road to SR-78). The southbound a.m. and p.m. peak hours would be similar to the LOS ratings of the existing conditions, with the exception of a few segments where the LOS ratings degrade to F (*Tables 3.6.6* and *3.6.7*).

With the 8+4 Barrier/Buffer alternatives, the corridor would degrade in the a.m. and p.m. peak hours when compared with the existing conditions; however, the a.m. and p.m. peak hour conditions would have a better LOS when compared with the year 2030 No Build scenario (*Tables 3.6.6* and *3.6.7*).

Weekend Use

There is an influx of midday traffic on weekends. Average travel times on Saturday and Sunday using recent 2003 to 2006 average travel times on the I-5 within the project area revealed that the weekend does not contain a distinct morning peak period, although congestion may sometimes begin before noon. This lack of a separate peak period can be attributed to the majority of people having weekends free from work and businesses operating on different schedules that are open during the weekends. There is, however, a notable travel trend on

Saturday in the southbound direction and on Sunday in the northbound direction. There is an increased travel time period from 9:00 a.m. to 8:00 p.m. on Saturday, and on Sunday the increased travel time period is from 1:00 p.m. to 8:00 p.m. Saturday southbound peak average travel time occurs between 12:00 p.m. and 1:00 p.m., while Sunday northbound average peak travel time occurs between 5:00 p.m. and 6:00 p.m. In the southbound direction, there is a consistent peak, between 25 and 35 minutes, for most of the daytime suggesting a constant, all day flow of traffic with a slight reduction in travel time.

HOV Use

During weekday peak periods, approximately 13 percent of the vehicles within the project limits are HOVs with two or more occupants. There is a directional tendency to the HOV demand volume between the northbound and southbound directions. The demand volume in the northbound direction is higher during the p.m. peak hour and lower during the a.m. peak hour. In contrast, the demand volume in the southbound direction is lower during the p.m. peak hour and higher during the a.m. peak hour. The HOV percentages are typically higher (13 to 23 percent) during the midday and the off-peak periods. (San Diego Regional Vehicle Occupancy and Classification Study – 2000, SANDAG, June 2002). This percentage is anticipated to increase to approximately 15 to 20 percent by 2030.

On the weekends, I-5 serves a variety of local, regional, and interregional, as well as tourist and seasonal/event-generated, trips. During weekend peak periods, approximately 55 to 60 percent of the vehicles within the project limits are HOV. The percentages of those vehicles are typically higher, 55 to 65 percent, during midday peak travel times southbound on Saturday, and northbound on Sunday *(Tables 3.6.8* and *3.6.9).*

Tables 3.6.8 and *3.6.9* provide a brief summary of peak hour HOV traffic volumes through each of the five cities traversed by the project.

Table 3.6.8: Weekday Northbound HOV Volumes

Freeway Segment		Existing*		2030 No Build*		2030 10+4 Barrier/Buffer		2030 8+4 Barrier/Buffer	
From	**To**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
La Jolla Village Drive	**Genesee Avenue**	X	X	X	X	1,500	1,280	1,600	1,530
I-5 / I-805 Merge	**Carmel Valley Road**	300	1,100	1,620	1,920	1,880	2,450	2,000	2,540
Carmel Valley Road	**Lomas Santa Fe Drive**	300	1,100	1,230	1,580	1,520	2,040	1,640	2,130
Santa Fe Drive	**La Costa Avenue**	X	X	X	X	1,900	2,270	2,120	2,470
La Costa Avenue	**Cannon Road**	X	X	X	X	1,820	2,170	2,030	2,180
SR-78	**Oceanside Boulevard**	X	X	X	X	1,700	2,100	1,900	2,240

*HOV/Managed Lanes do not exist in areas designated with an "X"

Table 3.6.9: Weekday Southbound HOV Volumes

Freeway Segment		Existing*		2030 No Build*		2030 10+4 Barrier/Buffer		2030 8+4 Barrier/Buffer	
From	To	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Oceanside Boulevard	SR-78	X	X	X	X	2,170	1,650	2,570	2,030
Cannon Road	La Costa Avenue	X	X	X	X	2,080	1,920	2,460	2,380
La Costa Avenue	Santa Fe Drive	X	X	X	X	2,050	1,880	2,410	2330
Lomas Santa Fe Drive	Carmel Valley Road	1200	350	1,030	1,010	2,050	1,640	2,400	2,030
Carmel Valley Road	I-5 / I-805 Merge	1200	350	1,500	1,480	2,450	2,040	2,800	2,430
Genesee Avenue	La Jolla Village Drive	X	X	X	X	1,120	1,460	1,500	1,850

*HOV/Managed Lanes do not exist in areas designated with an "X"

Along with HOV/Managed Lanes, DAR locations were identified. For each proposed DAR location, an area of influence on the local streets was defined. Each area of influence was analyzed to establish the extent of potentially affected roadway segments and intersections in the vicinity of each proposed DAR location. These roadway segments and intersections became the focus of the subsequent local area traffic impact assessment. The area of influence was then used to define the project study area for the Local Circulation System Impact Study (Wilson & Company, August 2004). The methodology used to identify the areas of influence is discussed in more detail in Technical Report No. 1, Area of Influence Analysis (Wilson & Company, August 2004).

Opportunities for DAR development were based primarily on existing/future traffic patterns within the corridor, existing/future local freeway access locations, existing street over- and undercrossings to I-5, land use patterns and vacant land availability. Another key consideration is priority/Managed Lane connectivity for regional BRT or other transit services and HOV vehicles within the I-5 corridor. Over 30 DAR locations were identified throughout the corridor for further consideration.

Eleven sites, which propose the development of DARs within existing local interchanges, were initially eliminated from consideration due to the adverse traffic impacts of "three-point" signalized control.

The remaining DAR sites were initially screened based on the following criteria:

- Beneficial effect on freeway general purpose lane congestion by reducing/eliminating high volume "cross-lane weaving" for vehicles entering/exiting the Managed Lanes
- Potential land availability
- Proximity to employment/activity centers
- Potential to serve local/regional transit services
- Proximity to park and ride facilities

- Proximity to underrepresented communities
- Engineering feasibility
- Local support

The remaining DAR sites were further screened based on the following criteria:
- Potential impact to public parklands
- Potential impact to agricultural lands
- Potential impact to underrepresented communities
- Potential impact to public utilities
- Visual impacts/aesthetics
- Air quality/noise
- Engineering feasibility
- Projected traffic demand (ADT, peak hour)
- Potential impacts to local streets and roads

Based on the above criteria, the Draft EIR/EIS proposed DARs at four interchanges: Oceanside Boulevard, Cannon Road, Manchester Avenue, and Voigt Drive. Following public circulation of the Draft EIR/EIS, continued coordination with the Cities of Oceanside and Carlsbad resulted in the DARs at Oceanside Boulevard and Cannon Road being deleted from the project. The project addressed in this Final EIR/EIS proposes DARs at Manchester Avenue and Voigt Drive. The numbers of intersections at or over capacity at these two locations are shown on *Table 3.6.10*.

Table 3.6.10: Intersections At or Over Capacity

Street	Local Jurisdiction	Number of Intersections At or Over Capacity
Manchester Avenue	City of Encinitas	2
Voigt Drive	City of San Diego	3
	TOTAL	**5**

Weaving Analysis

One source of vehicle conflict occurs where vehicles are required to change one or more lanes creating a "weaving section." This can contribute to bottlenecks, ramp queues, and reduction in travel time for general purpose lanes. This occurs most frequently at closely spaced interchanges, ramps, lane drop, or access points. Weaving between interchanges was analyzed in both the a.m. and p.m. peak hours in 21 freeway segments at 1,800 vehicles per hour per lane (vphpl) for weaving lanes and 2,000 vphpl for general purpose lanes. In the existing condition, there were 6 a.m. peak and 17 p.m. peak exceedances in the northbound direction, and 16 a.m. peak and 8 p.m. peak exceedances in the southbound direction. In the 2030 No Build, there would be 15 a.m. peak and 17 p.m. peak exceedances in the northbound direction, and 20 a.m. peak and 20 p.m. peak exceedances in the southbound direction.

The analysis identified where the exceedances were due to high ramp volumes, main through lanes being above 2,000 vphpl, and auxiliary lanes exceeding 1,800 vphpl.

Accident Analysis

The number of accidents and accident rates for July 2004 through June 2007 from the CHP accident database available through PeMS were used. The total accident rates along the project area were less than the Statewide average for total accident rates. There were three segments that were over the Statewide average for fatal plus injury.

Other Related Congestion Analysis

Bottlenecks represent persistent drops in speed between two locations on the freeway as seen through increased travel time due to duration of the bottleneck and queue length. There can be a number of causes, including, but not limited to, a visual distraction, an incident, a heavy weaving section or a change in capacity (such as a reduction of the number of lanes). Consistently there are three major bottlenecks in the northbound direction during the p.m. peak perio—near Carmel Valley Road, Via de la Valle, and Lomas Santa Fe Drive—and smaller bottlenecks near Leucadia Boulevard and Cannon Road. In the southbound direction, there are bottlenecks during the a.m. peak near Via de la Valle, Manchester Avenue, and Birmingham Drive. In the p.m. peak, the southbound direction has bottlenecks at Birmingham Drive, Manchester Avenue, and Oceanside Boulevard. The No Build bottlenecks would increase in duration and queue length. The northbound direction for a.m. peak would include bottlenecks at La Jolla Village Drive and Del Mar Heights Road. The northbound p.m. peak would include bottlenecks near Del Mar Heights Road and Oceanside Boulevard. The southbound a.m. peak would include bottlenecks near Via de la Valle, Tamarack Avenue, and Manchester Avenue. The southbound p.m. peak would include bottlenecks near La Jolla Village Drive and Manchester Avenue.

Freeway interchanges were analyzed to assess if modifications could improve capacity and alleviate congestion at ramp intersections. In addition, all freeway on-ramp locations within the project limits would be metered to improve projected freeway operations while simultaneously not overloading surface streets with excessive queue lengths. The ramp meter rates for the interchanges within the project limits were analyzed and the length of signal time was developed from weaving results and queuing analysis.

On- and Off-ramps

Table 3.6.10 includes a summary of the intersections under the existing conditions within the proposed project's DAR area of influence that are at or over capacity (LOS E or F) in either the a.m. or p.m. peak traffic hour. Most on- and off-ramps in the project area would be widened. HOV lanes would be created at most on-ramps. Caltrans also is working with the local cities to improve intersections under their jurisdiction.

Freeway Interchange Operations

Freeway interchanges were analyzed along with on-ramp and off-ramp locations, capacity, turning, and metering. Several locations were identified in the Freeway Interchange Operations Report *(*Technical Report No. 6), which analyzed 51 ramp intersections and 25 arterial intersections within close proximity of the *I-5 NCC Project. Table 3.6.11* describes the proposed interchange improvements (with additional revisions based on the refined 8+4 Buffer alternative [Preferred Alternative]).

Table 3.6.11: Proposed Interchange Improvements

Interchange	Ramps	Proposed Lane Geometry Modifications
Genesee Avenue	SB & NB	Adding lanes to SB on-ramp, 1 SOV and 1 HOV, totaling 3 ramp lanes NB Braided on-ramp (1 HOV and 2 SOV), totaling 3 ramp lanes
Roselle Street	SB	Adding lanes to SB ramp, 1 SOV and 1 HOV, totaling 3 ramp lanes to merge with SB I-5. An additional SOV lane would diverge (split) from the SB on-ramp and merge with the SB Braided off-ramp to Genesee Avenue
Del Mar Heights Road	SB & NB	SB ramp adjustments to remove free right turn capabilities Convert NB left/through/right lane to a right-turn lane, Add a left-through lane (creating dual right and dual lefts) Adding lane to NB on-ramp and WB to SB on-ramp, 1 HOV, totaling 3 ramp lanes, respectively Adding lane to EB to SB on-ramp, 1 SOV, totaling 3 ramp lanes
Via de la Valle	SB & NB	SB ramp adjustments to remove free right turn capabilities. Widen Via de la Valle to add an exclusive WB right-turn lane NB ramp adjustments to remove free right-turn capabilities. Widen Via de la Valle to add an exclusive EB right-turn lane WB to SB on-ramp would remain 2 SOV lanes. Adding lane to EB to SB on-ramp Adding lane to EB to SB on-ramp, 1 SOV, totaling 3 ramp lanes
Manchester Avenue	SB	SB ramp adjustments to remove free right turn capabilities. Widen WB Manchester Avenue to add a second right-turn lane (creating dual right-turn lanes)
Birmingham Drive	SB & NB	Proposed roundabouts on the east and west sides of the overcrossing, otherwise there would be standard signalized intersections Adding lane to SB on-ramp, 1 HOV, totaling 3 ramp lanes Adding lane to NB on-ramp, 1 SOV, totaling 3 ramp lanes
Santa Fe Drive	SB & NB	Convert SB through lane to a shared through left-turn lane. Extend exclusive right-turn lane. Widen Santa Fe Drive to add a second WB left-turn lane (creating dual left-turn lanes) Widen Santa Fe Drive to add a second EB left-turn lane (creating dual left-turn lanes) Adding lane to SB on-ramp, 1 SOV, totaling 3 ramp lanes Adding lanes to NB on-ramp, 1 SOV and 1 HOV, totaling 3 ramp lanes

Table 3.6.11 (cont.): Proposed Interchange Improvements

Interchange	Ramps	Proposed Lane Geometry Modifications
Encinitas Boulevard	SB & NB	SB adding an exclusive left-turn lane (creating one left-turn lane and one left-through lane)*; adding an exclusive SB right-turn lane (creating dual right-turn lanes). Widen Encinitas Boulevard to add a second WB left-turn lane (creating dual left-turn lanes)* NB adding an exclusive NB left-turn lane (creating one left-turn lane and one left-through lane)*; adding an exclusive NB right-turn lane (creating dual right-turn lanes). Widen Encinitas Boulevard to add a second EB left-turn lane (creating dual left-turn lanes); and to add a third EB through lane* Adding lane to SB on-ramp, 1 SOV, totaling 3 ramp lanes Adding lane to NB on-ramp, 1 SOV, totaling 3 ramp lanes
Leucadia Boulevard	NB	Adding lane to NB on-ramp, 1 SOV, totaling 3 ramp lanes
La Costa Avenue	NB	Adding lane to NB on-ramp, 1 SOV, totaling 3 ramp lanes
Palomar Airport Road	SB	Ramp adjustments to remove free right-turn capabilities Adding lane to WB to SB on-ramp, 1 SOV, totaling 3 ramp lanes
Tamarack Avenue	SB & NB	SB adding a WB left-turn lane (creating dual lefts) NB adding a right-turn lane (creating dual right-turn lanes) Adding lane to NB on-ramp, 1 SOV, totaling 2 ramp lanes
Carlsbad Village Drive	SB & NB	Convert the SB shared left/through/right lane to a second right-turn lane, add a shared left-turn through lane (creating a single left-turn lane and dual right-turn lanes). Widen Carlsbad Village Drive to add a second WB left-turn lane (creating dual left-turn lanes) NB left-turn lane separated, right-turn lane converted to a shared left/through/right lane. Widen Carlsbad Village Drive to add a second EB left-turn (creating dual left-turn lanes) Adding lane to NB and SB ramps, 1 SOV, totaling 2 ramp lanes
Las Flores Drive	SB	Adding lane to SB on-ramp, 1 SOV, totaling 2 ramp lanes
SR-78	SB & NB	Adding lane to SR-78 to SB I-5 Connector, 1 SOV, totaling 2 connector lanes Remove EB SR-78 to NB I-5 Connector

Table 3.6.11 (cont.): Proposed Interchange Improvements

Interchange	Ramps	Proposed Lane Geometry Modifications
Oceanside Boulevard	SB	Convert SB shared left/through/right turn-lane into two separate lanes: shared left/through lane, and exclusive right-turn lane. Retain exclusive left-turn lane (creating dual left-turn lanes). Widen Oceanside Boulevard to extend the existing WB to SB right-turn lane further east along Oceanside Boulevard (up to near the I-5 NB ramps/Oceanside Boulevard intersection) to increase traffic storage. Widen Oceanside Boulevard to extend WB left-turn lane storage Widen Oceanside Boulevard to extend EB left-turn lane storage Adding lane to SB on-ramp, 1 SOV, totaling 3 ramp lanes
	NB	Convert 1 SOV lane, NB on-ramp, to 1 HOV lane, resulting in 1 SOV and 1 HOV, totaling 2 ramp lanes
Mission Avenue	SB & NB	Ramp adjustments to remove free right-turn capabilities. Remove EB to SB on-ramp, add dual EB left-turn lanes. Convert SB through/left to an exclusive left-turn lane (creating dual lefts), convert the exclusive SB right-turn lane to a shared through/right-turn lane. Widen Mission Avenue to extend WB left-turn lane storage Remove NB to EB free right-turn lane, add a second EB left-turn lane (creating dual lefts), add SB dual left-turn lanes Adding lane to SB on-ramp, 1 SOV, totaling 3 ramp lanes Adding 2 lanes to NB on-ramp, 1 SOV and 1 HOV, totaling 2 ramp lanes
SR-76	NB	Addition of a second NB left-turn lane (creating dual lefts) Adding lane to SB and NB ramps, 1 HOV, totaling 3 ramp lanes Remove loop structure (currently closed to traffic) located in the northeast quadrant of the interchange

Table 3.6.11 (cont.): Proposed Interchange Improvements

Interchange	Ramps	Proposed Lane Geometry Modifications
Harbor Drive	SB	Ramp adjustments to remove free right-turn capabilities (a separate project reconstructed the I-5 SB ramps/Harbor Drive intersection removing the free right-turn capabilities. However, the *I-5 NCC Project* would still realign the SB on-ramp from Harbor Drive) Widen WB Harbor Drive to extend the existing exclusive right-turn lane further east along Harbor Drive (up to Harbor Drive / San Rafael / Vandegrift Boulevard Intersection) to increase traffic storage. Widen WB Harbor Drive to extend WB left-turn lane storage NB re-alignment to WB off-ramp to align with San Rafael intersection (EB right turn would be controlled by signal and would no longer be a free right turn); convert NB shared through/right-turn lane into an exclusive through lane, eliminating the NB right-turn movement
	NB	EB Harbor Drive undercrossing off-ramp would be a new one-lane off-ramp that would facilitate traffic from EB Harbor Drive to SB San Rafael Drive. The off-ramp would diverge from EB Harbor Drive, then traverse under the I-5 NB off-ramp to EB Harbor Drive/Vandegrift Boulevard, and continue parallel to this off-ramp to terminate as a right-turn lane to SB San Rafael Drive. Adding lane to NB on-ramp, 1 SOV, totaling 2 ramp lanes

SB = southbound, NB = northbound, EB = eastbound, WB = westbound
HOV = High Occupancy Vehicle, SOV = Single Occupancy Vehicle
*To be cleared by the I-5/Encinitas Boulevard Project Environmental Document

Managed Lanes/Value Pricing Concept

The four HOV/Managed Lanes (two in each direction) proposed to be located in the median of I-5 are expected to operate at a high level of service for carpools, bus transit, vanpools, and others, regardless of the traffic conditions of the general purpose lanes. To optimize the capacity of the HOV/Managed Lanes and additionally help alleviate congestion of the main lanes, it has been suggested to allow SOVs to use the HOV/Managed Lanes for a predetermined fee. The concept, called Value Pricing, was analyzed in the I-5 North Coast Value Pricing Planning Study Concept Plan.

The viability of HOV/Managed Lanes along the *I-5 NCC Project* area was assessed along with investigating the technical and financial feasibility of HOV/Managed Lanes between the Cities of La Jolla and Oceanside. Specifically, the study included traffic operations (traffic demand, HOV/Managed Lane access, impacts to main lane traffic), pricing strategies (fixed/flat rate, preset variable rate, and dynamic variable rate), electronic toll collection requirements, potential revenue, equity, and performance monitoring requirements. A community outreach survey also was conducted to assess the interest of the general public, local agencies, and key stakeholders towards HOV/Managed Lanes and their use as Managed Lanes. The I-5 North Coast Value Pricing Planning Study Concept Plan is divided into two volumes; Volume 1 addresses technical studies involving value pricing and Volume 2 addresses the community outreach survey results and findings.

Table 3.6.12 is a summary of the estimated HOV/Managed Lane revenue for the year 2030 8+4 Barrier/Buffer alternatives and 10+4 Barrier/Buffer alternatives. A higher toll rate is anticipated at the south end of the project due to the larger traffic demand.

Table 3.6.12: I-5 HOV/Managed Lanes Estimated Annual Revenue

Location	2030 8+4 Estimated Revenue*	2030 10+4 Estimated Revenue*
South of SR-56	$6.656	$4.329
South of Via de la Valle	$6.274	$3.983
South of Manchester Avenue	$2.076	$1.154
North of Encinitas Boulevard	$2.421	$1.478
South of Palomar Airport Road	$1.203	$0.837
North of Carlsbad Village Drive	$0.882	$0.629
North of SR-76	$0.227	$0.225
TOTAL	**$19.739**	**$12.636**

*Estimated revenue in millions of dollars

Barrier and Buffer separated HOV/Managed Lanes

Both barrier and buffer separated facilities allow the HOV/Managed Lanes to function. The difference in traffic circulation between the barrier and buffer alternatives is nominal. The barrier-separated lanes provide the HOV/Managed Lanes a physical barrier from the mainline lanes and paved shoulders for emergency parking. The striped buffer separation provides a smaller overall construction footprint because it does not require shoulders for emergency parking.

No Build Alternative

In the No Build scenario, ADT would increase, but hourly volumes would be constrained to a maximum nominal capacity of approximately 2000 vphpl. The increase of congestion on I 5 would likely lead to additional congestion for local circulation as motorists seek alternative routes. For peak conditions, the northbound travel time would increase to 29 to 37 minutes in the a.m. and 67 to 69 minutes in the p.m.; while the southbound travel time would increase to 53 to 54 minutes in the a.m. and 40 to 48 minutes in the p.m. During congested times and bottlenecks, total delay to the motoring public would be 13,700 hours northbound and 14,000 hours southbound. The duration of congestion northbound would last three-and-a-half hours for a.m. peak and six hours for p.m. peak. The southbound duration of congestion would increase to six hours during the a.m. peak and seven hours for the p.m. peak. The LOS would mostly be F, with forced flow, heavy congestion, and long queues from behind break down points with stop-and-go traffic. Even the existing HOV Lanes would be congested. Freeway interchanges and ramps would experience back up from traffic entering I-5 (*Tables 3.6.3,* and *3.6.6* through *3.6.9* above, and Tables 3.7 and 3,8 in the Draft Technical Report No. 6, Freeway Interchange Operations Report, August 2007).

10+4 Barrier and 10+4 Buffer Alternatives

ADT would increase, as would capacity to accommodate the amount of vehicles forecasted for the year 2030. Therefore, peak hour northbound travel time would be 25 to 27 minutes in the a.m. and 30 to 36 minutes in the p.m. The southbound travel time would decrease to 28 to 35 minutes in the a.m. and 26 to 30 minutes in the p.m. Motorists could still seek alternative routes to the congestion along I-5. However, during congested times and bottlenecks, total delay to the motoring public would be reduced to 600 (plus) hours northbound and 3,700 hours southbound. This would maintain or improve existing conditions. The duration of congestion in the northbound direction would be zero hours for a.m. peak and two-and-a-half hours for p.m. peak; while southbound congestion would last five hours in the a.m. and two hours in the p.m. (*Table 3.6.3*). The LOS would mostly be D, approaching unstable flow with heavier volumes and reduced freedom to maneuver. Even the HOV/Managed Lanes volumes would reach up to 1,900 a.m. peak and 2,270 p.m. peak in the northbound direction at La Costa Avenue; and up to 2,450 a.m. peak and 2,040 p.m. peak in the southbound direction at Carmel Valley Road. Freeway interchanges and ramps would have improvements decreasing the amount of back up from traffic entering I-5 identified in the No Build. Managed Lanes could earn revenue of approximately $12,600,000 per year (*Table 3.6.12*).

8+4 Barrier Alternative and 8+4 Buffer Alternative (Preferred Alternative)

ADT would increase, as would capacity to accommodate the amount of vehicles forecasted for the year 2030. Therefore, peak travel time in the northbound direction would be 27 to 29 minutes in the a.m. and 45 to 50 minutes in the p.m. The southbound travel time would be 36 to 47 minutes in the a.m. and 29 to 30 minutes in the p.m. Motorists could still seek alternative routes to the congestion along I-5. However, during congested times and bottlenecks, total delay to the motoring public would be 9,600 hours northbound and 8,000 hours southbound. The duration of congestion northbound would be zero hours for a.m. and six hours for p.m. The southbound congestion would last five-and-a-half hours for a.m. and two hours for p.m. The LOS would mostly be D, with LOS E and F during peak hours. LOS E approaches unstable flow, heavy volumes, very limited freedom to maneuver. LOS F is forced flow, heavy congestion, long queues from behind break down points with stop-and-go traffic. Even the HOV/Managed Lanes volumes would reach northbound up to 2,120 a.m. peak and 2,540 p.m. peak in the northbound direction at Santa Fe Drive and Carmel Valley Road, respectively. Freeway interchanges and ramps would have improvements, decreasing the amount of back up from traffic entering I-5 identified in the No Build. Managed Lanes could earn revenue of approximately $19,700,000 per year (*Table 3.6.12).*

Construction Impacts

For construction and funding purposes, the *I-5 NCC Project* would be broken into three stages and sub-stages to allow construction phasing flexibility, as described in *Section 2.4, Phased Construction.* During construction, detours would be required for nighttime work, bridge work, and where there are closed ramps and structures in order to maintain access for vehicles, bicycles, and pedestrians. Construction for the bridges over the freeway would occur in phases. Noise activity, such as demolition and pile driving, would be followed by more quiet activity providing a rest between types of construction activity. For peak travel times, an equivalent number of lanes would remain open as will exist at the time of construction. This information would be detailed in the TMP.

3.6.3.2 Pedestrian and Bicycle Facilities

The following facilities, most of which are included as project enhancements, would improve the existing pedestrian and bicycle circulation. Design and construction of these features would occur in coordination with each affected city and include future formal cooperative agreements between Caltrans and each city, where Caltrans would build these features and the cities and Caltrans would form an agreement regarding responsibility for their maintenance.

Pedestrian and Bicycle Enhancement Facilities

- Sorrento Valley Road would remove the bicycles from the freeway, moving them to a new Class III bike facility along city streets in the northbound direction and a Class I bike facility with barrier separation on the southbound side
- Carmel Valley Bicycle/Pedestrian Trail Connection, San Diego
- Enhanced trail and bridge on west side of San Dieguito Lagoon
- Pedestrian Overpass north of Del Mar Heights Road, San Diego
- Streetscape Enhancements on Ida Avenue, Solana Beach
- Pedestrian trailhead at Solana Hills Drive
- Enhanced trail on both sides of I-5 at San Elijo Lagoon with bridge connection to Manchester Avenue
- Manchester Avenue would include sidewalks and a Class II bike facility
- Park and ride enhancements at Birmingham Drive, including new trailhead along Villa Cardiff Drive
- Villa Cardiff Drive Improvements and MacKinnon Bridge enhancements including connections to sidewalk/trails, Encinitas
- Hall Property Park Trail Connecting to Santa Fe Drive, Encinitas
- Trail Connecting Santa Fe Drive to Requeza Street with Wetland Revegetation, Encinitas
- Trail Connecting Requeza Street to Encinitas Boulevard
- Union Street Pedestrian Overpass and Trail Connection, Encinitas
- Cottonwood Creek Park to Union Street Trail Connection with Wetland Revegetation
- Park and Ride Enhancement at La Costa Avenue, Carlsbad
- Bridge crossing under I-5 to connect to lagoon trails on east side of I-5 at Batiquitos Lagoon, Carlsbad
- Trail on west side of I-5 crossing over Batiquitos Lagoon
- Pedestrian bridge and trail crossing from east to west sides of I-5 on the southern shore of Agua Hedionda Lagoon, Carlsbad
- Trail on east side of I-5 crossing over Agua Hedionda Lagoon, Carlsbad
- Streetscape Enhancements on Chestnut Avenue, Carlsbad
- Pocket Park and Access at California Street, Oceanside
- Oceanside Boulevard Pedestrian Streetscape Enhancement, Oceanside
- Enhancements to Division Street Overpass, Oceanside
- Enhanced Pedestrian Overpass Connection on Mission Avenue, Oceanside
- Enhanced Pedestrian Overpass Connection on Bush Street, Oceanside
- Community Open Space Park and/or community gardens, Oceanside
- Parking/Staging Area for recreation at SR-76, Oceanside
- Pedestrian Underpass Improvements at San Luis Rey River, Oceanside
- Harbor Drive/Camp Pendleton pedestrian and bicycle enhancements
- Elements of the NC Bike Trail from Gilman Drive in the City of San Diego to Harbor Drive in the City of Oceanside

10+4 Barrier/Buffer Alternatives

Circulation for pedestrians and bicyclists would improve. Many of the bridges carrying streets over the freeway would need to be replaced for the 10+4 Barrier/Buffer alternatives because the existing bridges are not long enough to span the improved freeway. Bike lanes and sidewalks would be added to the new structures as part of the project. The new bridges would include areas for bike lanes and sidewalks connections or improve many existing pedestrian and bike facilities that are currently constrained. In addition, the enhancement opportunities, if implemented, would improve trailheads and enhance existing facilities.

8+4 Barrier Alternative and 8+4 Buffer Alternative (Preferred Alternative)

Circulation for pedestrians and bicyclists would improve as some of the existing bridges spanning I-5 would be replaced as part of the 8+4 Barrier/Buffer alternatives. Where new bridges are constructed, bike lanes and sidewalks would be added that would connect pedestrian and bicycle facilities currently constrained. In addition, the enhancement opportunities, if implemented, would improve trailheads and enhance existing facilities.

No Build Alternative

Circulation of pedestrians and bicyclists would continue similarly to existing conditions, with some improvements occurring from other planned projects.

3.6.4 Avoidance, Minimization, and/or Mitigation Measures

3.6.4.1 Traffic and Transportation

A construction phasing plan has been proposed, as detailed in *Chapter 2*, to further identify the sequence of construction and help minimize traffic delays. Traffic delays would be controlled to the extent feasible during periods of many simultaneous construction operations. A comprehensive TMP to further minimize delays would be developed after selection of the Preferred Alternative but prior to the start of construction.

The TMP would be similar for each build alternative. It is designed to increase driver awareness, ease congestion, and minimize delay during construction. Many TMP components would be implemented prior to construction and could continue after construction with local funding. The components of the TMP would be:

Public Awareness Program

Strategies that would be considered to increase public awareness may include one or more of the following items:

- Mailings: construction bulletins, newsletters, public notices
- Speakers bureau
- Public service announcements: radio, television, and newspapers
- Paid advertising
- Signs along roadway: changeable message signs
- Telephone information line, hotline, “800” number
- Updates to local businesses
- Web page

Traffic Operations Strategies Program

This includes ongoing evaluation of traffic operations and would provide for incident response during construction. Strategies that would be considered may include one or more of the following items:

- TMP evaluation and adjustment
- Alternate route strategies

- Construction Strategies, including lane closure charts for closing lanes, ramps, and connectors
- Delay clauses for the late re-opening of lane closures
- Temporary signal location
- CHP enforcement of construction zone speed limits during lane closures
- Freeway Service Patrol
- Demand Management strategies, including improvement to HOV/Managed Lanes and public transit

3.6.4.2 Pedestrian and Bicycle Facilities

During construction of transportation facilities, work can act as both a physical and psychological barrier to pedestrians and bicycle users. Where freeway construction crosses bikeways and sidewalks, access may be restricted or severed entirely. The TMP would include components for pedestrians and bicyclists along with consideration for the motoring public. In addition to the items listed for the motoring public, signs would be used, as appropriate, to provide notices of bike and pedestrian closures, detours, and other pertinent information. Temporary access would be provided where possible.

3.7 Visual / Aesthetics

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.7.1 Regulatory Setting

NEPA establishes that the federal government use all practicable means to ensure all Americans safe, healthful, productive, and *aesthetically* (emphasis added) and culturally pleasing surroundings (42 USC 4331[b][2]). To further emphasize this point, the FHWA in its implementation of NEPA (23 USC 109[h]) directs that final decisions regarding projects are to be made in the best overall public interest, taking into account adverse environmental impacts, including among others, the destruction or disruption of aesthetic values.

Likewise, CEQA establishes that it is the policy of the State to take all action necessary to provide the people of the State "with…enjoyment of *aesthetic*, natural, scenic and historic environmental qualities" (CA PRC Section 21001[b]).

3.7.2 Affected Environment

This section in based upon the Visual Impact Assessment (VIA), 2009, which is incorporated by reference and the Design Guidelines: I-5 NCC Project contained in Appendix L.

Project Setting

The I-5 North Coast Corridor freeway began in 1955 as a short by-pass route on the east side of downtown Oceanside. As the freeway moved south over the years, it continued as a rural route around the old coastal towns, and formed an unofficial dividing line between the coastal and inland portions of the region. Of greater significance was the corridor's developing role as the northern gateway to the San Diego region. Today, the corridor's scenic image forms the visitor's first impression of a city that takes pride in its unique visual identity.

Although the freeway has grown to become the primary link between two of the largest metropolitan regions in the country, the character of the corridor has managed to survive. Expansive views of river valleys, coastal lagoons, beaches, and other natural scenic resources offer a freeway driving experience like no other in southern California. Development densities near these natural features have remained low for the most part, and large groupings of mature trees are the primary visual element in the developed landscape.

Large structures normally found on urban freeways such as retaining walls and soundwalls are, in a large part, absent from much of the corridor. An exception to this is at Lomas Santa Fe Drive where large retaining walls were recently constructed. Throughout most of the corridor, however, natural landscape features remain in the forefront, opening scenic views from the road and screening views of the freeway from adjacent communities. On the freeway proper, large oleander shrubs in the median reduce the visual scale of the freeway by half for the driver, suggesting the visual character of a parkway. On both sides of I-5, towering eucalyptus trees provide vertical relief in proportion to the broad horizontal plane of the freeway.

The I-5 corridor leads the traveler through a sequence of outdoor spaces that alternates between coastal valleys and their corresponding uplands. The valleys are characterized by natural open space and open water in the form of the ocean, lagoons and/or rivers, and the uplands consist of hills and mesas that contain a variety of developed land. Typically, new large-scale suburban development is primarily located east of I-5 and much of this is beyond the freeway viewshed,[1] while older, small scale beach communities are adjacent to and west of the freeway.

Landscape Units in the Project Setting

The project setting is broken down into Landscape Units, which are portions of the regional landscape that provides local visual context. A Landscape Unit can be thought of as an outdoor room that exhibits a distinct visual character, and will often correspond to a place or district that is commonly known among local viewers. Landscape Units identified for the proposed project are oriented to the freeway corridor, but also include characteristic landscape components in adjacent communities beyond the view of the freeway. Landscape Units for the proposed projects are identified in *Figure 3-7.1*.

Analyzing Visual Resources

Identify Visual Character

Visual character is descriptive and non-evaluative, which means it is based on defined attributes that are neither good nor bad in and of themselves. A change in visual character cannot be described as having good or bad attributes until it is compared with the viewer response to that change. If there is public preference for the established visual character of a regional landscape and a resistance to a project that would contrast that character, then changes in the visual character can be evaluated.

Assess Visual Quality

Visual quality is evaluated by identifying the vividness, intactness, and unity present in the viewshed. This approach is particularly useful in highway planning because it does not presume that a highway project is necessarily an eyesore. This approach to evaluating visual quality can also help identify specific methods for mitigating specific adverse impacts that may occur as a result of a project.

The three criteria for evaluating visual quality can be defined as follows:

Vividness is the visual power or memorability of landscape components as they combine in distinctive visual patterns.

[1] A viewshed is an analytical tool used to aid in the identification of views that could be affected by a potential project. The viewshed is defined as the surrounding geographic area from which the on-site elements of a project are likely to be seen, and is primarily delineated based on topography.

Intactness is the visual integrity of the natural and man-built landscape and its freedom from encroaching elements. It can be present in well-kept urban and rural landscapes, as well as in natural settings.

Unity is the visual coherence and compositional harmony of the landscape considered as a whole. It frequently attests to the careful design of individual man-made components in the landscape.

Assessment Methodology

A VIA (2009) was prepared for this project and can be referred to for additional details. The enjoyment or interpretation of experience can have many preferential and subjective components, yet there is clear public agreement that the visual resources of certain landscapes have high visual quality. The existence of a broad commonality of public response to visual stimuli has been validated by academic research and forms the basis for the FHWA method of visual quality assessment.

During the development of the assessment method, several sets of evaluative criteria based on relationships between visual components in the landscape were proposed and tested. One set that proved to be useful includes the three criteria mentioned above: vividness, intactness, and unity. The relationship among these three criteria correlates sufficiently well with public judgments of visual quality to predict those judgments. The FHWA concluded that professionals can use these relationships as valid and reliable criteria for evaluative appraisals of visual quality.

FHWA guidelines state:

> The objectivity of evaluation processes can sometimes be an issue. Two principal components of objectivity are reliability and validity. A test is reliable if different observers using the test obtain similar results. A test is valid if the results prove relevant to other evaluation measures, which may be more direct but generally impractical to use. Thus, it may be impractical to obtain a random and completely representative sample of the public to rate the visual effects of highway alternatives. Expert judgment may be a valid and reliable substitute, if it is based on criteria derived from research about public perceptions. Its validity can be further strengthened by direct but limited public response in project community involvement programs.

In addition to the FHWA method, this assessment relies upon a variety of public response data to validate its results. Public policy and planning document goals and objectives pertaining to visual quality and character were researched and are summarized in the viewer sensitivity section. Moreover, a wide range of direct public comment was received over a period of several years from elected officials, local agency staff, resource agency staff, interested community groups, organizations of design professionals, and the general public.

Figure 3-7.1: Landscape Units Map (not to scale)

Existing Visual Resources within the Project Setting

La Jolla Hills

Natural forms of mature groves of trees and rolling topography give this landscape unit its visual character (*Figures 3-7.2* and *3-7.3*). Freeway slopes are planted with eucalyptus trees and naturalized groundcover consistent with the adjacent UCSD campus landscape. The unit has an almost ranch-like appearance despite the presence of large institutional campus buildings.

The existing visual quality of this unit is moderate. Views from the freeway are somewhat limited due to its location in a depressed section, but the unity created between the freeway landscape and surrounding landscape is high. Intactness is moderate to high due to the lack of visually intrusive features in the landscape. Vividness is low to moderate.

Figure 3-7.2: Looking north to Voigt Drive overcrossing

Figure 3-7.3: Freeway landscaping blends with that of UCSD near Voigt Drive

Sorrento Valley

Open space and rolling hills in the southern portion give way to graded slopes and large-scale development farther to the north (*Figures 3-7.4* and *3-7.5*). In the valley, the I-5 / I-805 merge forms a wide horizontal plain of concrete bordered by retaining walls and topped by bridge structures. These features give the project area an urban character that contrasts with the natural landscape of Torrey Pines State Reserve to the west.

The existing visual quality of this unit is low to moderate. The tangle of freeway structures, manufactured topography, and large-scale development in the northern part of the unit results in low levels of intactness and unity. Views of the rolling hillsides near Genesee Avenue are moderate in intactness and unity. Both portions possess low levels of vividness.

Figure 3-7.4: Looking north to the freeway and Sorrento Valley beyond

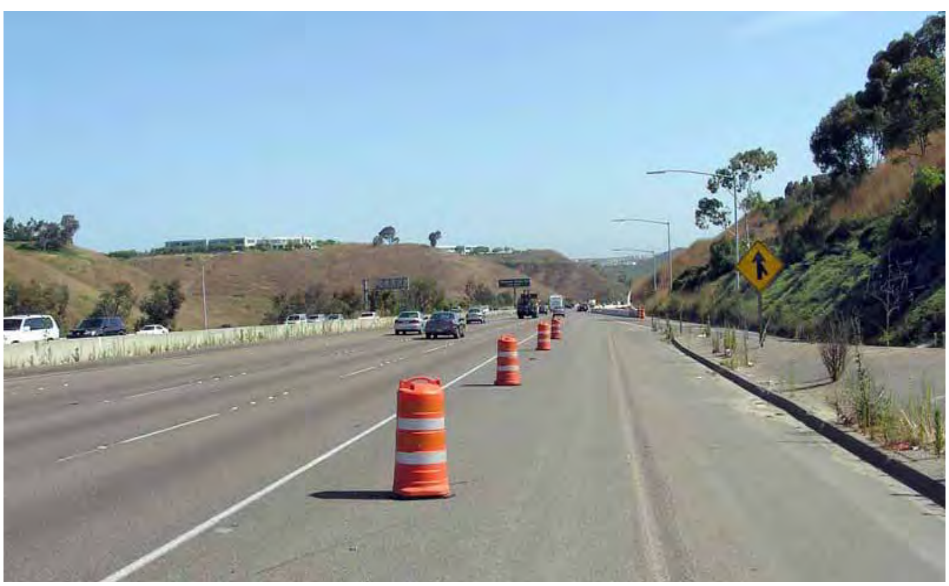


Figure 3-7.5: Looking north from northbound I-5 at Genesee Avenue

Carmel Valley

The unique forms, colors, and textures of Torrey Pines bluffs and Los Peñasquitos Lagoon become prominent here, and give this landscape unit a natural character despite the presence of the freeway and encroaching development to the east and north (*Figures 3-7.6* and *3-7.7*). Also, the freeway is more compatible with the surrounding landscape in scale and pattern character due to fewer lanes and contour-graded side slopes.

This unit has moderate to high levels of existing visual quality. The views of Torrey Pines State Reserve and beach, Los Peñasquitos Lagoon, and an historic bridge in the distance, possess very high levels of vividness, intactness, and unity. The visual quality of the unit is moderated by the presence of the freeway and adjacent development to the east.

Figure 3-7.6: A distant view of the ocean and Los Peñasquitos Lagoon from northbound I-5

Figure 3-7.7: A distant view of I-5 from Torrey Pines State Reserve

Del Mar Heights

Manufactured forms predominate here, including slopes that reinforce the flat planes and linear forms of the freeway and adjacent architecture (*Figures 3-7.8* and *3-7.9*). The overall visual character would be considered suburban due to the low density of the development and visual prominence of mature community landscaping.

Views from the freeway are limited to manufactured slopes, residential and commercial development, and the Del Mar Heights Interchange. Visual quality in this landscape unit is moderate due to a continuity of landscape elements between the freeway interchange and adjacent community that maintains a degree of unity and intactness despite the lack of vividness.

Figure 3-7.8: Looking north to Del Mar Heights Road

Figure 3-7.9: Looking south from the Del Mar Heights Road overcrossing

San Dieguito Valley

Views of the ocean and natural forms of the river valley are in contrast with views of the freeway itself, and commercial development at the northern side of the valley along Via de la Valle (*Figures 3-7.10* and *3-7.11*). The large tracts of natural open space allow distant views from the freeway, which outweigh the scale of built forms and give the valley an almost rural character. Highly visible, distinctive natural features also contribute to the natural feel of the area. The racetrack and fairgrounds complex is a cultural landmark that seems to reinforce the rural character by adding a resort atmosphere to the landscape.

Views of the natural features in the river valley, surrounding bluffs, and ocean, are of high vividness despite lower levels of unity and intactness found on the northern edge along Via de la Valle where commercial development is located. The racetrack enhances the vividness of the scene due to its unique location near the ocean “where the surf meets the turf.” Overall visual quality remains high because the vivid natural and man-made features far outweigh less desirable elements in the landscape.

Figure 3-7.10: Looking southwest from I-5 towards San Dieguito Lagoon and the bluffs of Del Mar

Figure 3-7.11: Looking northeast from I-5 towards San Dieguito Lagoon

Solana Beach Hills

Natural forms and human-scale manufactured visual elements adjacent to the freeway predominate in this unit. Views of the ocean and racetrack are available for southbound freeway travelers. As shown in *Figure 3-7.12*, median oleanders also reduce the scale of the freeway by half, in comparison to the landscape unit to the south. Manufactured cut slopes are vegetated with native and naturalized plants, and possess partially eroded surfaces similar to nearby scenic bluffs. With the exception of an office building in close proximity to the freeway, this unit displays a natural visual character associated with north coast beach communities.

The visual quality of this unit is moderate. Views from the freeway include topography, vegetation, and development characteristic of north coast beach communities that are moderated by foreground views of manufactured cut slopes. Views of the ocean from the southbound lanes add vividness to the unit. Unity and intactness are moderate due to encroaching visual elements such as a four-story commercial building located in close proximity to the northbound lanes. Tall vegetation and intervening slopes generally screen views of the freeway from the community. Some residences located near the freeway have ocean views, and the low-density, suburban hillside neighborhoods in which they are set possess high levels of visual quality.

Figure 3-7.12: A view of the sandstone slopes and northbound I-5, south of Lomas Santa Fe Drive

San Elijo Valley

Natural features of the ocean, San Elijo Lagoon, and bordering bluffs define the visual character of this landscape unit (*Figures 3-7.13* and *3-7.14*). Distant views to the eastern foothills display a typical west-to-east progression of the regional landscape as it transitions from coastal lagoon to inland foothills to back-country mountains. A small agricultural field on the northern side of the lagoon contributes a rural character to the unit, while the bisecting freeway and a residential community on the southeastern slope form an urbanized contrast.

Views of the ocean, the San Elijo Lagoon Reserve, and inland foothills contribute to the high level of visual quality in this unit. A residential development on the southeast edge of the preserve reduces intactness, but levels of vividness and unity remain high.

Figure 3-7.13: Distant view to eastern foothills from northbound I-5, south of Manchester Avenue

Figure 3-7.14: View of San Elijo Lagoon, agricultural fields, and sandstone bluffs from the shoulder of northbound I-5, just south of Manchester Avenue

Cardiff Bluffs

Natural forms and human-scale visual elements off the freeway predominate in this unit. Naturally vegetated open space canyons, bluffs, and hillsides are visible from the freeway and buffers overlooking residences (*Figures 3-7.15, 3-7.16,* and *3-7.17*). Ocean views are visible from the southbound lanes and this unit contains a scenic viewpoint overlooking the ocean and San Elijo Lagoon. Median oleanders reduce the scale of the freeway by half, and combined with freeway landscaping north of Birmingham Drive, suggest the visual character of a suburban parkway. This unit displays a natural visual character in its southern portion, and a suburban character to the north.

Visual quality in this unit is moderate to high. Ocean views, natural open space, small-scale residential development set in mature vegetation, and freeway landscaping combine to create high levels of intactness and unity. Vividness is moderate.

Figure 3-7.15: A view of I-5 looking south

Figure 3-7.16: Looking southwest from the Birmingham Drive overcrossing

Figure 3-7.17: Natural open space along the northbound lanes of I-5

Encinitas Uplands

South of Encinitas Boulevard, moderate levels of intactness and unity combine with moderate to low vividness as the freeway traverses a mixture of commercial, residential, and institutional land uses (*Figures 3-7.18, 3-7.19*, and *3-7.20*). The northern portion of the landscape unit exhibits higher levels in all three categories due to a consistency of residential land use and the unique visual character of the community as described elsewhere in this assessment. Overall visual quality for this landscape unit is moderate.

Figure 3-7.18: Wetland vegetation buffers the adjacent community from I-5

Figure 3-7.19: Northbound I-5, looking north toward Requeza Street overcrossing

Figure 3-7.20: Looking northwest across I-5 from MacKinnon Drive overcrossing

Leucadia Hills

Natural forms and human-scale visual elements off the freeway predominate in the unit. North of Encinitas Boulevard, long-established residential areas composed of widely spaced custom homes nestle in the remnants of historic avocado and citrus groves (*Figures 3-7.21* and *3-7.22*). Interspersed throughout are commercial greenhouses which contribute to the unit's distinctive character. Large groves of mature trees are the primary visual element, along with median oleanders that complement the view. These median oleanders reduce the scale of the freeway for the driver. This unit epitomizes the visual character associated with historic north coast hillside neighborhoods. Overall visual quality for this landscape unit is moderately high.

Figure 3-7.21: Looking west from southbound I-5, a residential area at Orpheus Street

Figure 3-7.22: Commercial greenhouses and open space lots characterize this landscape unit

Batiquitos Valley

The wide expanse of open water in Batiquitos Lagoon gives this landscape a distinct character rare in the arid climate of southern California. The rolling topography of this unit also distinguishes it from similar wetlands to the south, although the general character created by distant open views across natural open space continues to prevail even if an ocean view from the freeway is absent (*Figures 3-7.23* and *3-7.24*).

Batiquitos Lagoon is a vivid landscape component; although the vividness of the freeway viewshed is moderated somewhat because views to the west are limited and adjacent hillsides lack picturesque geologic features or vegetation. Recent development near the northern shore also moderates a high degree of unity and intactness. Overall visual quality is moderately high.

Figure 3-7.23: Batiquitos Lagoon as seen from southbound I-5

Figure 3-7.24: A view of Batiquitos Lagoon and I-5, looking southeast

Carlsbad Mesa

Relatively flat topography and large-scale development give this landscape unit an urban character (*Figures 3-7.25, 3-7.26*, and *3-7.27*). Despite the high number of manufactured landscape elements, ornamental landscaping and median oleanders play a large role in softening their effects and making the area more compatible with other coastal communities.

Generic suburban development placed on flat topography result in low levels of vividness and intactness. A moderate degree of unity exists due to regulated signage and landscaping. Another moderating influence is an agricultural field that is a visual resource and provides a vivid highlight to an otherwise ordinary suburban viewshed. Freeway landscaping (notably oleanders) provides a buffer for adjacent development, and screens views of an industrial area from the freeway. Overall visual quality is moderately low.

Figure 3-7.25: Commercial development bordering northbound I-5

Figure 3-7.26: Commercial development bordering southbound I-5

Figure 3-7.27: A naturalized drainage channel buffers northbound I-5 from nearby residences

Agua Hedionda

This landscape unit is characterized by the open water of the lagoon and the recreational and agricultural uses that border it (*Figures 3-7.28* and *3-7.29*). Freeway landscaping complements this character and screens views of contrasting industrial uses from freeway travelers. Five-story multiple unit residential buildings interspersed along the shore contrast with the natural elements contained in large tracts of open space near the water.

The high vividness of the lagoon with its adjacent agricultural land is reduced somewhat by moderate levels of intactness and unity caused by development on its northern shores. Views to the west are limited due to the freeway's low profile. Overall visual quality is moderately high.

Figure 3-7.28: A view of Agua Hedionda Lagoon from northbound I-5

Figure 3-7.29: A view of Agua Hedionda Lagoon from the southbound lanes

Carlsbad Village

This landscape unit is characterized by small to medium-scale built forms buffered by ornamental landscape elements (*Figures 3-7.30* and *3-7.31*). Mixed-use development gives the viewshed the appearance of a small town or village that is consistent with the downtown districts of other beach communities in the corridor.

The elevated section of the freeway in this landscape unit allows for expansive views across Carlsbad Village, including distant views towards the horizon. A traditional, pedestrian-scale village of this type is a rare and vivid image in southern California. The village landscape includes a variety of land uses that are, for the most part, unified in scale by building type and mature urban landscaping. Mature freeway landscaping serves as a buffer and a unifying element. An absence of encroaching signage contributes to the intactness of the setting. Overall visual quality is moderately high.

Figure 3-7.30: A view of Pine Street looking west to the freeway and ocean

Figure 3-7.31: Holiday Park as seen from the shoulder of northbound I-5

Buena Vista Lagoon

The natural forms of Buena Vista Lagoon and ornamental freeway landscaping at the I-5 / SR-78 Interchange characterize this landscape unit (*Figures 3-7.32* and *3-7.33*). Hosp Grove Park and Saint Malo Beach are two culturally important features that are visible from the freeway and reinforce the historic beach community character of the area. Large swaths of aquatic reeds in the lagoon provide seasonal changes in color and character. Two large retail centers at the east end of the lagoon conflict with the natural character of the viewshed.

The open space and open water of Buena Vista Lagoon is a vivid image in the midst of an urban area. The lagoon is bordered on the north by the SR-78 freeway and the south by Jefferson Street, which serve as low-profile buffers to encroaching development. Freeway landscaping also screens views of development. Unity and intactness of the freeway viewshed are moderately high, as is the overall visual quality.

Figure 3-7.32: View of I-5 at Buena Vista Lagoon, looking northwest

Figure 3-7.33: View of I-5 at Buena Vista Lagoon, looking northeast

Loma Alta Creek

Mature freeway landscaping featuring large eucalyptus trees and median oleanders set the visual character of this landscape unit (*Figures 3-7.34* and *3-7.35*). These visual elements enable the freeway to appear as a suburban parkway. Mid-ground views to open space, a golf course, and distant views of the ocean reinforce viewshed character. Residential and commercial development in the area is small scale and also features mature landscaping. An exception to this is a large mobile home park set on thinly landscaped manufactured terraced slopes.

The freeway viewshed in this landscape unit is primarily defined by mature freeway landscaping featuring tall eucalyptus trees that delineate the skyline. Linear sightlines are expanded at the Oceanside Boulevard Interchange by distant views to the west, where an ocean view is available to southbound travelers. This view provides orientation and vividness, and the mature freeway landscaping gives the viewshed a high degree of unity and intactness. Intactness is lessened for southbound viewers, however, by the presence of the above-mentioned mobile home park and its encroaching signage. Overall visual quality is moderately high.

Figure 3-7.34: Mature freeway landscaping establishes the parkway character of the viewshed

Figure 3-7.35: Mature freeway landscaping establishes the parkway character of the viewshed

Oceanside Gateway

This unit has a similar parkway character as the previous unit, despite the fact that it contains perhaps the highest density residential community in the I-5 North Coast Corridor (*Figures 3-7.36* and *3-7.37*). The tall freeway trees, mature landscape, and depressed freeway section, screen most off-site views for freeway travelers.

The same type of freeway landscaping described in the previous unit also contributes to the visual quality of this viewshed. Views of soundwalls and urban development beyond the right-of-way reduce vividness, intactness, and unity to moderate levels.

Figure 3-7.36: Freeway landscaping provides a visual buffer and improves visual quality of the landscape unit

Figure 3-7.37: Freeway landscaping provides a visual buffer and improves visual quality of the landscape unit

San Luis Rey River

For freeway travelers from the north, this unit serves as the visual gateway to the San Diego metropolitan region (*Figures 3-7.38* and *3-7.39*). As discussed, two visual elements in the freeway landscape create the signature parkway character of the I-5 North Coast Corridor. Tall eucalyptus trees on each side of the freeway provide vertical relief to the horizontal expanse of concrete paving, and oleander shrubs in the median block views of oncoming traffic and reduce the visible portion of the roadway by half. Tall fan palms in the community combine with ocean views to reinforce a beach resort appearance to the landscape. These also serve as pattern elements to soften manufactured forms, and provide natural forms, colors, and textures, to the visual environment.

As the freeway spans the San Luis Rey River valley, views of the ocean to the west and river valley to the east provide a high level of vividness. A wide variety of roadside commercial development, including high rise resort hotels, reduces the unity and intactness of the viewshed to moderate levels. Overall visual quality is moderately high.

Figure 3-7.38: A view of I-5 from the San Luis Rey River Trail

Figure 3-7.39: Plentiful landscaping forms a visual gateway to the San Diego region, as viewed from southbound I-5

Existing Scenic Resources within the Project Setting

The I-5 corridor is eligible for official designation in the California Scenic Highway System and is also designated as a scenic view corridor by some of the cities it traverses.

A scenic resource may be an object, set of objects, or a whole landscape that has exceptional visual quality, character, uniqueness, cultural significance, or historical value. Since there is no comprehensive list of specific features that automatically qualify as scenic resources, a Caltrans District Landscape Architect (DLA) is responsible to research community values, conduct field reviews, perform site analysis, and synthesize the data gathered, to determine whether scenic resources exist within the project area.

The following visual elements of the *I-5 NCC Project* viewshed have been identified as Scenic Resources:

The Pacific Ocean

The I-5 freeway provides visual access to the ocean for hundreds of thousands of people each day. These views orient the viewer in the landscape and introduce visitors to the visual character of the region. Views such as these are rarely experienced while traveling on a major urban freeway and establish the corridor's unique visual identity.

Ocean views from the freeway occur at the following locations:

- Northbound lanes between Carmel Mountain Road and SR-56
- Northbound lanes between Del Mar Heights Road and San Dieguito River Bridge
- Southbound lanes between Via de la Valle and Lomas Santa Fe Drive
- Northbound lanes between Lomas Santa Fe Drive and Manchester Avenue
- Southbound lanes between Manchester Avenue and Birmingham Drive
- Vista Point adjacent to southbound lanes north of Manchester Avenue
- MacKinnon Avenue overcrossing
- All lanes at Encinitas Boulevard
- Southbound lanes between La Costa Avenue and Poinsettia Lane
- Southbound lanes at Oceanside Boulevard
- All lanes at the San Luis Rey River Bridge

Coastal Wetlands

The coastal lagoons in the project area are some of the last surviving wetlands of their kind in southern California. The freeway also traverses two rivers that flow throughout the year, which is an unusual visual experience for southern Californians. Not only are the wetlands a rare commodity, the expansive open spaces associated with them offer relief from views of urban development, and also serve as view corridors from freeway to foothills.

These scenic resources exist at the following locations:

- Los Peñasquitos Lagoon in San Diego
- San Dieguito River in San Diego
- San Elijo Lagoon in Encinitas
- Batiquitos Lagoon in Carlsbad
- Agua Hedionda Lagoon in Carlsbad
- Buena Vista Lagoon in Oceanside
- San Luis Rey River in Oceanside

Torrey Pines State Reserve

The vivid sight of native Torrey pines clinging to picturesque coastal bluffs at the headland of Los Peñasquitos Lagoon is considered to be one of the scenic treasures of the region. The Reserve is visible from the Sorrento Valley and Carmel Valley landscape units.

Coastal Bluffs

The bluffs are ancient marine terraces cut by the sea and are composed primarily of cream-colored Torrey sandstone capped by a denser layer of rust red Linda Vista Formation that contains protruding horizontal bands of cobblestones. These picturesque eroded cliffs are found near coastal beaches, lagoons, and rivers. The distinctive eroded appearance of the sandstone bluffs also appears in old road cuts, and to a lesser extent, on some freeway cut slopes. Eroded sandstone is particularly associated with the Torrey Pines, Del Mar, and Solana Beach communities.

Areas in which this scenic resource exists are:

- Torrey Pines State Reserve
- Southern slopes of the San Dieguito River Valley
- Native slopes of the San Elijo Valley
- Native slopes adjacent to the northbound freeway lanes between Manchester Avenue and Birmingham Drive

Agricultural Land

The strawberry fields situated along I-5 near Manchester Avenue in Encinitas and Cannon Road in Carlsbad are highly visible artifacts of historic land uses, are in visual harmony with adjacent lagoons, and provide relief from the visual patterns of urban development along the corridor. As development continues to displace agriculture in southern California, their uniqueness and value as a scenic resource increases in equal proportion.

Encinitas and Leucadia Hillside Neighborhoods

These neighborhoods exemplify Encinitas' unique historic identity as a center of exotic horticulture. The older homes in this area were built early in the twentieth century on large parcels of several acres that were utilized as avocado groves, exotic plant nurseries, or commercial greenhouse space. The homes were sited atop a coastal ridge that afforded views of the ocean to the west and mountains to the east. Most were designed in the romantic Spanish Colonial style and featured outdoor living areas surrounded by lush tropical landscaping.

Today, the visual character of the scene survives despite intense urban development that has occurred elsewhere along the coast. A few parcels have been subject to residential infill projects, but many of the original homes, large stands of tall trees, and some of the avocado groves, nurseries, and greenhouses remain. This is a viewshed that would not at first glance be considered scenic, yet it retains a high level of vividness due to the rarity of residential open space near the coast. Views of this resource are available from the freeway between Encinitas Boulevard and La Costa Avenue.

Carlsbad Village

Holiday Park, located in Carlsbad Village, is visible from the elevated northbound freeway lanes. The village that surrounds the park was developed in the first half of the twentieth century and is what urban planners now call a traditional or livable community. This means that commercial and residential land uses coexist, streets are relatively narrow and shaded with large trees, parking lots and commercial signage are barely noticeable, and commercial buildings are in scale with nearby custom-built single-family homes. Freeway landscaping screens the sight of moving traffic from the community, and large trees enable it to be consistent with the Village's visual character. This scene forms a sharp contrast to the more contemporary and commonplace land use patterns and building types found in the Carlsbad Mesa landscape unit to the south.

Freeway Median Oleanders

As southbound travelers approach the City of Oceanside, they are introduced to San Diego's metropolitan region by freeway landscaping of a type not experienced as they passed through urban areas to the north. The route changes from a standard freeway to a green parkway, principally due to the presence of large, flowering oleander shrubs in the median. Oleanders reduce the scale of the freeway by half as they screen views of oncoming traffic. They provide cooling visual relief with their soft, green, natural appearance. They are a visual link to scenic areas adjacent to the freeway. Median oleanders are an I-5 freeway feature unique to San Diego and vividly communicate the region's distinctive landscape character. The oleanders extend from Harbor Drive Interchange in Oceanside to the San Dieguito River Bridge in San Diego, and again from Genesee Avenue Interchange in San Diego past the southerly project limit.

Existing Landmarks

Landmarks are prominent features in the landscape that provide orientation or identify a particular locality. In most cases, they possess some degree of cultural significance. Landmarks are not necessarily scenic resources because some can act as encroaching visual elements and reduce visual quality. The following are landmarks located within the project viewshed:

- Del Mar Racetrack and Fairgrounds – The Del Mar Racetrack and Fairgrounds, adjacent to the ocean, are visible from the freeway in the San Dieguito Valley and Solana Hills landscape units. For generations of San Diegans, this image brings to mind the slogan "where the surf meets the turf."

- Encina Power Station – The Encina Power Station's single concrete chimneystack is a Carlsbad landmark. Because of its location directly adjacent to the beach, it is visible from La Jolla to San Clemente. Freeway travelers can see the plant from Carlsbad Mesa, Agua Hedionda, and Carlsbad Village landscape units.

Please see *Figure 3-7.110* for the Scenic Resource Map.

Methods of Predicting Viewer Response

Viewer Response

Viewer response is composed of viewer sensitivity and viewer exposure.

Viewer Sensitivity

Viewer sensitivity is defined both as the viewers' concern for scenic quality and the viewers' response to change in the visual resources that constitute the view.

Local values and goals may confer visual significance on landscape components and areas that would otherwise appear unexceptional in a visual resource analysis. Even when the existing appearance of a project site is uninspiring, a community may still object to projects that fall short of its visual goals. Analysts can learn about these special resources and community aspirations for visual quality through citizen participation procedures, as well as from local publications and planning documents.

Research has shown that viewers exhibit similar responses to the arrangement of visual elements in outdoor space, and that spatial qualities can positively or negatively affect their personal comfort and ability to function. For example, most people respond negatively to large expanses of undifferentiated groundplane and hard vertical spatial edges that obstruct views. In contrast, people respond positively to a varied groundplane, coherent spatial relationships that provide opportunities for discovery, and open views that include orientation features such as landmarks. This behavioral consistency enables the reliable prediction of viewer sensitivity to changes in the visual environment.

Viewer Exposure

Viewer exposure is typically assessed by measuring the number of viewers exposed to the resource change, type of viewer activity, duration of their view, the speed at which the viewer moves, and the position of the viewer.

Studies indicate that people are active receptors of visual information and seek understanding from experiencing their surroundings. Therefore, high viewer exposure heightens the importance of early consideration of urban design, public art, and architecture and their roles in managing the visual resource effects of a project.

Viewer Groups, Viewer Exposure, and Viewer Awareness

Freeway Travelers

There are approximately 250,000 freeway travelers per day in the project area, which is the primary northern gateway for visitors to the San Diego metropolitan area. Many local residents also commute to and from coastal north county every day and use a majority of the 27-mile project. During periods of free flow travel, the project can be traversed in approximately 25 minutes.

The I-5 North Coast Corridor links two of the nation's largest metropolitan regions and is the primary transportation gateway to San Diego from the north. As San Diego's "front door," it forms the first impression of the region's scenic character for millions of tourists each year.

Daily commuters may have an increased awareness of views from the road due to the amount of time spent on the facility each day. Those that experience congested traffic conditions and slower speeds tend to notice views beyond the freeway itself.

Tourists traveling to and from San Diego on I-5 would likely have a high awareness of the visual environment. Studies have shown that visitors' perceptions of a metropolitan region are formed to a great extent by the views they observe from the road.

Drivers traveling at normal freeway speeds will focus attention on long distance, non-peripheral views. Passengers have a heightened awareness of a wide range of views.

Community Residents

Hundreds of residents live near the freeway. Landscaping and/or berms now screen most residential views of the freeway. Some residents located at an elevation higher than the freeway have long duration mid-ground views of moving traffic. A number of these residents also have distant views of the ocean. Most residents located below freeway elevation view landscaped fill slopes. Some fill slopes also include small retaining walls.

Residents typically have a high concern about the effect of the project on views from their homes and its effect on the visual character of their community.

Recreational Area Users

The freeway is adjacent to five natural preserves, two open space parks, five community parks, three recreational areas, and one golf course. Hikers and equestrians have foreground to mid-ground views of the freeway facility for periods of less than an hour. Community park users have mid-ground views of the freeway for longer periods of time. Golfers have mid-ground to distant views of the facility for up to three hours.

Those that visit nature preserves and open space parks near the freeway may have a high concern about project appearance due to its potential to disrupt their experience of the natural environment. Community park users would have an acute awareness of the proposed project features due to the relative scale of park to freeway.

Commercial Employees and Patrons

A variety of commercial uses ranging from shopping centers to hotels are located near the freeway. Potentially, there are hundreds of viewers per day with short to moderate duration views of the facility. Commercial employees and patrons would likely have a moderate to low awareness of visual changes caused by the project.

Business Park Employees and Visitors

Office buildings located in North City West and Carlsbad would have direct, foreground to mid-ground views of the freeway. Employees working in these buildings would have moderate duration views of the facility. Office workers would likely have a low awareness of the freeway.

Local Street Users

Thousands of drivers using local streets each day have short-duration views of the freeway facility at interchanges. Pedestrians and bicyclists using the interchanges would have longer-duration views. There are residential frontage streets such as Orpheus Avenue in Encinitas that have direct views to the freeway. Community residents are the primary users of these streets and would have short-duration views of the proposed project. Some residents may have high frequency exposure to these views from local streets. Adjacent streets such as Avenida Encinas in Carlsbad serve commercial areas and would have direct foreground views of freeway traffic.

Frequent users of local streets near the freeway would have a high awareness of visual change caused by the project.

Public Facility Users

Thousands of students and faculty, healthcare facility patients and staff, city staff, and citizens have short- to long-duration views of the freeway. UCSD and Scripps Memorial Hospital would be adjacent to the proposed DAR at Voigt Drive. Oceanside High School is in close proximity to I-5, and hundreds of students are exposed to traffic entering and exiting the freeway at the Mission Avenue Interchange on a daily basis.

Public facility users would have a low to moderate awareness of the freeway. Awareness would be most acute for students who walk near or across the facility to attend classes.

Viewer Sensitivity

In an area as scenic as the I-5 North Coast Corridor, there are many visual resources that are important not only to local viewers, but also to residents of the region and visitors from around the world. Within the corridor viewshed, natural features such as the ocean, beaches, lagoons, sandstone bluffs, canyons, agricultural fields, and natural open space are particularly memorable because it is unusual for a traveler on an urban freeway in southern California to see such a quantity of scenic open space.

Also important to local viewers is the village-like character of the older seaside communities that border the freeway. This character can be viewed from the freeway as travelers pass through older neighborhoods such as Carlsbad Village, or the residential neighborhoods of Encinitas that are characterized by the presence of horticultural greenhouses and avocado groves. The historic suburban appearance that has been preserved in the older communities of the corridor is considered to be a scenic resource in itself.

The portion of I-5 within the project area is part of the California Scenic Highway System as a route eligible for official designation. Additions and deletions to the list of highways eligible for designation are made through legislative action. Because local agencies are required to complete a lengthy nomination process in order to nominate a route as an eligible scenic highway, it can be assumed that viewer sensitivity to visual changes to that route would be above average.

Caltrans has adopted policies relating to the protection of scenic corridors with Deputy Directive 31, and context sensitive solutions with Director's Policy 22, as a response to public sensitivity regarding the effects of highway projects on visual resources.

Caltrans Deputy Directive 31 states:

> Caltrans, in cooperation with affected communities, identifies impacts to scenic corridors as an integral part of its project planning and project development process, taking into account local perspectives, and is sensitive to the obstruction or degradation of any scenic view open to the public.

Caltrans Director's Policy 22 states:

> Caltrans uses "Context Sensitive Solutions" as an approach to plan, design, construct, maintain, and operate its transportation system. These solutions use innovative and inclusive approaches that integrate and balance community, aesthetic, historic, and environmental values with transportation safety, maintenance, and performance goals. Context sensitive solutions are reached through a collaborative, interdisciplinary approach involving all stakeholders.

The sensitivity of California citizens to changes in coastal resources was clearly expressed in 1972 with the passage of Proposition 20, the "Save Our Coast" initiative. The initiative created the California Coastal Commission (CCC), and in 1976, the Legislature adopted the California Coastal Act. The project area is located in the California Coastal Zone, which is under the jurisdiction of the CCC. The CCC works with local governments and other public agencies to protect public beach access, wetlands, wildlife, water quality, scenic vistas, and coastal tourism in accordance with the California Coastal Act. This document focuses on effects of the *I-5 NCC Project*. Further information on transportation projects within the coastal zone can be found in the PWP/TREP (Appendix R).

Regarding visual resources, Chapter 3, Article 6, Section 30251 of the Coastal Act states:

> The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas.

Similar values are expressed in the planning documents and ordinances of local cities along the coast. The scenic qualities that give coastal communities their unique sense of place are highly valued by north coast residents and are perhaps best expressed in the following excerpts from the City of Del Mar General Plan:

> Unquestionably the strongest theme running through the Citizen's Report was the determination to maintain Del Mar as a village-like community of uncrowded, predominantly single-family residences. A closely related principal concern was the permanent protection of the outstanding natural features of Del Mar. Specifically, the citizens were concerned with preservation of Del Mar's two and one half miles of sand beach, its still largely undeveloped scenic sandstone bluffs, the open vistas and private gardens, the groves of native and exotic trees, and the presently degraded but restorable San Dieguito Lagoon.
>
> A broad-based concern for proper land use is especially important for Del Mar because of the community's regional significance as part of the coastal land of California. It should not be forgotten that the village qualities of sea-side communities like Del Mar are appreciated by people of all California and even of nearby states.

Specific goals and policies contained in the general plans of other cities in the corridor reflect the community values expressed above. For example, most cities have instituted building height restrictions in the coastal zone to preserve the existing village character of the seaside and protect visual access to the ocean. A summary of such goals and policies that pertain to the I-5 corridor follows below.

The Torrey Pines Community Plan recommends relocating overhead power lines adjacent to Sorrento Valley Road at Los Peñasquitos Lagoon underground. It also contains guidelines to ensure visual compatibility between natural open space features and nearby development. Building size, form, and color are to be subordinate to the natural environment. The plan also recommends planting Torrey Pine trees in roadways and other landscaped areas. It requires the installation of landscaping to screen views of development from designated scenic roadways.

The City of Encinitas General Plan has designated I-5 at the San Elijo lagoon as a scenic view corridor. It identifies bluffs, rock outcroppings, natural drainage courses, wetland and riparian areas, steep topography, trees, and views as significant natural features to be preserved. It has also identified the entire I-5 corridor within the City limits as a Scenic View Corridor. Encinitas has set a General Plan goal to maintain the sense of spaciousness within the I-5 corridor, and has a policy to encourage and preserve low-density residential zoning adjacent to I-5 and discourage development that would infringe upon scenic views and vistas within the I-5 corridor. It has a policy to encourage retention of buffer zones such as natural vegetation or earth barriers, bluffs, and canyons to protect areas adjacent to the freeway. It considers public use facilities such as linear parks, local streets, public parking, pedestrian and bicycle trails, and related facilities to be land uses compatible with the I-5 corridor. It encourages freeway median planting and other freeway landscaping.

The City of Carlsbad General Plan has designated the segment of I-5 within the City as a scenic corridor. It also identifies hillsides, ridges, valleys, canyons, beaches, lagoons, and lakes as visual resources. It considers passive parks, open space, and agriculture as land uses compatible with I-5. It discourages the use of walls in excess of 6 ft in height for noise attenuation.

Since the project area is within the California Coastal Zone, is eligible for the California Scenic Highway System, and has been designated by Encinitas and Carlsbad as a scenic view corridor, overall public sensitivity to visual changes caused by the proposed project could be considered high.

3.7.3 Environmental Consequences

Assessment Method

The process used in the VIA to evaluate potential visual impacts associated with the proposed project follows the federal guidance outlined in the Visual Impact Assessment for Highway Projects (FHWA, March 1981). This process includes the following steps:

1. Define the project setting and viewshed (see *Section 3.7.2)*
2. Identify key views for visual assessment
3. Analyze existing visual resources and the viewer response
4. Depict the visual appearance of project alternatives
5. Assess the visual impacts of project alternatives
6. Propose methods to avoid, minimize, and/or mitigate adverse visual impacts

Assess Change to Visual Character - Since visual character is descriptive and non-evaluative, change alone is assessed at this stage. The change likely to be caused by the project is assessed according to the visual attributes of objects (pattern elements) and the relationships between those objects (pattern character) in the visual environment before and after the project is constructed.

Assess Change to Visual Quality – The second step of the process is to compare the visual quality of the existing resources with projected visual quality after the project is constructed. Existing and proposed intactness, unity, and vividness are assessed and compared.

Predict Viewer Response – Viewer response to changes in the visual environment is predicted by using existing viewer exposure and viewer sensitivity values, which are assumed to remain constant before and after the project is implemented. The viewer response to project changes is the average of viewer exposure and viewer sensitivity to the project.

Determine Visual Impact – The resulting level of visual impact is determined by averaging the degree of resource change with the extent to which people are likely to be affected by the change (viewer response).

Definition of Visual Impact Levels

Low – Low negative change to existing visual resources, and low viewer response to that change. May or may not require mitigation.

Moderately Low – Low negative change to the visual resource with a moderate viewer response, or moderate negative change to the resource with a low viewer response. Impact can be mitigated using conventional practices.

Moderate – Moderate negative change to the visual resource with moderate viewer response. Impact can be mitigated within five years using conventional practices.

Moderately High – Moderate negative visual resource change with high viewer response or high negative visual resource change with moderate viewer response. Extraordinary mitigation practices may be required. Landscape treatment required would generally take longer than five years to mitigate.

High – A high level of negative change to the resource or a high level of viewer response to visual change such that extraordinary architectural design and landscape treatment may not mitigate the impacts below a high level. An alternative project design may be required to avoid high negative impacts.

Assessing Project Alternatives

The 10+4 Buffer alternative was assessed in the VIA and the comparative impacts of other build alternatives have been interpolated. That project alternative was chosen because its footprint width is an approximate average of the other proposed build alternatives. The decision to interpolate the impacts of the other alternatives was made because the footprint width of all build alternatives is very similar (about 12-ft maximum difference in most locations). This is due to the inclusion of auxiliary lanes in the 8+4 alternatives, narrow inside shoulders in the 10+4 alternatives, and the use of eight mixed-use lanes in the northern portions of the 10+4 alternatives. Therefore, the difference in impact severity between build alternatives in most locations would be minor.

Since it is a project objective to minimize construction outside existing right-of-way limits, differences in visual effects would primarily consist of roadway views pertaining to pavement width, retaining wall height, and removal of oleanders in the median. Other project features that create visual effects such as soundwalls would essentially be the same for all build alternatives. In certain locations, the 10+4 Barrier alternative may require acquisition of additional right-of-way that may require additional assessment. This would be done on a case-by-case basis.

Analysis of Key Views

Because it is not feasible to analyze all the views in which the proposed project would be seen, it is necessary to select a number of representative key viewpoints that would most clearly display the visual effects of the project. Key views also represent the primary viewer groups that would potentially be affected by the project. *Figure 3-7.40* depicts the locations of 17 key views along the corridor.

Key view photo simulations depict primary design elements of the proposed project. Some visual features proposed as mitigation such as landscaping and enhanced structure design are being integrated into the proposed project features to minimize adverse visual impacts. Some of these features are depicted in the photo simulations for illustrative purposes. Additional mitigation measures to those depicted may be required in each location. Specific mitigation requirements would be determined during the design phase according to the implementation procedures contained in the visual mitigation section of this assessment. Mitigation measures shown outside Caltrans right-of-way such as trees planted along local streets or those that require the installation of non-standard equipment such as pedestrian bridge lights would be implemented only if the responsible local government is willing to maintain them in perpetuity.

All photo simulations are constructed using current design data that may change as the project is developed. Appurtenances (an accompanying part or feature of the freeway such as overhead signs, signals, and value pricing equipment) could cause additional impacts that may require additional assessment in the future.

Figure 3-7.40: Key View Map

Key View 1 – Voigt Drive DAR

Orientation

La Jolla Hills Landscape Unit in San Diego, southbound I-5 between Genesee Avenue and La Jolla Village Drive Interchanges, looking south to Voigt Drive overcrossing (*Figure 3-7.41*).

Proposed Project Features

Project features would include DAR structures, overcrossing widening, Voigt Drive widening and modifications, freeway improvements, retaining walls up to 46 ft in height, and loss of most existing freeway landscaping including median oleanders (*Figure 3-7.42*).

Change to Visual Quality/Character

Visual unity and intactness between the freeway and adjacent land uses would be reduced to low levels with the introduction of large walls, ramp structures, and widened local streets. This would occur despite the use of project features such as terrain-contoured retaining walls, planting pockets at freeway level, median landscaping where possible at DAR, enhanced bridge design, landscape buffer planting at the top of walls, and widened sidewalks and landscaped parkways on Voigt Drive. The resulting visual quality of the freeway would be low. The existing campus character and compatible suburban parkway character of the overcrossing area and the freeway would change to one resembling an urban core area due to the large structures that are proposed. This would contrast with the visual context of the landscape unit, and could be viewed as a negative change to the community.

Viewer Response

The freeway would serve over 200,000 vehicles per day. Voigt Drive would accommodate thousands of freeway users; UCSD students, faculty, and staff; and hospital users; per day. Duration of views would vary from less than a minute to several minutes. Viewer awareness and activity could be redirected toward the proposed freeway features. Viewer sensitivity could be high. Overall viewer response could be high.

Resulting Visual Impact

The change in visual quality would be from moderate to low. Visual character would undergo a high degree of change as it transitions from suburban campus/parkway to urban core. Viewer response could be high. The resulting visual impact would be high.

Figure 3-7.41: Key View 1 - Voigt Drive: Existing view looking south

Figure 3-7.42: Key View 1 - Voigt Drive: Proposed view looking south along DAR ramp

Key View 2 – I-5 at Del Mar Heights Road

Orientation
Del Mar Heights Landscape Unit in San Diego, northbound I-5 between Del Mar Heights Road and Via de la Valle Interchanges, looking north (*Figure 3-7.43*).

Proposed Project Features
A pair of large retaining walls is proposed in the existing cut slopes to accommodate freeway improvements. The wall on the northbound side would be about 3600 ft in length and 33 to 40 ft in height, with the majority of the wall being 30 to 33 ft in height. The corresponding southbound wall would be of similar size. These walls would be designed as "terrain-contoured walls" as a visual impact minimization feature (illustrated in the visual mitigation section) and would be typical of those proposed for similar large cut slopes in Solana Beach, Cardiff, Encinitas, and Carlsbad. They would be located at or near existing mid-slope benches so the upper portion of existing slopes and their vegetation could be preserved intact. In addition, they would have curved surfaces, sloped faces, integral earth-tone colors, and enhanced surface textures. They would be partially screened from freeway users by landscaped slopes at their bases. A safety barrier would be incorporated where the wall would be within the clear recovery zone. In this key view location, the freeway surface would increase to almost twice its existing width (*Figure 3-7.44*).

Change to Visual Quality/Character
The proposed walls would decrease the intactness and unity of the viewshed from moderate to low levels. Views of the preserved upper slopes and adjacent community would be obscured because the tops of the near-vertical retaining walls would block the line of sight for many freeway viewers. Vividness also would be reduced as the attention of the viewer is directed more toward foreground views of the widened freeway. Large forms would be built in both the horizontal and vertical planes and would be incompatible with the small-scale suburban character of the community. They would produce a marked increase in visual contrast between the freeway and its surroundings. The change to visual character would be high.

Viewer Response
The freeway would serve over 200,000 viewers per day with foreground views of the project. Hundreds of local street users on Del Mar Heights Road would have mid-ground views of the walls. Duration of views would vary from less than one minute to several minutes. Some local residents would be able to view the freeway from their rear yards. Viewer sensitivity to changes in the visual environment in the Torrey Pines and Del Mar communities could be high.

Resulting Visual Impact
The change to visual quality would be moderate. Change to visual character would be high. Viewer response would be moderately high. Overall visual impact would be moderately high.

Figure 3-7.43: Key View 2 - I-5 at Del Mar Heights Road: Existing view looking north

Figure 3-7.44: Key View 2 - I-5 at Del Mar Heights Road: Proposed view looking north

Key View 3 – Ida Avenue in Solana Beach

Orientation

Solana Hills Landscape Unit in Solana Beach at Ida Avenue south of Genevieve Street looking north (*Figure 3-7.45*).

Proposed Project Features

Freeway improvements would require a large retaining wall along Ida Avenue. The wall would be up to 30-ft tall and 1300-ft long. The circulated Draft EIR/EIS evaluated a solid 12-ft masonry soundwall on top of the retaining wall that would bring its total height up to 42 ft. That wall would block existing scenic coastal views from the freeway. Based on general comments received on loss of potential ocean views during public review of the Draft EIR/EIS and Supplemental Draft EIR/EIS, as well as coordination with the CCC, the masonry soundwall was assessed with a nine-ft transparent soundwall on a three-ft solid concrete barrier in an attempt to reduce coastal view impacts. A transparent soundwall at this location proved unsatisfactory. Views to the ocean and racetrack would be obscured by the soundwall posts and horizontal framing, reflections off translucent panel surfaces, and image distortion through the panels. The plexiglass panels incorporate wire safety mesh which changes the clear panel to be light gray, and the gray color would obscure the gray/blue color of the ocean. The viewer would interpret the ocean view as hazy sky. Also, the Ida Avenue view to the coast is at an angle. Transparent walls are best used where the view is straight on through the transparent panels (perpendicular) and where views are of long-duration. At freeway speeds, the viewer would perceive a series of translucent panels, posts and metal framing. Coastal views must be retained to comply with the Coastal Act. Therefore, the soundwall was assessed to be split with a gap where the blocked coastal view was identified. A three-ft concrete safety barrier would occur at the gap for coastal view. Therefore, the retaining wall and three-ft concrete safety barrier would result in a solid wall height of 33 ft at the highest point.

The soundwall and retaining wall surface would be battered and the walls and barrier would incorporate architectural treatment similar to that found in the Lomas Santa Fe Drive Interchange Improvement Project. A small landscaped slope would be located at the base of the wall on the residential side. Existing overhead utility lines would be relocated underground. In addition, street landscaping consistent with the Eden Gardens Master Streetscape Plan would be included as part of the freeway project (*Figure 3-7.46*).

Change to Visual Quality/Character

The proposed soundwall, retaining wall, and barrier would reduce visual unity, intactness, and vividness from existing moderate levels to low levels. Structures of that size are normally associated with urban core areas, and would form a severe contrast to the visual character of the neighborhood.

Viewer Response

Hundreds of residents and local street users would have foreground, mid-ground, and background views of the project. Unlike the solid soundwall identified in the Draft EIR/EIS, the gap in the soundwall would allow taller vehicles on the freeway to be visible. Durations of the views would range from minutes to hours. Viewer exposure would be moderate. Views from some homes on Ida Avenue are directed toward the freeway, so viewer awareness would be moderate to high. Viewer sensitivity would be moderately high. Overall viewer response would be moderately high for either the solid soundwall or the soundwall with the gap.

Resulting Visual Impact

Change to visual quality would be moderately high, change to visual character would be high, and viewer response to proposed changes would be moderately high. The visual impact would therefore be moderately high for either the solid soundwall or the soundwall with the gap.

Figure 3-7.45: Key View 3 - Ida Avenue: Existing view looking north

Figure 3-7.46: Key View 3 - Ida Avenue: Proposed view looking north

Note: Key View 3 is not updated. The proposed soundwall would be replaced by a split soundwall with a concrete safety barrier at the gap to preserve scenic views.

Key View 4 – I-5 at Ida Avenue

Orientation

Solana Beach Landscape Unit in Solana Beach, southbound I-5 south between Via de la Valle and Lomas Santa Fe Drive Interchanges, looking southwest (*Figure 3-7.47*).

Proposed Project Features

Freeway improvements would add three lanes to the west of the existing shoulder. The Draft EIR/EIS evaluated a solid soundwall 12 ft in height. As part of this Final EIR/EIS, this solid soundwall was split to include a gap to retain coastal views, per compliance with the Coastal Act. At the gap in the soundwall, a three-ft concrete safety barrier has been recommended at the edge of the proposed roadway. As described under Key View 3, based on general comments received on loss of potential ocean views during public review of the Draft EIR/EIS and Supplemental Draft EIR/EIS, as well as coordination with the CCC, the masonry soundwall was assessed with a nine-ft transparent soundwall on a three-ft solid concrete barrier to retain the coastal view from the freeway. A split soundwall with a gap to preserve a coastal view is now recommended at this location.

Change to Visual Quality/Character

The overhead utility lines would be buried. The proposed concrete safety barrier would preserve existing scenic views of the ocean and racetrack, and partially screen foreground views. The split soundwall with gap changes the result from high to moderately low level of change in visual quality and would retain public access to a high quality visual resource. The open character of the existing freeway would be preserved. The additional paving and concrete barrier would contribute to the freeway change to a large urban freeway. This would contrast with the existing visual character.

Viewer Response

More than 100,000 viewers per day, with short-duration views, would be affected by the proposed changes. Distant views of the ocean would be preserved by the gap in the soundwall. This would change the level of awareness from high to moderate by viewers to the proposed changes. Therefore, the change from a solid soundwall to the split soundwall with a gap would be moderately high to low for viewer response.

Resulting Visual Impact

Change to visual quality and character for the solid soundwall would be high, and for the soundwall with gap it would be moderately low. Viewer response to those changes could likely be moderately high for the solid soundwall and for the soundwall with gap it would be low. Therefore, the visual impact for the solid soundwall would be high and for the soundwall with gap it would be moderately low.

Figure 3-7.47: Key View 4 - I-5 at Ida Avenue: Existing view looking southwest

Figure 3-7.48: Key View 4 - I-5 at Ida Avenue: Proposed view looking southwest

Note: Key View 4 is not updated. A split soundwall with a gap to preserve a coastal view is now recommended at this location.

Key View 5 – I-5 at Manchester Avenue

Orientation
San Elijo Lagoon Landscape Unit in Encinitas, northbound I-5 at the San Elijo Lagoon Bridge, looking north (*Figure 3-7.49*).

Proposed Project Features
Following circulation of the Draft EIR/EIS, the proposed DAR was redesigned in consideration of the sensitive visual context of the area as a scenic gateway to Encinitas. It is currently proposed as a trenched access ramp and an undercrossing to maintain views of the surrounding hillsides, open spaces, and San Elijo Lagoon. A trenched DAR facility would be located just north of the interchange loop ramp. It would consist of entry and exit ramps descending into the median and meeting at an undercrossing structure below the northbound lanes. The median ramp would have retaining walls at each side that would reach a maximum height of 26 ft. Here the paved freeway footprint would be at its widest as additional DAR entry and exit lanes would be added to existing or proposed through lanes for each project alternative. Existing oleanders would be removed from the median. Large terrain-contour retaining walls would be terraced on each side of the freeway to replace existing cut slopes. The scenic bluffs located above the northbound slope would remain undisturbed. The DAR access road would go east from the freeway undercrossing to the proposed San Elijo Multi-use Facility located on existing agricultural fields behind the gas station. The access road would connect to Manchester Avenue east of the station. The multi-use facility would provide a bus platform and parking for 150 cars. It would be situated below the level of the existing ground plane to minimize its visibility (*Figure 3-7.50*).

Change to Visual Quality/Character
The bridges, walls, loss of trees, and parking lot proposed for this scenic area would cause a high degree of change to its visual quality and character. Intactness and unity levels would change from high to low, and vividness would be reduced to a moderate level. Visual character would change as incompatible built forms replace existing visual resources.

Viewer Response
Hundreds of thousands of freeway travelers and thousands of local street users would view the project each day. Hundreds of residents would have views to the project. Viewer response is high.

Resulting Visual Impact
Change to visual quality and character would be high. Viewer response is high. The visual impact would be high. The DAR redesign of a trenched ramp and undercrossing instead of elevated ramps and overcrossing would reduce the visual impact.

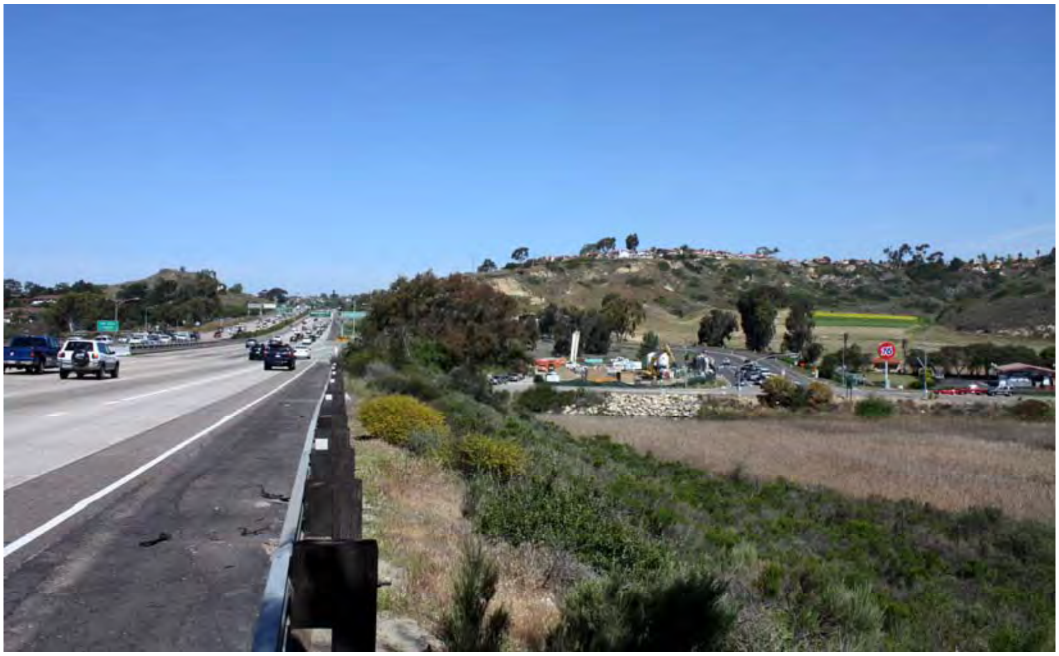


Figure 3-7.49: Key View 5 - I-5 at Manchester Avenue: Existing view looking north

Figure 3-7.50: Key View 5 - I-5 at Manchester Avenue: Proposed view looking north

Key View 6 – Devonshire Drive in Encinitas

Orientation

Encinitas Upland Landscape Unit in Encinitas, Devonshire Drive near Requeza Street, looking north (*Figure 3-7.51*).

Proposed Project Features

A soundwall 16 ft in height is proposed to be located at the freeway right-of-way. It would be approximately 950 ft in length. The wall would incorporate architectural detailing in addition to enhanced color and texture to reduce its apparent size and increase its compatibility with the surroundings. Street trees would also be planted in front of the wall if the City maintains them in perpetuity (*Figure 3-7.52*).

Change to Visual Quality/Character

The proposed wall would be an encroaching urban element due to its large size. It would replace the variable spatial edge of the neighborhood with a tall, vertical plane. Its height would be more than twice that allowed by local building codes for solid, freestanding walls in residential communities. In a small-scale community environment such as this, the wall would look singularly out of place, and reduce unity and intactness to moderately low levels.

Viewer Response

There are hundreds of local street users and residents who view this area each day. Most views are of short duration, but there would be a high awareness of the proposed visual changes. Residents would likely be sensitive to this change in their neighborhood.

Resulting Visual Impact

Change to visual character would be moderately high, change to visual quality would be moderate, and viewer response would be moderately high. The visual impact would be moderately high.

Figure 3-7.51: Key View 6 - Devonshire Drive in Encinitas: Existing view looking north

Figure 3-7.52: Key View 6 - Devonshire Drive in Encinitas: Proposed view looking north

Key View 7 – I-5 at Encinitas Boulevard

Orientation

Encinitas Upland Landscape Unit, in Encinitas, northbound I-5 / Encinitas Boulevard Interchange, looking north (*Figure 3-7.53*).

Proposed Project Features

The northbound side of the freeway would be widened to seven lanes, and a large retaining wall would replace the existing landscaped slope. The wall would be up to 40 ft in height near the northbound on-ramp, and be approximately 3500 ft in length. A second retaining/soundwall of similar height and length is proposed on the existing landscaped slope adjacent to the southbound on-ramp. Both would be terrain-contoured walls (described in the visual mitigation section), and for a portion of their length, small slopes adjacent to the freeway would provide landscape screening. A minimum five-ft planting pocket would be located between the wall and concrete safety barrier at the edge of the northbound shoulder where there is insufficient room for a slope. Proposed soundwalls would be placed at or near the tops of the retaining walls. A third soundwall located near the southbound off-ramp would be visible in the key view. Freeway improvements would also occur in the existing median, new concrete safety barriers would be constructed (including a safety barrier where the wall would be within the clear recovery zone), and existing oleanders would be preserved in place (*Figure 3-7.54*).

Change to Visual Quality/Character

Large manufactured objects would define the horizontal and vertical planes and would replace landscaping as the prominent visual element in the viewshed. The proposed retaining walls would likely be the largest built forms in the area. Visual unity would change from moderately high to moderately low. Intactness and vividness would be reduced to low levels. Visual character would change as manufactured forms replace existing natural components. The existing suburban parkway character of the freeway would become more urban.

Viewer Response

Hundreds of thousands of freeway users, local street users, and local residents would view the proposed project features in this viewshed. Duration of views would be several seconds to several hours. There would likely be a high awareness of the project features by a majority of viewers. Local residents may be highly sensitive to the proposed changes.

Resulting Visual Impact

The change to visual character would be high. Change to visual quality would be moderately high. Viewer response would be moderately high. The visual impact would be moderately high.

Figure 3-7.53: Key View 7 - I-5 at Encinitas Boulevard: Existing view looking north

Figure 3-7.54: Key View 7 - I-5 at Encinitas Boulevard: Proposed view looking north

Key View 8 – Union Street in Encinitas

Orientation

Leucadia Hills Landscape Unit in Encinitas, on Union Street west of I-5, looking east (*Figure 3-7.55*).

Proposed Project Features

A freeway pedestrian overcrossing (POC) at Union Street was recommended by the City of Encinitas to achieve the city's goal of enhancing pedestrian access across the freeway. It is proposed as an enhancement feature in the I-5 Corridor, and would be located on City right-of-way, if implemented. A small City-owned parcel in the key view foreground would become an informal city park. The POC would remain a bridge structure until it reaches well within the proposed park's eastern boundary. The POC and its associated walls and abutments would incorporate design features to keep their scale and mass to an absolute minimum. Usable park space would be created at the eastern terminus of the bridge by adding fill material. Freeway retaining walls and soundwalls would be located near the existing rights-of-way and would be visible from the park (*Figure 3-7.56*).

Change to Visual Quality/Character

The POC would add an urban design element to the viewshed and have a moderately high effect on the visual character of the neighborhood. Proposed walls at freeway edges would contribute to this effect. Visual unity and intactness would be reduced to moderately low levels due to the proposed park grading, freeway walls, and aerial structure. Vividness would change slightly assuming the POC appears as an attractive amenity as planned. Change to visual quality would be moderate.

Viewer Response

Hundreds of thousands of freeway viewers and hundreds of local residents would see the POC each day. Duration of views would vary from a few seconds for freeway viewers to several hours for adjacent residents. There would likely be a high awareness of the project features by both travelers and residents.

Resulting Visual Impact

Change to visual quality would be moderate. Change to visual character would be moderately high. Viewer response would be moderately high. The visual impact would be moderately high.

Figure 3-7.55: Key View 8 - Union Street in Encinitas: Existing view looking east toward I-5

Figure 3-7.56: Key View 8 - Union Street in Encinitas: Proposed view looking east toward I-5

Key View 9 - I-5 Near Union Street

Orientation

Leucadia Hills Landscape Unit in Encinitas, on southbound I-5 at Union Street looking south toward Encinitas Boulevard (*Figure 3-7.57*).

Proposed Project Features

Three lanes of widening would occur, and a proposed soundwall 0.75 mi in length and 16 ft in height would be located on the edge of shoulder. An articulated wall with a planting pocket behind a concrete safety barrier is one example that could be incorporated as a project feature to minimize visual impacts. Extensive groupings of mature trees would be permanently removed on side slopes to accommodate widening. Median widening would occur and existing oleanders would be preserved in place. Overhead utilities would be placed underground as part of improvement features proposed in the I-5 corridor (*Figure 3-7.58*). This area was selected for an additional view following public circulation of the Draft EIR/EIS and refinement of potential community enhancements (refer to *Figure 3-7.104,* below, which shows a potential pedestrian bridge crossing I-5 and connecting residential areas on the west and east sides of the freeway in this area*)*.

Change to Visual Quality/Character

The proposed soundwall would block desirable existing views and could result in a sense of enclosure, directing the traveler's attention to undesirable foreground views of the widened freeway. The articulated wall design and planting pocket would lessen the apparent height of the wall, but would not prevent existing views from being lost. The lost views would reduce vividness to a low level. Intactness and unity would also be reduced to low levels because the size of the new freeway and its vertical components visible on both sides would contrast with natural features of the surrounding landscape. The visual character of the freeway becomes more urbanized. Tree removal and the loss of visual connection to the community would result in a high degree of change to visual character.

Viewer Response

Local residents may be sensitive to the proposed changes.

Resulting Visual Impact

Change to visual quality and character would be high. Viewer response would be high. The visual impact would be high.

Figure 3-7.57: Key View 9 - I-5 Near Union Street: Existing view looking south

Figure 3-7.58: Key View 9 - I-5 Near Union Street: Proposed view looking south.

Note: Wall design shows an optional articulated layout. Architectural treatment could be added to be compatible with the Design Guidelines: I-5 NCC Project (Appendix L).

Key View 10 – Union Street in Encinitas

Orientation

Leucadia Hills Landscape Unit in Encinitas, on Union Street at the westerly I-5 right-of-way, looking southeast (*Figure 3-7.59*).

Proposed Project Features

A retaining wall 6 ft in height with a soundwall 16 ft in height would be constructed on or near the existing Caltrans right-of-way boundary. Due to topography, the top of the proposed soundwall would be 30 ft higher than the elevation of the adjacent residence. The new freeway shoulder would be located immediately behind the wall. Drainage features such as a concrete ditch or vegetated swale may be located at the base of the wall and be protected by a chain link fence. Paved access from Union Street for Caltrans maintenance personnel may also be required (*Figure 3-7.60*).

Change to Visual Quality/Character

The replacement of the existing landscaped freeway buffer with the proposed wall would result in a manufactured urban form that would visually dominate the neighborhood. The scale of the wall would approximate that of a three-story building and could result in a feeling of enclosure for adjacent residents. It could also increase shading, air circulation, and microclimate. It would severely contrast with the suburban setting and change the visual character of the neighborhood. Visual quality components would be reduced to low levels.

Viewer Response

Adjacent residents would have foreground and mid-ground views of the project for long durations.

Resulting Visual Impact

Change to visual quality would be moderately high. Change to visual character would be high. Viewer response would be moderately high. The visual impact would be moderately high.

Figure 3-7.59: Key View 10 - Union Street in Encinitas: Existing view looking southeast

Figure 3-7.60: Key View 10 - Union Street in Encinitas: Proposed view looking southeast

Key View 11 – Orpheus Avenue in Encinitas

Orientation

Leucadia Hills Landscape Unit in Encinitas, on Orpheus Avenue north of East Glaucus Street, looking north (*Figure 3-7.61*).

Proposed Project Features

The existing open channel would be enclosed and moved underground due to freeway improvements. In addition, an earthen berm would be placed at the edge of the freeway and be retained along Orpheus Avenue with a wall six to eight ft in height. The berm would be landscaped and trees would be planted along the street in informal groupings. The existing chain link fence would be removed and not replaced because the retaining wall would provide freeway access control. Curbs, gutters, sidewalks, or concrete drainage ditches, would not be placed in front of the wall (*Figure 3-7.62*).

Change to Visual Quality/Character

The proposed berm and retaining wall would screen views of the freeway from street level, but introduce another solid, manufactured structure to the viewshed. The height of the wall would be consistent in scale with other site features normally found in residential neighborhoods. Landscape planting in front of the wall and on the berm would soften the appearance of the wall's hard surfaces. These changes would have a moderate effect on the visual character of the street, and a low change to visual quality.

Viewer Response

Hundreds of local street users and residents would view the proposed project features each day. Most views would be of short duration, but there would be a high awareness of the proposed visual changes. Residents would likely be sensitive to this change in their neighborhood.

Resulting Visual Impact

Change to visual quality would be low. Change to visual character would be moderate. Viewer response to the changes would be moderately high. The visual impact would be moderate.

Figure 3-7.61: Key View 11 - Orpheus Avenue in Encinitas: Existing view looking north

Figure 3-7.62: Key View 11 - Orpheus Avenue in Encinitas: Proposed view looking north

Key View 12 – I-5 at Carlsbad Village Drive

Orientation
Carlsbad Village Landscape Unit in Carlsbad, northbound I-5 between Tamarack Avenue and Carlsbad Village Drive, looking north (*Figure 3-7.63*).

Proposed Project Features
Freeway improvements would result in the permanent loss of all freeway plantings adjacent to the outside shoulder. A soundwall 12 to 16 ft in height has been recommended, and would be placed on top of a concrete safety barrier. A planting pocket between the barrier and wall would not be feasible due to space constraints. A vertical barrier design would be required in order to place architectural detailing on the soundwall. This condition would exist for the length of Carlsbad Village between the Tamarack Avenue overcrossing and Las Flores Drive overcrossing, with the exception of the area between gore points at Carlsbad Village Drive undercrossing (*Figure 3-7.64*).

Change to Visual Quality/Character
The proposed soundwall would block high quality views of Holiday Park and Carlsbad Village. The vividness of those views would be lost and attention would be redirected to foreground views of the freeway. A sense of enclosure and separation from the city would replace the open views and visual unity of the existing scene. The increased horizontal width of the freeway in combination with the hard edge of the plane created by the concrete barrier and soundwall would also change the visual character to one more urban.

Viewer Response
Hundreds of thousands of travelers use the freeway each day, and their views of the Village endure for approximately one minute. Viewers would have foreground and mid-ground views of the project. Viewer response would be moderately high.

Resulting Visual Impact
Change to visual quality and character would be high. Viewer response is moderately high. The visual impact would be high.

Figure 3-7.63: Key View 12 - I-5 at Carlsbad Village Drive: Existing view looking north

Figure 3-7.64: Key View 12 - I-5 at Carlsbad Village Drive: Proposed view looking north

Key View 13 and 13A – Holiday Park in Carlsbad

Orientation

Carlsbad Village Landscape Unit in Carlsbad at Holiday Park. View 13 is from Pio Pico Drive looking north. View 13A is from the children's playground in the park looking southwest (*Figures 3-7.65* and *3-7.67*).

Proposed Project Features

Freeway improvements would require Pio Pico Drive to be narrowed 10 ft in width. A retaining wall would extend the length of Pio Pico Drive from Tamarack Avenue to Carlsbad Village Drive, and be from 12 to 25 ft in height adjacent to the park. A soundwall 12 to 16 ft in height is recommended to be placed on the retaining wall for its entire length. Because of space constraints caused by the need to maintain minimum street standards on Pio Pico Drive, a recessed retaining wall supporting a cantilevered roadway would be required in order to provide a planted buffer between the freeway and street. The soundwall would only have minimal architectural detailing due to the space constraints (*Figures 3-7.66* and *3-7.68*).

Change to Visual Quality/Character

The proposed walls adjacent to Holiday Park would be as tall as a three-story building. Unlike a row of three-story buildings, the proposed wall surface would continue unbroken for thousands of feet. The combined walls would be the largest built form in the Village and would greatly increase the visual prominence of the freeway, while decreasing visual cohesion in the community. The walls would effectively screen all views of freeway traffic, but their massive appearance would create a severe contrast with the small-scale architecture of the community and natural character of the park. Visual unity and intactness would be reduced to low levels, and change to existing community character would be high.

Viewer Response

Hundreds of residents and park visitors would view the project for durations that would range from a few minutes to several hours per day. There would likely be a high awareness of the project for most viewers.

Resulting Visual Impact

Change to visual quality and character would be high. Viewer response to the change would be moderately high. The visual impact would be high.

Figure 3-7.65: Key View 13 - Holiday Park in Carlsbad: Existing view looking north

Figure 3-7.66: Key View 13 - Holiday Park in Carlsbad: Proposed view looking north

Figure 3-7.67: Key View 13A - Holiday Park in Carlsbad: Existing view looking southwest

Figure 3-7.68: Key View 13A - Holiday Park in Carlsbad: Proposed view looking southwest

Key View 14 – I-5 at Carlsbad Village Drive

Orientation

Carlsbad Village Landscape Unit in Carlsbad, southbound I-5 between Tamarack Avenue and Carlsbad Village Drive, looking south (*Figure 3-7.69*).

Proposed Project Features

Freeway improvements would result in the permanent loss of all freeway plantings adjacent to the outside shoulder. A soundwall 12 to 16 ft in height has been recommended to be placed on top of a concrete safety barrier at the edge of shoulder. A planting pocket between the barrier and wall would not be feasible due to space constraints. A vertical barrier design would be required in order to place architectural detailing on the soundwall. This condition would occur along the length of Carlsbad Village Drive between Tamarack Avenue overcrossing and Las Flores Drive overcrossing, with the exception of the area between gore points at Carlsbad Village Drive undercrossing, where the wall would be located at the shoulders of the on- and off-ramps (*Figure 3-7.70*).

Change to Visual Quality/Character

The proposed soundwall would block open distant views. The vividness of those views would be lost and attention would be redirected to foreground views of the freeway. A sense of enclosure and disorientation would occur, and isolation from the surrounding landscape would replace the open views and visual unity of the existing scene. Visual quality would be reduced to a low level. The increased horizontal width of the freeway, the loss of a soft, landscaped freeway edge, and its replacement with one that would be hard and unarticulated, would change the visual character from suburban to urban.

Viewer Response

Hundreds of thousands of travelers use the freeway each day, and their views last for approximately one minute. Viewers would have foreground and mid-ground views of the project. Viewer response would be moderately high.

Resulting Visual Impact

Change to visual quality and character would be high. Viewer response would be moderately high. The visual impact would be high.

Figure 3-7.69: Key View 14 - I-5 at Carlsbad Village Drive: Existing view looking north

Figure 3-7.70: Key View 14 - I-5 at Carlsbad Village Drive: Proposed view looking north

Key View 15 – Pine Street in Carlsbad

Orientation
Carlsbad Village Landscape Unit in Carlsbad, adjacent to southbound I-5 near Pine Street, looking north (*Figure 3-7.71*).

Proposed Project Features
Freeway improvements would require a retaining wall of approximately 20 ft in height in this area. The proposed wall would be located approximately 6 ft closer to the apartment buildings than the existing wall, placing it 16 ft from the nearest residence. A soundwall of 12 to 16 ft would be placed on top of the retaining wall. The combined walls would be 32 to 36 ft in height and their length would extend to the limits of the viewshed. Existing freeway landscaping would be permanently removed (*Figure 3-7.72*).

Change to Visual Quality/Character
Visual unity and intactness would be reduced to low levels, while vividness would remain low. The combined height of the proposed walls would be about 12 ft higher than the two-story apartment buildings, and they would be near enough to living areas to produce a sense of enclosure. The retaining wall would be about 3000 ft in length, and the soundwall would be about 4200-ft long. The combined walls would be a dominant visual element in the Village, greatly increasing the visual prominence of the freeway and decreasing visual cohesion in the community. Large built forms such as these are normally associated with central urban core areas, and would change the visual character of the area accordingly. For adjacent residents, the walls could present an unwelcome source of reflected light and heat in the afternoons due to their close proximity. The project would cause a high degree of change to visual character.

Viewer Response
Hundreds of adjacent residents would view the project for hours at a time. They could have a high awareness of proposed changes to the existing visual environment.

Resulting Visual Impact
Change to visual quality would be low. Change to visual character would be high. Viewer response to those changes would be high. The visual impact would be moderately high.

Figure 3-7.71: Key View 15 - Pine Street in Carlsbad: Existing view adjacent to (west of) I-5

Figure 3-7.72: Key View 15 - Pine Street in Carlsbad: Proposed view adjacent to (west of) I-5

Key View 16 – I-5 at Oceanside Boulevard

The Key View 16 analysis has been deleted following circulation of the Draft EIR/EIS because the proposed Oceanside Blvd DAR has been deleted from the project. The removal of the large-scale DAR built forms would lower the visual impact and reduce the project footprint. As a result, although the visual impact would remain high at this key view location, it would not vary substantially from other interchanges in the North Coast Corridor without DARs and does not qualify as a key view.

Key View 17 – Mission Avenue Interchange

Orientation

Oceanside Gateway Landscape Unit in Oceanside, Mission Avenue at I-5, looking west (*Figure 3-7.73*).

Proposed Project Features

The interchange would be reconfigured to eliminate the two existing free-flow freeway ramps located on the south side of Mission Avenue. This would enable the creation of a continuous sidewalk crossing the freeway. The Mission Avenue overcrossing would be reconstructed and widened to include wider sidewalks. The proposed width for the southerly sidewalk is 15 ft to accommodate large numbers of students from Oceanside High School that now cross the facility on a daily basis. Pedestrian-scaled streetscape features such as street lights, street trees, and benches would also be provided (*Figure 3-7.74*).

This key view is representative of pedestrian and bicyclist improvements that would occur on interchanges, undercrossings, and overcrossings throughout the corridor.

Change to Visual Quality/Character

The project would improve visual unity and intactness by providing greater visual continuity and balance in the streetscape, allowing for greater ease of use and sense of security for non-motorized viewers, and increasing the prominence of natural forms and positive aesthetics. Vividness would also be improved as attractive visual elements are incorporated in the streetscape. Visual character would change slightly, but remain urban.

Viewer Response

Thousands of drivers, pedestrians, and bicyclists would view the project for several minutes each day. They would have a high awareness of the project. The public would likely view the change as positive.

Resulting Visual Impact

The visual quality would improve. Change to visual character would likely be seen as positive, and viewer response would be high. The project would enhance the viewshed and have no adverse visual impact.

Figure 3-7.73: Key View 17 - I-5 at Mission Avenue: Existing view looking west

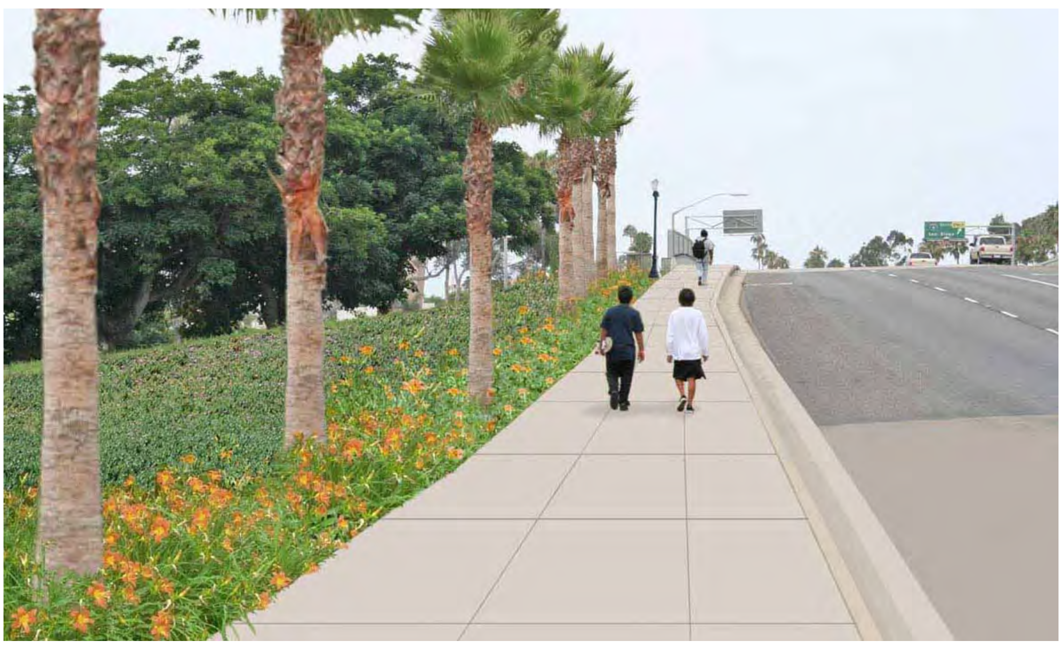


Figure 3-7.74: Key View 17 - I-5 at Mission Avenue: Proposed view looking west

Other Representative Views

Following circulation of the Draft EIR/EIS, a number of additional photosimulations were prepared. Additional views were also prepared in response to public comment, which depict retaining walls adjacent to lagoon and I-5, westerly ocean views, or specific design elements such as bike lanes, trails, etc. These simulations provide the reader with helpful detail as to project design, and are presented below.

The following existing and proposed views (*Figures 3-7.75* through *3-7.78*) depict the level to which retaining walls adjacent to Agua Hedionda and Batiquitos Lagoons would change existing views. As depicted in *Figures 3-7.76* and *3-7.78*, the retaining walls introduce substantial new built elements. New hardscape may also be visible off the highway, as shown in the Batiquitos Lagoon simulation, where the NC Bike Trail (shown with pedestrian and bike users) is visible west between I-5 and the retaining wall. Removal of non-native species, including both shrubs and trees between I-5 and the lagoons, as well as slope modification and retaining walls, would open up views from the lagoon to southbound travelers on I-5. Lagoon views would be visible to the traveler for a slightly longer period of time than under existing conditions. These views provide additional examples of project features for which additional clarification was requested by Draft EIR/EIS reviewers.

Figure 3-7.75: I-5 at Batiquitos Lagoon: Existing view looking southwest

Figure 3-7.76: I-5 at Batiquitos Lagoon: Proposed view looking southwest with landscaping and retaining wall

Figure 3-7.77: I-5 at Agua Hedionda Lagoon: Existing view looking south

Figure 3-7.78: I-5 at Agua Hedionda Lagoon: Proposed view looking south with landscaping and retaining wall

While I-5 pavement would be expanded, scenic views to the west along the lagoon crossings would appear identical, as demonstrated in *Figures 3-7.79* through *3-7.82* at Buena Vista Lagoon and along the San Dieguito River. The project would not affect the dominant scenic elements of this resource, which are the river, marsh areas, and vast open scenic views compared with the impacts of the existing I-5 facility. As shown in *Figures 3-7.80* and *3-7.82,* modifications to low crash barriers would also result in slightly more open views to lagoon for travelers where the current barrier interrupts westerly views.

Figure 3-7.79: I-5 at Buena Vista Lagoon: Existing view looking east

Figure 3-7.80: I-5 at Buena Vista Lagoon: Proposed view looking east with modified crash barrier

Figure 3-7.81: I-5 at San Dieguito River: Existing view looking southwest

Figure 3-7.82: I-5 at San Dieguito River: Proposed view looking southwest with modified crash barrier

A number of photosimulations were prepared that depict views to I-5 from viewpoints off the highway (*Figures 3-7.83* through *3-7.94*). These generally reflect trail locations from which the I-5 bridges can be seen. The simulations demonstrate the proposed bridge crossing, changes to bridge support features, locations where the NC Bike Trail might also be visible where it is suspended from the bridge, etc.

In *Figure 3-7.83*, the viewer can see the trail at San Dieguito, as well as its connection to the NC Bike Trail, which is on the east side of the bridge in this location. A retaining wall south of the bridge would be installed to allow for trail connection encroachment into off-highway native habitat. Tinted concrete would match natural soil color in this area to a greater extent than the existing facility. Retention of the existing bridge supports and the minimal vertical expanse of the NC Bike Trail result in the bridge generally looking similar to existing conditions (*Figure 3-7.84*).

Figure 3-7.83: Along the San Dieguito Trail: Existing view looking west

Figure 3-7.84: Along the San Dieguito Trail: Proposed view looking west with modified bridge and trail connection

Figures 3-7.85 and *3-7.86* depict the view from east of San Elijo Lagoon, looking northwesterly. New bridge supports are clearly visible in *Figure 3-7.86*, and the improved path on the south edge of the lagoon can be seen. The slightly wider I-5 is also visible, although visually outweighed by the water and vegetation between the viewer and the bridge. Manchester Avenue continues to cross under the bridge. The bridge widening would not change the visible elements of the view west of I-5.

Figure 3-7.85: South side of San Elijo Lagoon: Existing view looking northwest

Figure 3-7.86: South side of San Elijo Lagoon: Proposed view looking northwest with modified bridge and path

The representative simulations of the Batiquitos Lagoon crossing are taken from Navigator Circle and from the East Trail along the lagoon. From the elevated viewpoint of Navigator Circle, the view to the east is panoramic; consisting of the lagoon on both sides of I-5, I-5, and the hills in the distance (*Figure 3-7.87*). In project built conditions, the retaining wall installed to allow the trail, as well as the trail, can be seen on the west side of I-5 north of the crossing (*Figure 3-7.88*). The change in bridge supports can be seen (8 larger versus 12 smaller supports). Existing riprap would remain in place. From the trail on the east side of the lagoon, the difference in bridge supports is again visible (*Figures 3-7.89* and *3-7.90*). Riprap has been removed from this side of the bridge and native planting is visible on the slopes. The longer extent of the bridge is visible. The viewer's focus on lagoon elements from this viewpoint (vegetation, water, etc.) and the low profile of the bridge would minimize perceived change.

Figure 3-7.87: From Navigator Circle: Existing view looking east across Batiquitos Lagoon

Figure 3-7.88: From Navigator Circle: Proposed view looking east across Batiquitos Lagoon with modified bridge, retaining walls, and trail

Figure 3-7.89: North side of Batiquitos Lagoon: Existing view from East Trail looking southwest

Figure 3-7.90: North side of Batiquitos Lagoon: Proposed view from East Trail looking southwest with modified bridge and landscaping

Changes to the Bridge at Agua Hedionda are shown on *Figures 3-7.91* through *3-7.94*. In *Figure 3-7.92*, the changed bridge supports would be visible, and would provide a slightly more "open" feel under the bridge. Removal of trees at the lagoon crossing would remove existing greenery, but would provide more sky view. Riprap at the north and south extents of the bridge would remain. From the Agua Hedionda East Trail as shown in *Figures 3-7.92* and *3-7.93,* primary view elements are water in the foreground, backed by I-5 in the mid-ground, with tall trees on the hilltop in the background. The stack at the Encina Power Plant in Carlsbad is notable. The NC Bike Trail would be visible on the east side of I-5.

Figure 3-7.91: At Agua Hedionda Lagoon from YMCA: Existing view looking west

Figure 3-7.92: At Agua Hedionda Lagoon from YMCA: Proposed view looking west with modified bridge and landscaping

Figure 3-7.93: Agua Hedionda Lagoon: Existing view looking southwest from the East Trail

Figure 3-7.94: Agua Hedionda Lagoon: Proposed view looking southwest from the East Trail with modified bridge, trail, and landscaping

Existing visual conditions are shown on *Figure 3-7.95*, and changed conditions at the Buena Vista Lagoon crossing are depicted on *Figure 3-7.96*. Taken from the south side of the lagoon east of I-5, vegetation largely obscures the bridge supports. Darker coloration would add a slightly more visually consistent aspect to the crossing, as it is more similar to soil color in the area.

Figure 3-7.95: East of I-5 at Buena Vista Lagoon: Existing view looking west

Figure 3-7.96: East of I-5 at Buena Vista Lagoon: Proposed view looking west with modified bridge

Several simulations demonstrate visual changes along I-5. *Figures 3-7.97* through *3-7.104* variously depict retaining walls and increased pavement width. *Figures 3-7.98* through *3-7.102* show these features at Del Mar Heights Road, north of Vista Point, and at California Street. At California Street, sound barriers are also depicted at top of slope.

Figure 3-7.97: Looking north along I-5: Existing view north of Del Mar Heights Road

Figure 3-7.98: Looking north along I-5: Proposed view north of Del Mar Heights Road with retaining wall and wider roadway

Figure 3-7.99: Looking southeast on I-5: Existing view north of Vista Point

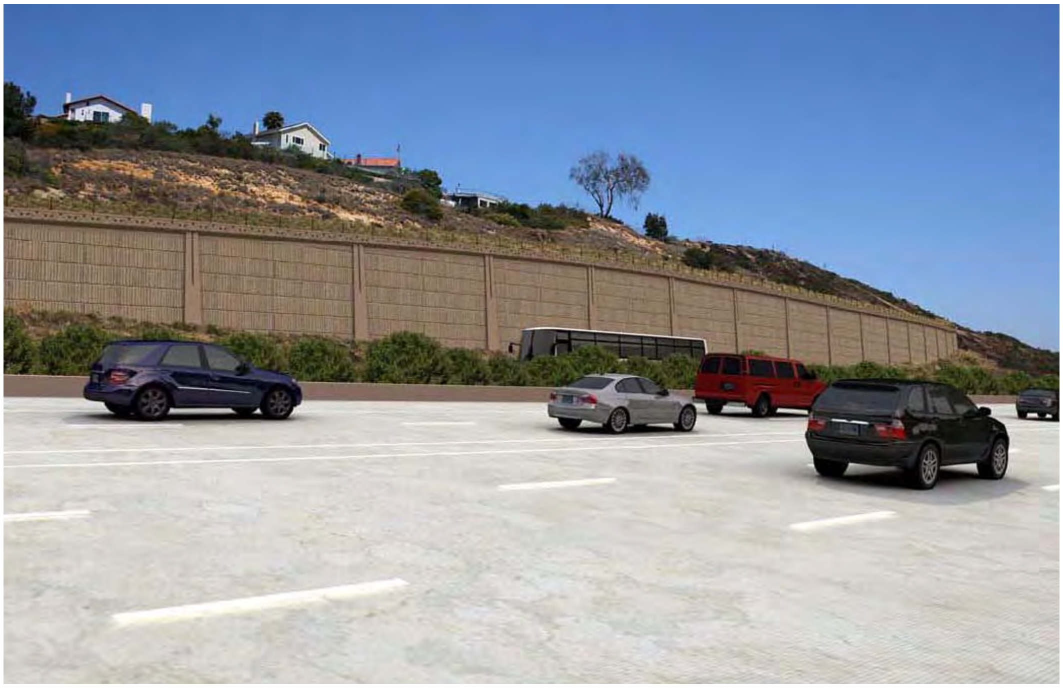


Figure 3-7.100: Looking southeast on I-5: Proposed view north of Vista Point with retaining wall

Figure 3-7.101: California Street overpass: Existing view looking northeast at I-5

Figure 3-7.102: California Street overpass: Proposed view looking northeast at I-5 with retaining walls, soundwalls, and modified landscaping

Figure 3-7.103 shows the existing visual condition near Union Street. *Figure 3-7.104* shows potential soundwalls and the Union Street pedestrian overpass as it would be seen from I-5. The overpass would be low profile, with a single support in the highway median. Safety fencing on top of the overpass would be visible to viewers in close proximity to the overcrossing, as shown in the simulation, but would fade with distance. Median planting would continue to provide a visual barrier of green in the center of the highway.

Figure 3-7.103: Looking southeast along I-5: Existing view near Union Street

Figure 3-7.104: Looking southeast along I-5: Proposed view near Union Street with sound barriers and pedestrian overpass

Several other simulations provide views to additional specific project elements. *Figures 3-7.105* and *3-7.106* depict the Old Sorrento Valley Road Bicycle/Pedestrian Enhanced Trail proposed as a potential community enhancement. The existing vacated road would be improved with striping, a bioswale, an improved non-hardscape walking area, and intermittent seating in order to improve non-motorized transportation in this area.

Figure 3-7.105: Old Sorrento Valley Road Bicycle/Pedestrian Enhanced Trail: Existing view looking east

Figure 3-7.106: Old Sorrento Valley Road Bicycle/Pedestrian Enhanced Trail: Proposed view looking east with enhanced trail

Figure 3-7.107 depicts the existing I-5 Vista Point location. A new Vista Point with a more expansive view would replace the existing Vista Point just north of this site, and would allow motorists to pull off the freeway to safely view scenery or park and relax. The facility would include parking and other pedestrian facilities that are accessible to all persons (*Figure 3-7.108*).

Figure 3-7.107: From I-5: Existing view looking over Vista Point to ocean

Figure 3-7.108: From I-5: Proposed view looking over Vista Point to ocean with parking area

Figures 3-7.109 and *3-7.110* show changes at the San Luis Rey River for westbound drivers on SR-76. The SR-76 overpass would become more visible, as would development west of I-5, due to vegetation removal of at least one mature tree. This would be balanced by elimination of the ramp, a built element which is currently visible between the viewer and I-5 on the south side of the river.

Figure 3-7.109: From SR-76: Existing view looking west along San Luis Rey River to I-5

Figure 3-7.110: From SR-76: Proposed view looking west along San Luis Rey River to I-5 with bridge widening, removal of tree and ramp

Figure 3-7.111 depicts the existing scenic resources within the project setting.

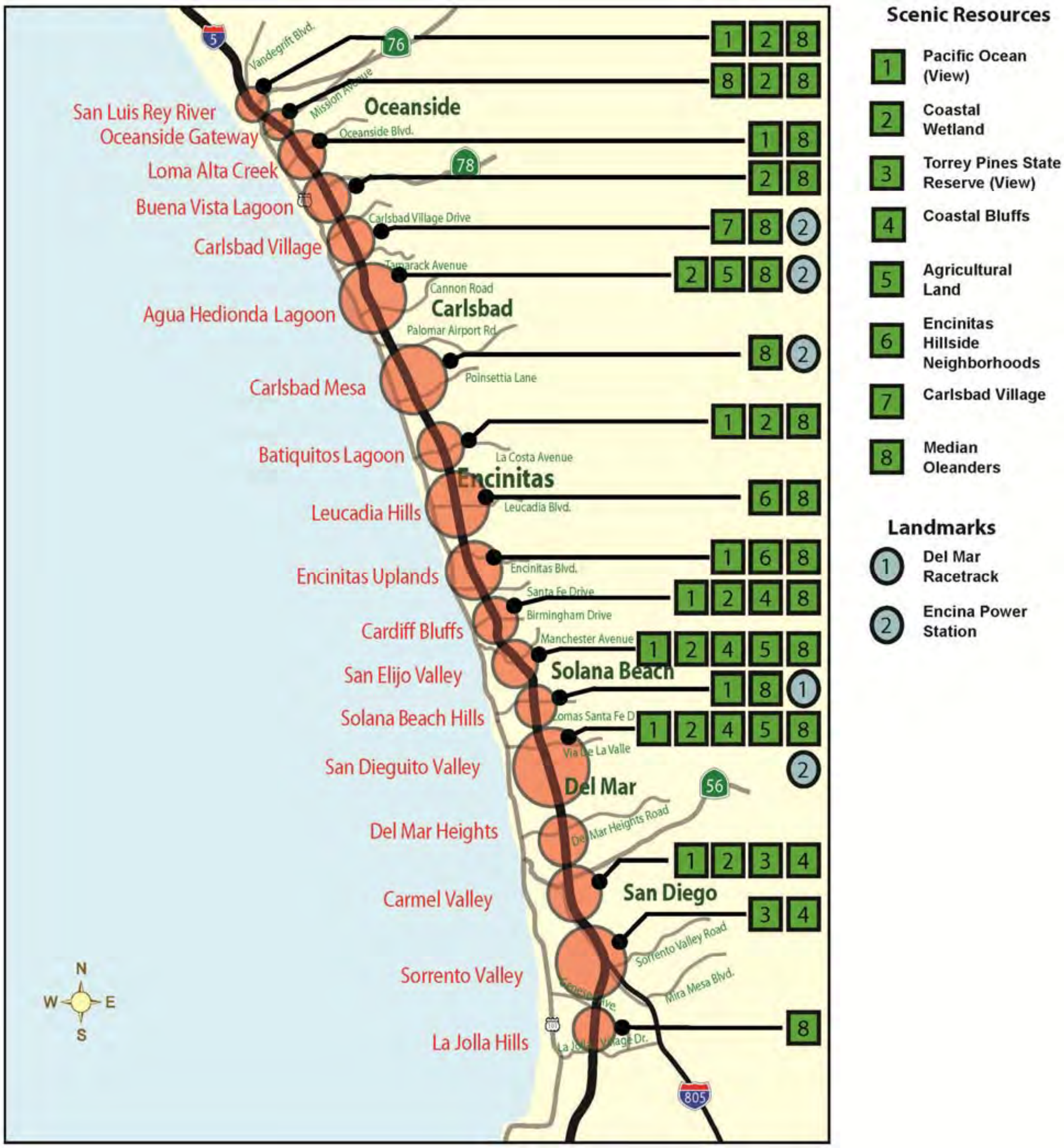


Figure 3-7.111: Scenic Resource Map

Summary of Visual Impacts

The visual effects of the project can be summarized in that the natural character of the I-5 corridor would become noticeably more urban, and scenic resources now available to the traveling public would become less accessible. The high degree of visual change caused by the project would remain despite the implementation of measures proposed in this assessment. Conclusions stated in the key view analyses and impact summary apply to the four build alternatives. Under the No Build alternative, the proposed improvements to I-5 would not occur. However, a number of interchange/operations/adjacent projects would move forward independently from the *I-5 NCC Project* as described in *Chapter 2*.

Impacts to Viewers on the Freeway

Loss of Existing Views and Creation of a "Tunnel Effect"

Views from the freeway would be diminished in quantity and quality by the introduction of walls, structures, and appurtenances (overhead signs, traffic sensors, video cameras, etc.). Visual access to scenic views would be obstructed by soundwalls in several locations, isolating travelers from scenic resources. The loss of open views that provide variety, interest, and orientation to the traveler (such as Leucadia Hills [Key View 9] and Carlsbad Village [Key Views 12 and 14]) would change the visual character of I-5. In addition, the sense of enclosure created by the walls would be similar to the travel experience one now encounters in large urban areas to the north, thereby diminishing the region's unique visual identity.

Visual impacts related to utility relocations would be minor, and in some areas would improve as some utilities would be relocated within bridge structures or underground. Other utilities remaining above-ground would be moved up to approximately 65 ft away from existing locations, and would have little impact on visual quality as existing views would, for the most part, remain unchanged.

Expansive Paving with Large Walls and Structures

Each build alternative would increase pavement, appearing to double the width of the existing freeway. This would occur for the most part within the existing right-of-way envelope, proportionally displacing landscaped roadside areas and adding large retaining walls that would enable the new roadway to cut through and cover existing topography. The walls depicted in Key Views 2 and 7 are typical of those that would be placed in cut sections facing the freeway. Key Views 3 and 15 contain walls that would be typical of those placed in fill sections facing communities. These types of large, urban freeway components would contrast with the visual character of adjacent scenic areas and beach communities. The contrast between proposed urban and existing natural features would be most noticeable at the Manchester Avenue DAR (Key View 5) where the DAR and San Elijo Multi-use Facility would impact agricultural fields.

Loss of Existing Freeway Landscape

Roadside areas for landscaping would be severely reduced and the exclusive use of native plants for freeway landscape replacement would be required by regulatory agencies and is proposed in project Design Guidelines: I-5 NCC Project in many locations. Also, due to limited roadside maintenance funds, the use of drought-tolerant planting that naturalizes with temporary irrigation has become necessary. These three factors would cause a substantial change to visual character and an adverse effect on the visual quality of the North Coast Corridor. Reduced areas for landscaping would shift the freeway's visual balance from landscaping to hard surfaces, and its character from suburban to urban. The prominence of tall trees in the freeway landscape would be reduced. This would be caused by space limitations as well as the limitations of San Diego's coastal native tree palette. Torrey Pines are the most suitable San Diego native for freeway planting because of their drought tolerance and relatively fast growth rate. Other natives such as sycamores or willows are riparian species that lack the drought tolerance required to survive freeway slope conditions. Others, such as oaks, are very slow growing, and would appear as shrubs for many years. None would grow tall enough to provide vertical balance for the freeway's expansive horizontal plane provided by existing ornamental trees.

Changeable Message Boards and Congestion Pricing Signage

New freeway appurtenances such as changeable message signs, overhead traffic sensors, video cameras, and congestion pricing signage would add to the urbanizing effect of the project and detract from scenic views. These types of features would be concentrated at or near DAR facilities and HOV/Managed Lanes ingress/egress points.

Impacts to Viewers in Adjacent Communities

Community Proximity Impacts

Views of the freeway would be affected at right-of-way edges where the project would bring the freeway in closer proximity to community viewers. Existing landscaped buffers would be substantially reduced in size or removed altogether and replaced with retaining walls and/or soundwalls. This condition would have a particularly noticeable effect for residents whose homes are located adjacent to the freeway at elevations near to or below the level of the road. From their rear yards, residents would have foreground views of features such as concrete retaining walls, soundwalls, and drainage ditches. Paved maintenance roads, bioswales, and chain link fencing would also be present in the foreground.

In some cases, such as the ones shown in Key Views 10 and 15, large walls would be in close proximity to residents, affecting light access and air circulation.

Community Entry Impacts

At freeway interchanges, overcrossing and undercrossing structures, and some local streets, would be enlarged and create an increased urban visual character. In particular, the visual experience of pedestrians and bicyclists would diminish as the balance of available circulation space would shift further from the pedestrian realm to the vehicular. At some interchanges, these impacts could be avoided or minimized by eliminating existing non-stop right turns to or from freeway ramps, and providing wide sidewalks, street trees, and other pedestrian amenities. Other interchanges, such as Mission Avenue in Oceanside (Key View 17), may be reconfigured to provide high volume pedestrian routes with uninterrupted access across the freeway.

At some freeway interchanges, the project may include new visual elements that would be incompatible with existing visual character. Existing ornamental freeway landscaping would be reduced or could be replaced by native species. Storm water detention basins as described in the project features section would be located at many interchange loop ramps. Many of their standard features such as maintenance vehicle roads, rock riprap slopes, concrete headwalls, standpipes, and chain-link fencing, could potentially be non-compatible visual elements in many community entry points, and further reduce available landscape area.

The proposed roundabout at the Birmingham Drive Interchange in the City of Encinitas would constitute an improvement to existing visual quality. Roundabouts create a more balanced visual environment between the street and community by requiring less vehicular circulation space, slowing vehicular speeds, allowing shorter street crossing distances for pedestrians, and providing a central island that can be landscaped as an attractive community entry feature.

Loss of Existing Median Oleanders

DARs would remove median oleanders at Voigt Drive and Manchester Avenue.

Impacts to Views of Scenic Resources

Views to scenic resources from some private residences located at an elevation higher than the freeway would be obstructed by proposed soundwalls (please refer to *Section 3.15, Noise*). Transparent panels could be incorporated in the soundwalls to avoid view impacts should residents agree to maintenance. The use of transparent panels in soundwalls adjacent to freeway lanes would not necessarily preserve existing scenic views due to a reduction in transparency caused by surface reflectivity, soiled or scratched surfaces, image distortion, substantial support latticework, and current Caltrans maintenance practices. For these and other reasons listed in the VIA, soundwalls with transparent material would not be considered as a viable method to avoid or mitigate the loss of scenic views from the freeway.

Below is a list of locations in which a permanent loss of a view to an existing scenic resource would occur. *Figure 3-7.112* summarily depicts the visual impacts to scenic resources along the project corridor.

Loss of Views to the Pacific Ocean

Between Via de la Valle and Lomas Santa Fe Drive, southbound freeway travelers have a view of the ocean and the Del Mar Racetrack and Fairgrounds. This view would have been completely obscured by a soundwall 10 to 12 ft in height proposed at the edge of freeway shoulder. The solid soundwall is no longer recommended and a divided soundwall, with a gap to maintain the coastal view, is now proposed. The prior soundwall impact is depicted and assessed under Key View 4 (*Figures 3-7.47* and *3-7.48*).

Loss of Views to Encinitas Hillside Neighborhood

Freeway travelers in both directions would lose existing views to the hillside neighborhood west of the freeway between Encinitas Boulevard and Leucadia Boulevard. The impact is depicted and assessed under Key View 9.

Loss of Views to Agricultural Fields

Direct impacts to agricultural fields would occur at the Manchester Avenue DAR and San Elijo Multi-use Facility location. A transit center with access road, parking for 150 cars, and bus platform is proposed as part of the multi-use facility. Agricultural fields north of the facility would continue to be visible.

Loss of Views to Carlsbad Village

Existing views of Carlsbad Village and Holiday Park would be obscured by a soundwall 12 ft in height placed at the edge of freeway shoulder. The impact is depicted and assessed under Key View 12.

Loss of Oleanders

Median oleanders would be permanently removed at the following DAR locations; Voigt Drive and Manchester Avenue. Existing median oleanders would be preserved wherever possible, since freeway improvements could disturb the roots of the plants. This retention provides for consistency with the existing visual environment.

Impacts of Project Alternatives

As stated previously, differences in freeway width between the proposed build alternatives would be relatively minor in most locations, and proposed freeway features expected to affect visual resources such as soundwalls would be the same or similar. The exception would be median oleander removal in curved portions of both barrier alternatives. All build alternatives would result in highly adverse change to existing visual character and quality.

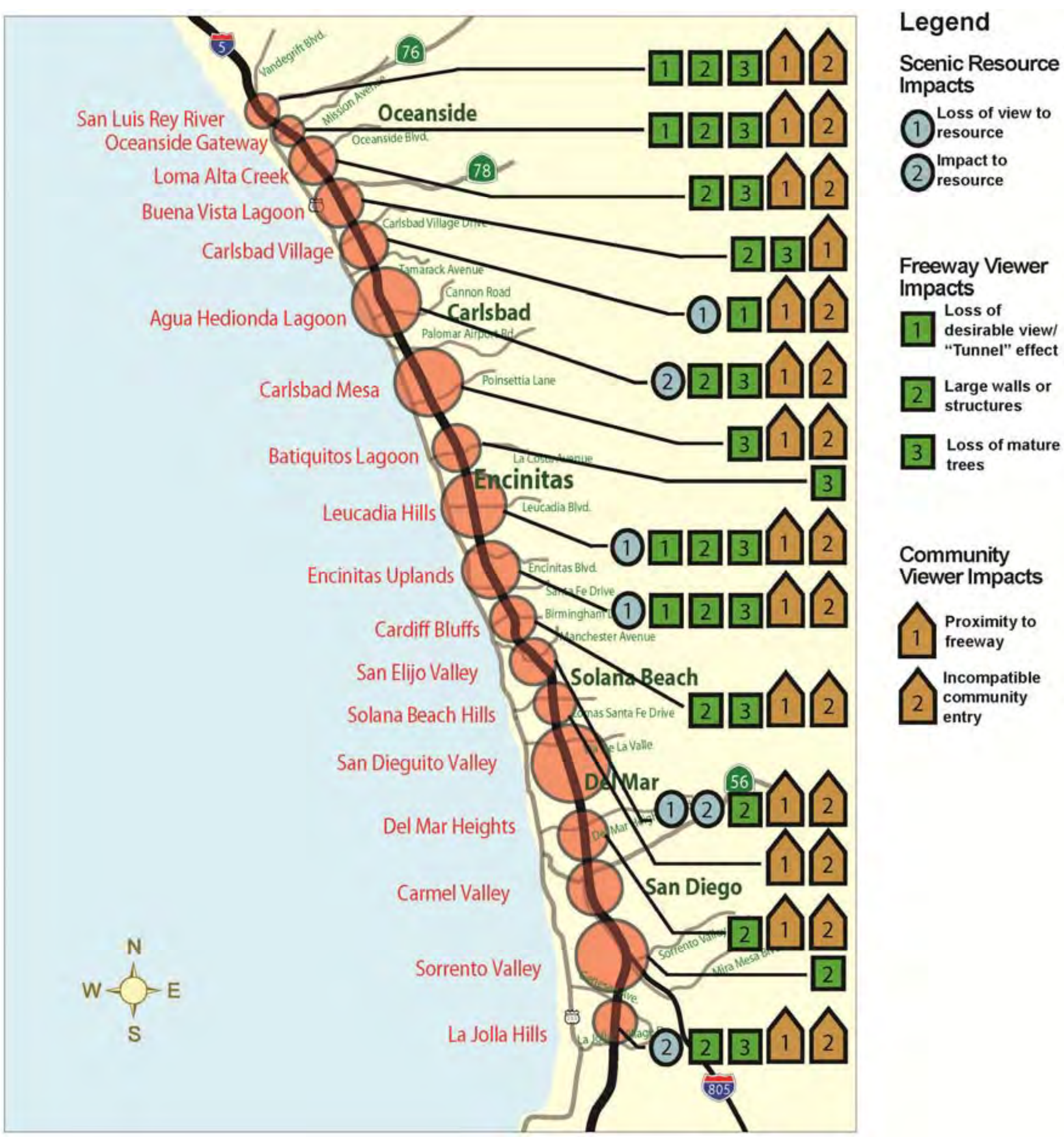


Figure 3-7.112: Visual Impact Summary Map

3.7.4 Avoidance, Minimization, and/or Mitigation Measures

Caltrans and FHWA recommend that a qualitative/aesthetic approach should be taken to mitigate for visual quality loss in the project area. This approach is intended to replicate desirable visual qualities that are impacted by a project and to restore in place a viewshed's original level of aesthetic excellence. It fulfills the letter and the spirit of FHWA requirements because it addresses the actual cumulative loss of visual quality that would occur in the project viewshed when the project is implemented. It also constitutes mitigation that can more readily generate public acceptance of the project.

Visual mitigation for project impacts addressed in the previous section would consist of adhering to the following design requirements in consultation with the District 11 DLA. The requirements are arranged by project feature and include required options in order of effectiveness. One or more of these options would be implemented on applicable project features wherever they occur.

In addition, the Design Guidelines: I-5 NCC Project were developed under the direction of the DLA. The guidelines supplement the mitigation requirements found in this assessment. They contain detailed architectural and landscape mitigation guidance that reflects comments from the project development team and comments received during public outreach meetings with interested community groups, city staff members, regulatory agencies, and the general public. The guidelines include a requirement that all landscaped areas have underground automatic sprinkler systems.

Effective implementation of the following mitigation measures would require a multi-disciplinary design approach as required by NEPA and Caltrans Policy and Procedures Manual. Since the project has not yet been designed, specific visual mitigation measures cannot be proposed at this time. Instead, the general design requirements and guidelines contained in this document and the Design Guidelines: I-5 NCC Project have guided the design of specific project features and areas according to the process described in the following paragraph. Mitigation measures shown in photo simulations are generic and illustrative. Alternative mitigation measures may be necessary in each viewshed as project designs are developed and mitigation design guidelines are applied.

During project design and construction, it would be the responsibility of the DLA to analyze the visual effects of specific project features, synthesize applicable mitigation measures from this document and the Design Guidelines: I-5 NCC Project, apply those requirements to actual design features in specific locations, and submit proposals to the project design team. The team and DLA would then develop design solutions considered to be reasonable visible mitigation solutions that achieve team consensus, and can in turn be implemented. The DLA also would provide technical assistance during construction and perform mitigation monitoring of all visual mitigation requirements.

Caltrans would consult with the property owners and/or officials with jurisdiction over recreational areas during project design for potential aesthetic options, as applicable. During the design process, shareholder interaction will continue, guidelines will become more and more specific, locally oriented design details will be added, and a design palette of specific features and products will be developed.

Mitigation measures that require regular maintenance and are located outside Caltrans right-of-way, such as trees planted along local streets, or measures that require the installation of non-standard equipment within the right-of-way such as pedestrian bridge lighting, can be implemented only if the responsible local government would be willing to maintain them in perpetuity.

Implementation of the measures in this section would partially mitigate adverse effects of the project for all build alternatives. The requirements are arranged by project feature and include options in order of effectiveness from most to least effective. The overall visual impact of each mitigated build alternative would remain high.

Soundwalls

Landscaped Noise Berms

Noise barriers should consist of landscaped berms wherever possible. Landscaped berms are the preferred visual mitigation for soundwall and are most visually compatible with most land uses adjacent to the freeway.

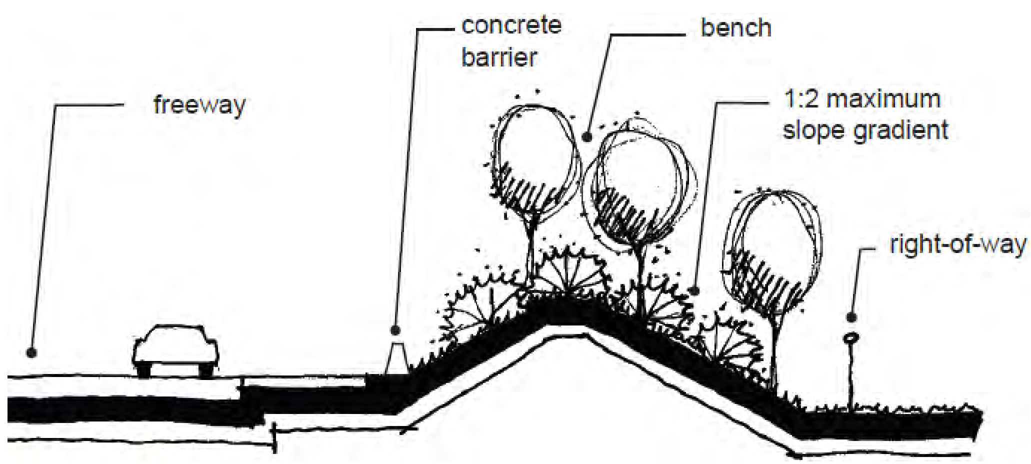


Figure 3-7.113: Berm in fill section

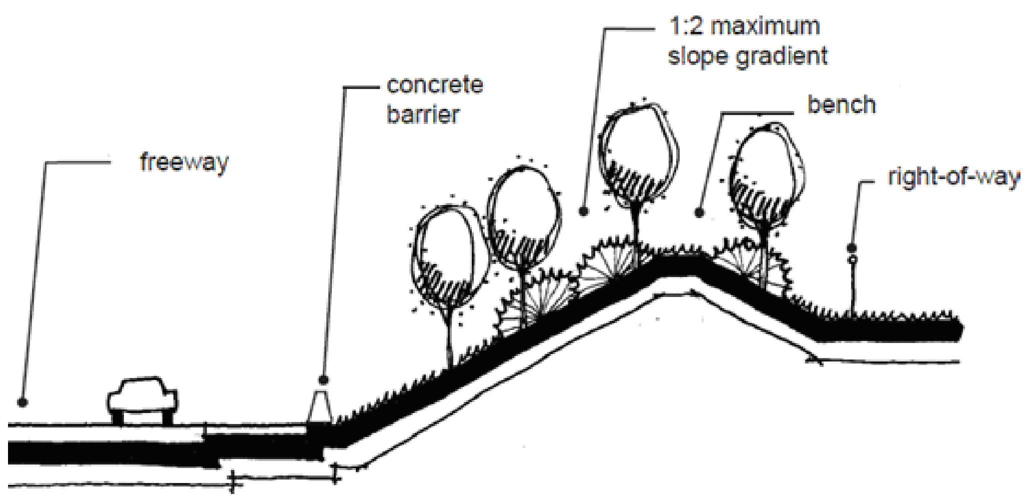


Figure 3-7.114: Berm in cut section

Noise Berm/Retaining Wall Combinations

In areas too narrow for a berm, a retaining wall may be used to avoid constructing a soundwall on top of the berm. This may result in a barrier with a lower profile than a noise berm/wall combination due to the berm's superior sound attenuation qualities.

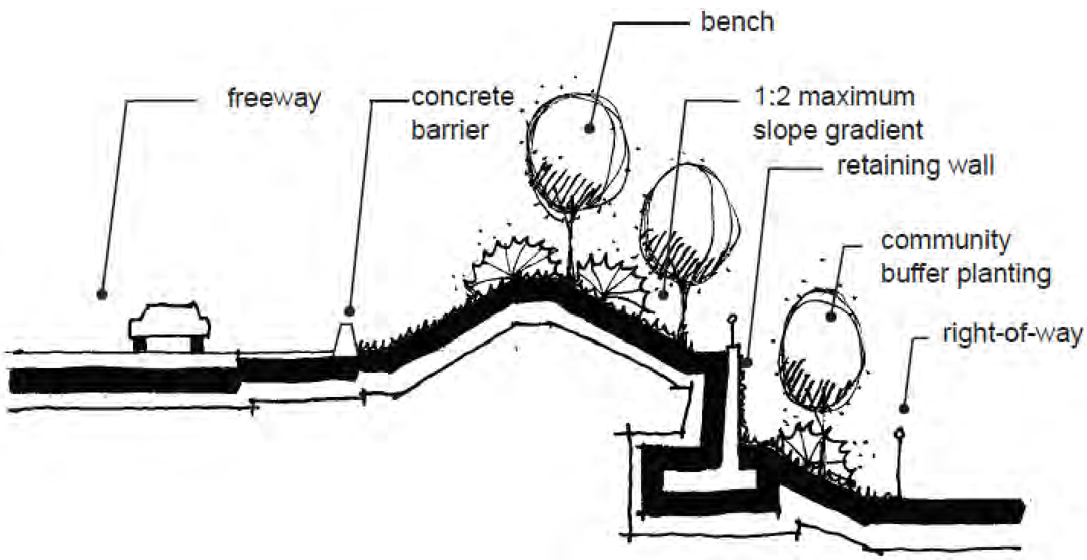


Figure 3-7.115: Noise berm/retaining wall section

This barrier configuration is preferable in situations where a tall retaining wall at the toe of slope would create a visual impact to an adjacent property. To be effective, this option should incorporate a berm with a 1:2 slope (vertical/horizontal) on the freeway side that is a minimum of six-ft high. This size berm should allow enough space to provide screening shrubs in front of the wall.

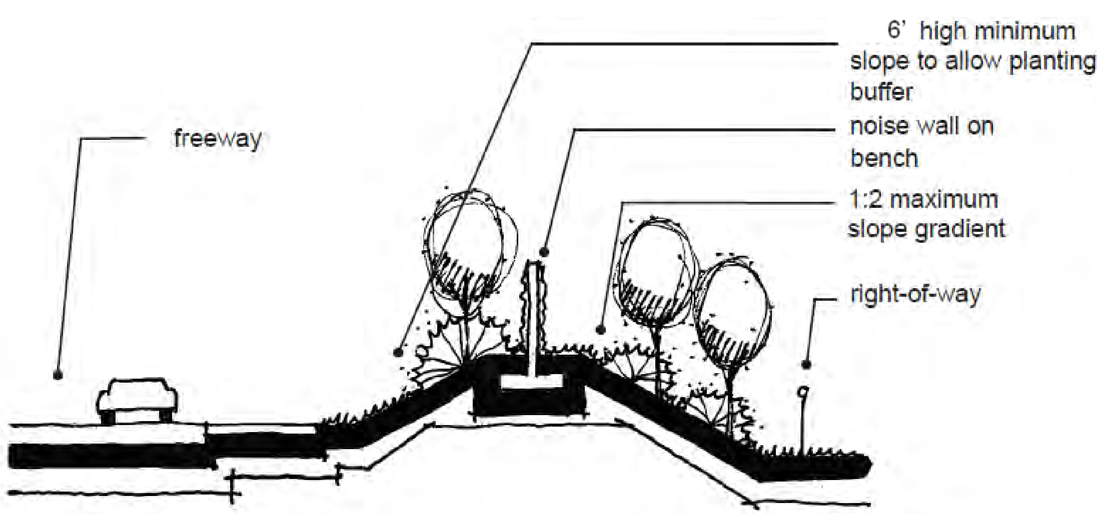


Figure 3-7.116: Noise berm/soundwall combination section

Soundwall Landscape Buffers

Where berms are entirely infeasible, soundwalls should incorporate planting on both sides. In some cases, retaining walls and/or a concrete barrier at the edge of shoulder may be needed to provide the required planting space.

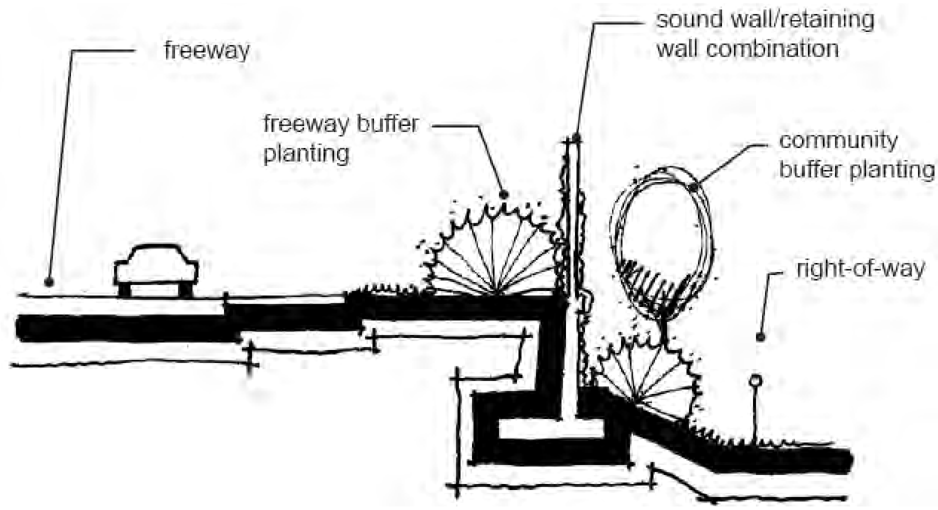


Figure 3-7.117: Soundwall buffer planting section

Soundwall Articulated Layout/Varied Profile

The use of setbacks and return sections in wall layouts reduces the monotonous visual effect of a single wall surface and helps reduces its apparent scale. This design option can be used with a varied top of wall profile to further increase visual interest.

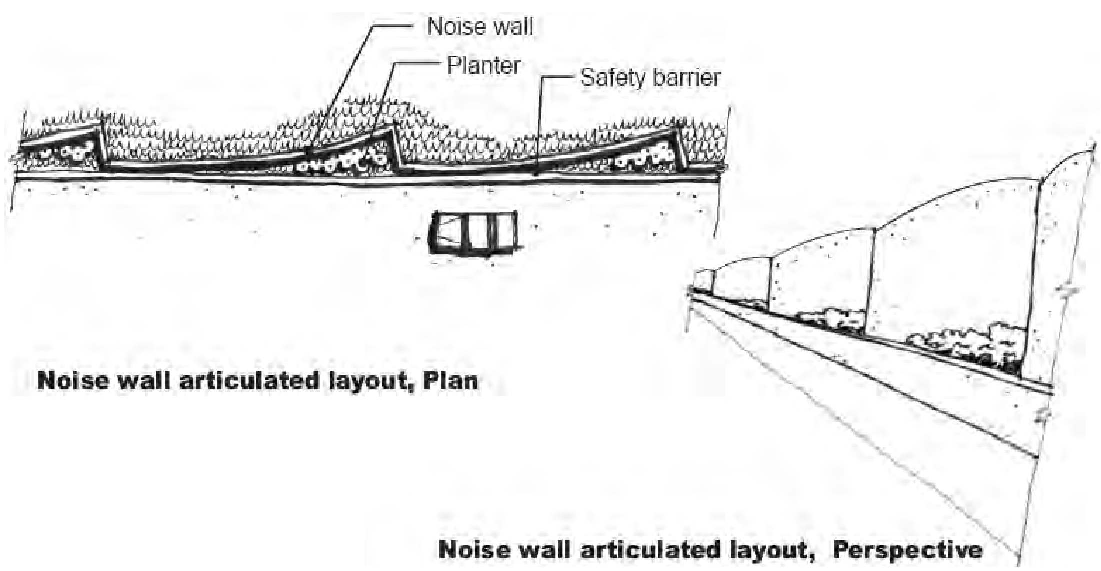


Figure 3-7.118: Soundwall articulated layout/varied profile

Soundwall Planting Pockets

Where right-of-way is too narrow to employ the configurations listed above, a minimum five-foot-wide planting area should be provided between the back of the barrier and the face of the soundwall.

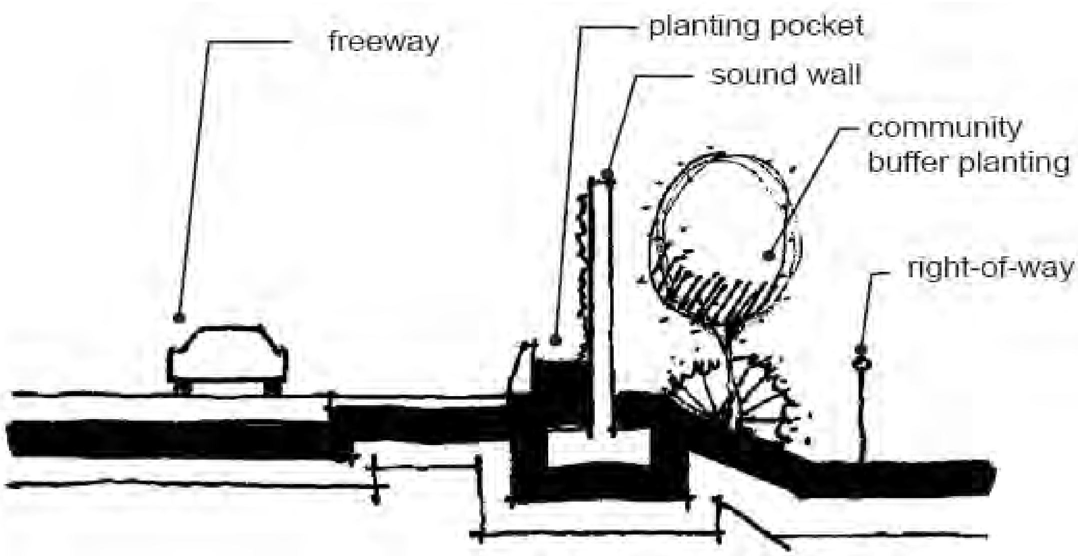


Figure 3-7.119: Soundwall planting pocket section

Soundwall/Barrier Setback

In areas too narrow to place a planting pocket, the soundwall would be recessed behind the barrier at a sufficient distance to allow architectural features to be included on the face of the soundwall. A soundwall on top of a concrete barrier would be avoided if at all possible.

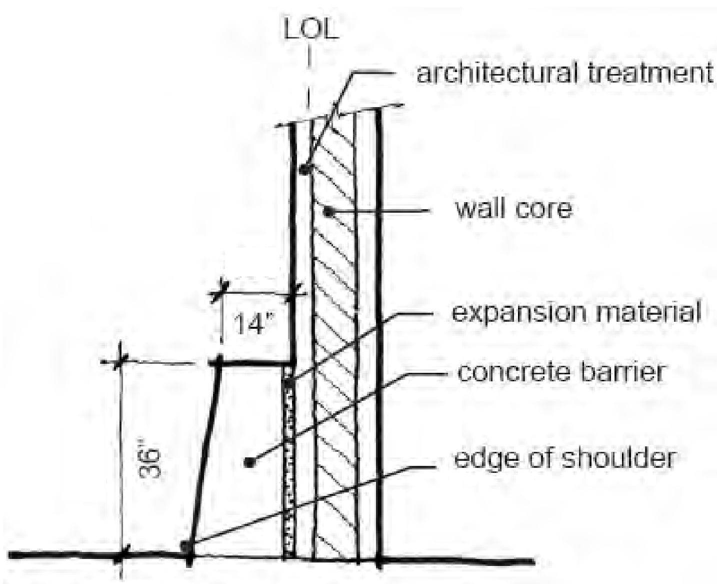


Figure 3-7.120: Soundwall setback section

Vertical Concrete Safety Barriers

In areas where space for architectural detailing does not exist, vertical concrete safety barriers would be considered. Vertical barriers add 12 in of additional width in which architectural elements such as pilasters and wall caps can be included.

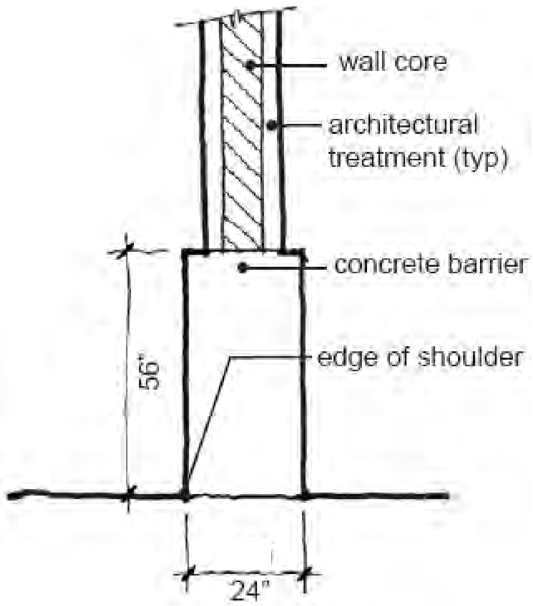


Figure 3-7.121: Vertical concrete safety barrier section

Transparent Soundwalls on Private Property

In situations where noise receptors are located above the elevation of the freeway, transparent soundwalls located at the top of slope on the right-of-way line or on private property would be used if the benefited property owner agrees to maintain wall surfaces. Locating walls at higher elevations nearer receptors substantially reduces the height of walls to achieve "line of sight" noise reductions.

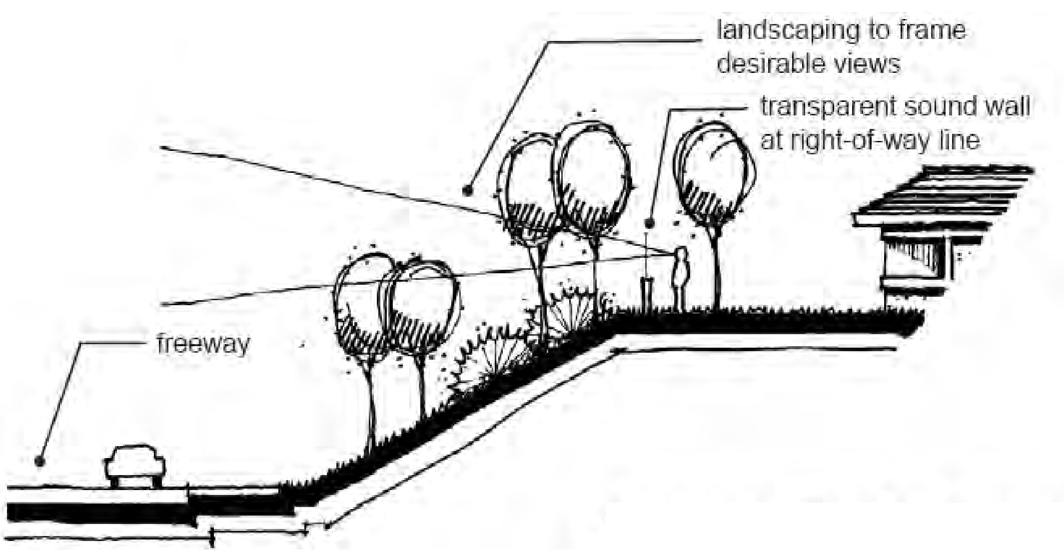


Figure 3-7.122: Transparent soundwall section

Translucent materials can be placed on top of soundwalls to reduce their apparent height and create a greater sense of openness. Translucent materials should be placed above areas of potential vehicle impact, out of easy reach, and should consist of vandal-resistant materials.

Architectural Detailing

Soundwalls would be designed to be visually compatible with the surrounding community. Architectural detailing such as pilasters, wall caps, interesting block patterns, and offset wall layouts would be used to add visual interest and reduce the apparent height of the walls. Poured-in-place integrally colored concrete construction techniques would be encouraged where visual consistency with retaining walls is desired. Enhanced surface materials such as mosaic tile and weathering steel would also be used where appropriate.

Retaining Walls

Terrain Contoured Retaining Walls

Retaining walls that follow the contours of the topography and maintain a constant elevation at the top of wall would be used where appropriate. Wall layouts and profiles would be composed of long radius curves, with no tangents or points of intersection. Wall faces would be battered at a 1:6 maximum horizontal/vertical ratio. Walls should be located at mid-slope. This type of wall is visually compatible with surrounding terrain and provides room at the base for a slope that contains landscape screening.

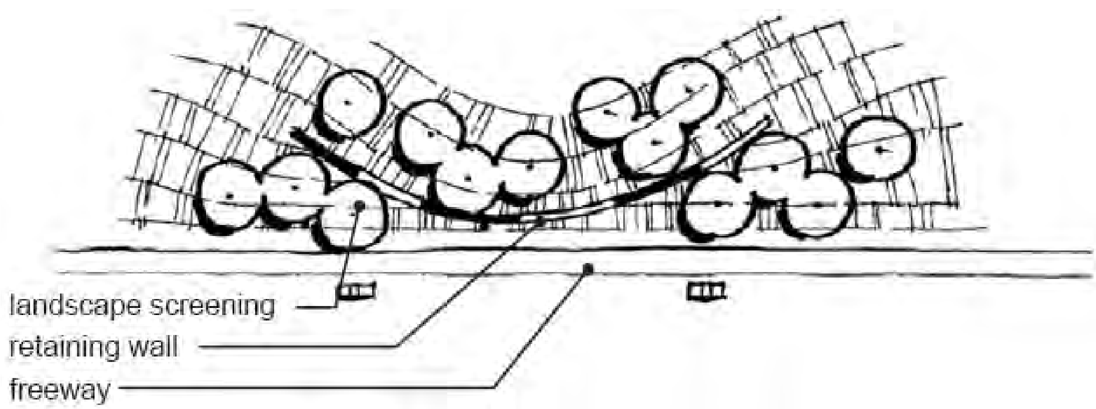


Figure 3-7.123: Terrain-contoured wall in cut section (Plan View)

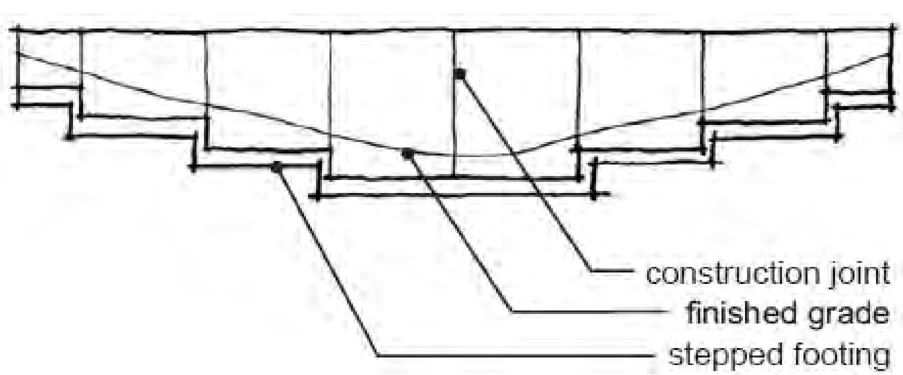


Figure 3-7.124: Terrain-contoured wall in cut section (Elevation View)

Terraced Retaining Walls

Where site conditions are favorable, retaining walls over 19.7 ft in height would be divided into separate structures sufficiently offset from one another to create a planting area between the two.

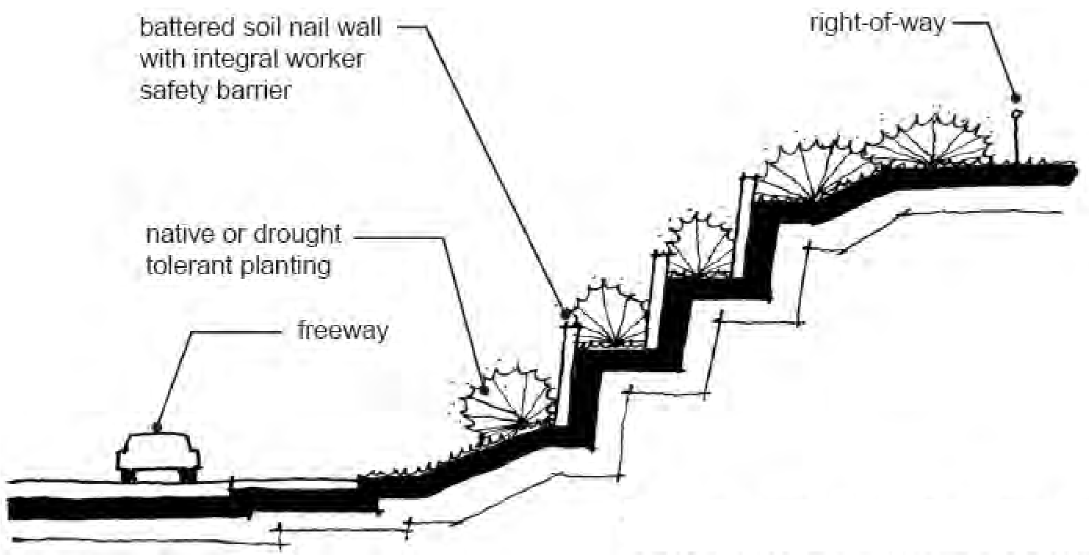


Figure 3-7.125: Terraced retaining walls section

Mid-Slope Retaining Walls in Cut Sections

Retaining walls would be located at mid slope wherever possible in cut sections to provide a buffer area for landscape screening between the wall and the freeway.

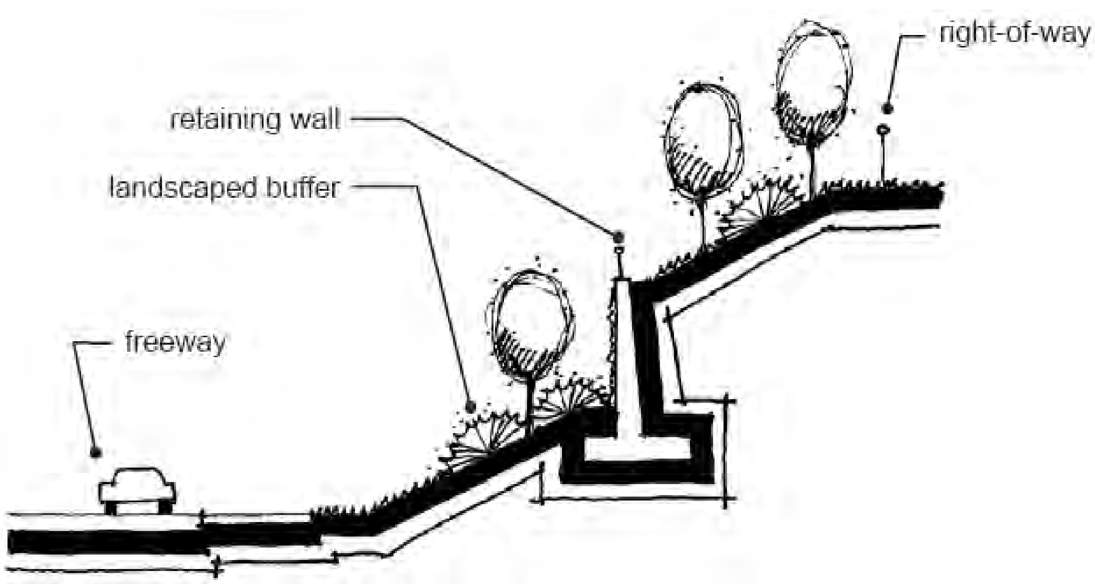


Figure 3-7.126: Mid-slope retaining wall section

Top-of-Slope Retaining Walls in Fill Sections

Retaining walls would be located at the top of slope wherever possible in fill sections to provide a buffer area for landscape screening between the wall and the community.

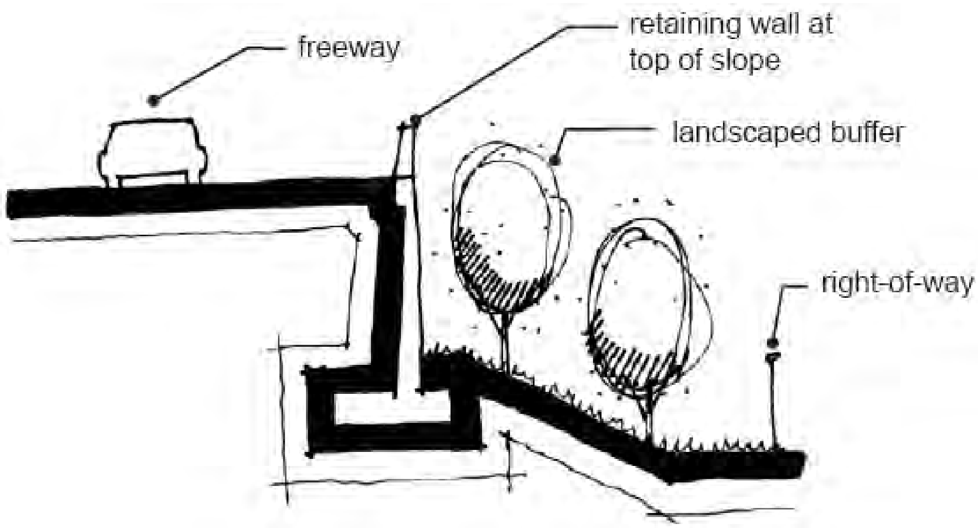


Figure 3-7.127: Top-of-slope retaining wall section

Viaduct Retaining Walls

In areas where insufficient space exists to include planting buffers between freeway retaining walls and adjacent community features such as frontage roads, the use of viaduct retaining walls would be considered. Viaduct retaining walls would cantilever the roadway to form a wall recess in which spatial articulation and planting can occur.

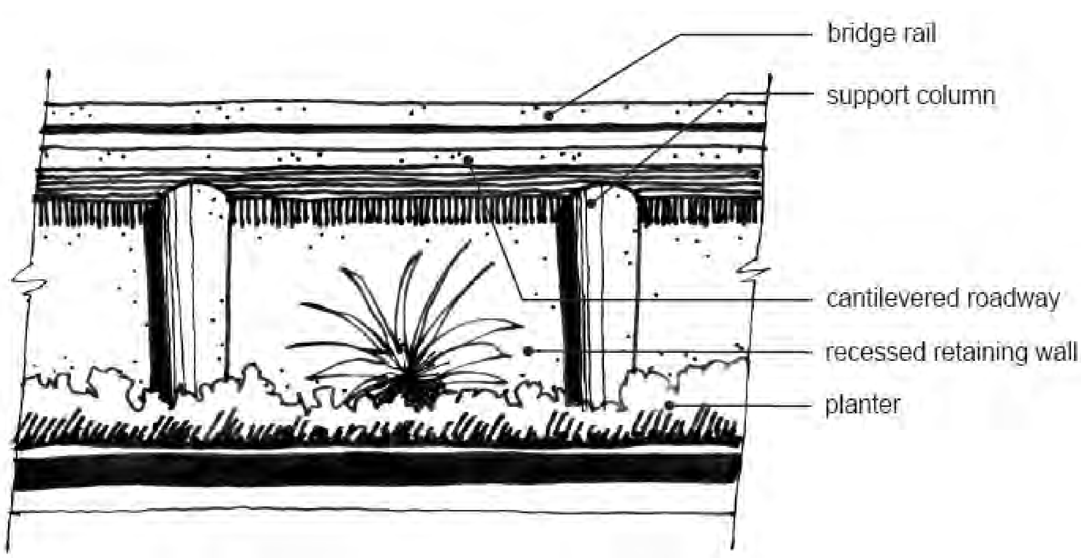


Figure 3-7.128: Viaduct retaining wall (Elevation View)

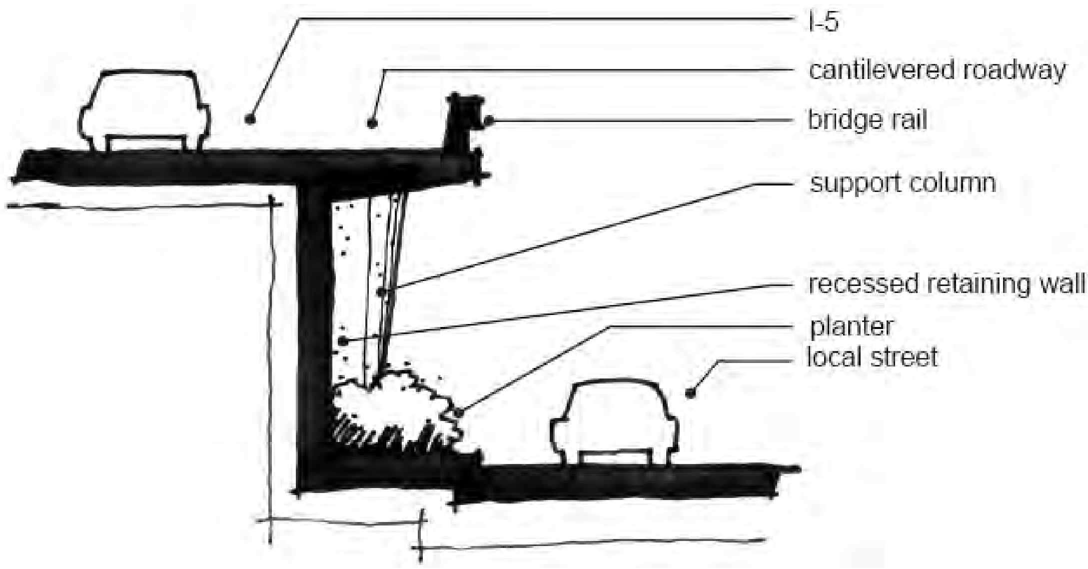


Figure 3-7.129: Viaduct retaining wall (Section View)

Retaining Wall/Barrier Planting Pockets

In areas where retaining walls must be placed close to the traveled way, space should be reserved between the wall and the safety barrier to include a five-ft-wide planting pocket.

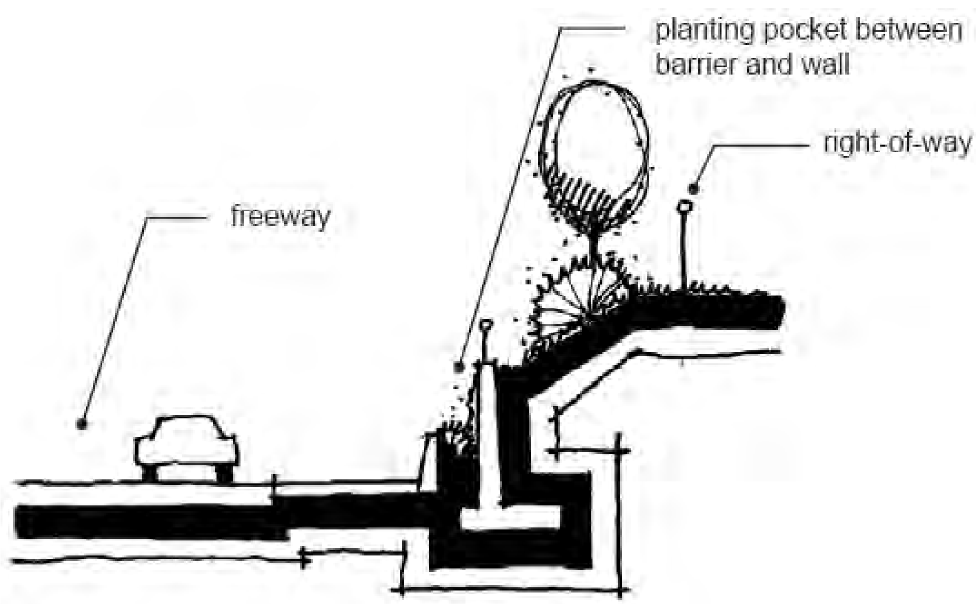


Figure 3-7.130: Retaining wall/planting pocket section

Retaining Wall/Barrier Setbacks

In areas too narrow to place a planting pocket, the retaining wall would be recessed behind the face of barrier at a sufficient distance to allow architectural features to be included on the face of the retaining wall.

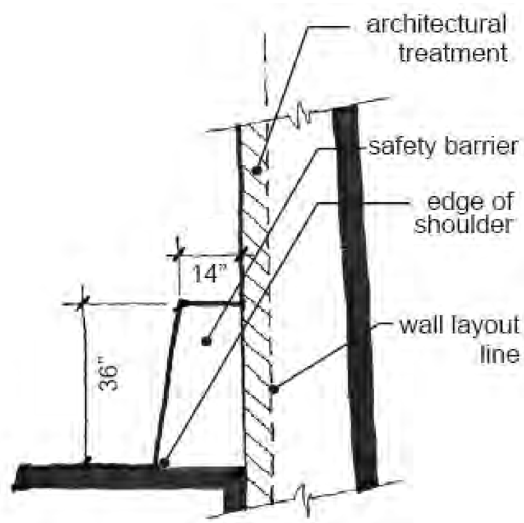


Figure 3-7.131: Barrier setback section

Vertical Concrete Safety Barriers

In areas where space for architectural detailing does not exist, vertical concrete safety barriers would be considered. Vertical barriers add 12 in of additional width in which architectural elements such as mechanically stabilized earth wall panel relief, pilasters, and wall caps can be included.

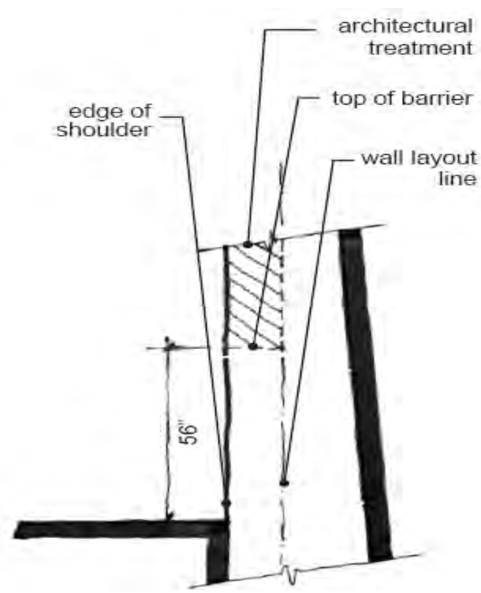


Figure 3-7.132: Vertical concrete safety barrier section

Battered Wall Faces

Wall faces would be battered at a 1:6 maximum horizontal/vertical ratio wherever possible to reduce the apparent scale of the wall and give the wall a more natural appearance. The batter also can serve as a barrier safety shape where the base of wall exhibits a smooth surface facing traffic.

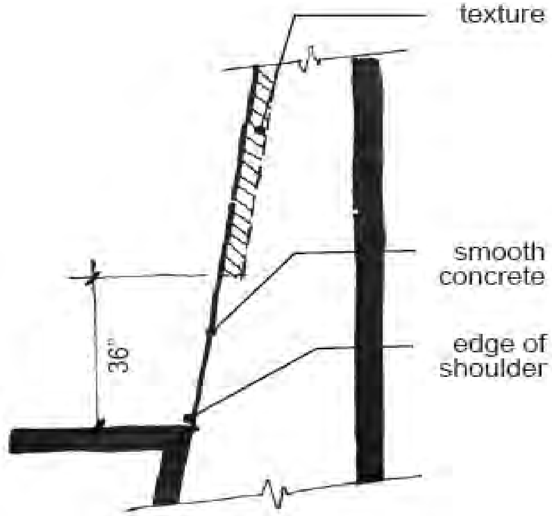


Figure 3-7.133: Battered wall face section

Enhanced Safety Railings

Alternatives to standard cable rail barrier would be used to complement enhanced wall designs. Options could include integral solid concrete parapets or alternative metal materials. Design details are contained in the Design Guidelines: I-5 NCC Project.

Architectural Surface Treatment

Architectural features, textures, and integral concrete colors would be used to mitigate the appearance of retaining wall surfaces. Walls would incorporate architectural features such as pilasters and caps to provide shadow lines, provide relief from monolithic appearance, and reduce their apparent scale. Enhanced surface materials such as mosaic tile and weathering steel would also be used where appropriate to meet community design goals. Design details are contained in the Design Guidelines I-5 NCC Project.

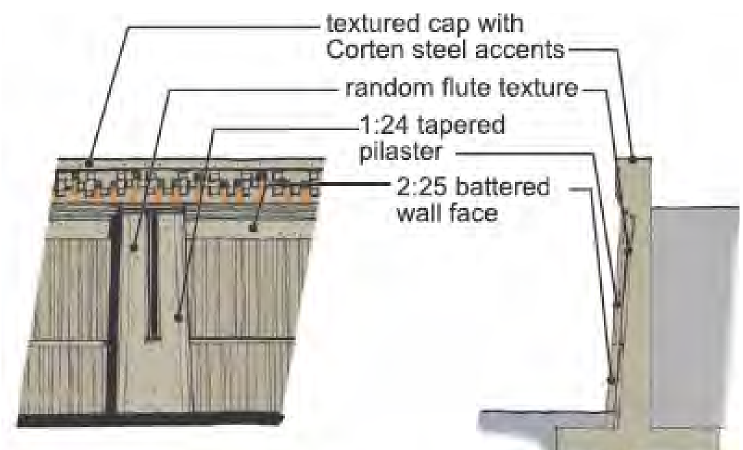


Figure 3-7.134: Southbound/northbound cut wall, elevation and section

Mechanically Stabilized Earth Walls

Great care should be taken when considering the use of mechanically stabilized earth (MSE) walls due to their design constraints. Placement of landscaped slopes, soundwalls, barriers, drainage conveyances, and other roadway features can require special design. MSE walls would have custom-designed panels that include integral color and enhanced surface texture and a minimum four-in reveal on each panel.

Figure 3-7.135: An MSE wall with a four-in pattern reveal

Low Profile and See-Through Safety Barriers

Low profile (e.g., Caltrans Type 60S) or see-through (e.g., Caltrans Type 80) safety barriers would be used if at all possible in areas where standard height barriers would diminish views of scenic resources from the freeway.

Overcrossing, Undercrossing, Bridge, and DAR Structures

Bridge type selection and all other structure design would be consistent with these mitigation measures and the design themes contained in the Design Guidelines: I-5 NCC Project. Some mitigation features may be new or non-standard and require approvals or design exceptions.

Freeway Overcrossings

Abutments would be short seat abutments placed at the top of slopes wherever possible. The visual mass of abutments would be minimized as much as possible. High cantilever abutments would be used in locations where space does not exist for short seat abutments at the top of a slope.

At each overcrossing, bridge abutments would be of the same type to produce a symmetrical appearance. Where overcrossing structures are replaced, high cantilever abutments would be used in lieu of secondary tie-back walls. Temporary tie-back walls would be terrain-contoured walls and would receive architectural features consistent with permanent walls in the viewshed. Temporary tie-back walls would be removed when overcrossing structures are reconstructed.

In locations where retaining walls must be incorporated into abutments, they would be designed as terrain-contoured walls if possible, and located away from the edge of shoulder to allow space for a planted buffer at their base.

Slope paving would be enhanced with integral concrete color, texture, and deeply textured facing materials such as veneer block or natural rock.

Bridge signage would be designed to visually integrate with bridge architecture. Concrete sign pedestals would be consistent in appearance with bridge design themes.

Figure 3-7.136: An example of a short seat abutment

Figure 3-7.137: Secondary walls such as this reduce visual unity and should be avoided

Sidewalks would be provided on both sides of each overcrossing. They would have a 6-ft minimum width on a two-lane structure with a curb-to-curb width of 32 ft or less. On wider streets, both sidewalks would be a minimum of 10 ft in width. Sidewalk widths would be selected based on SANDAG regional guidelines (Planning and Designing for Pedestrians, June 2002) and local pedestrian design guidelines. Sidewalks may receive score patterns, surface texture, and in some cases integral color.

Low-profile barrier separations between pedestrian and vehicular traffic, wherever possible, would be provided on overcrossings where Caltrans policy prohibits or restricts architectural features and pedestrian amenities on or near concrete bridge rails. Sidewalks in these locations would be a minimum of 10 ft in width.

Pedestrian lighting, enhanced fencing and railings, and other urban amenities would be provided on each overcrossing. Local agency streetscape design guidelines would be continued within Caltrans right-of-way at each overcrossing and interchange. Container trees located on structures would also be provided in locations where the responsible local agency has requested them and agreed to maintain them in perpetuity.

Bicycle shoulders, lanes, or paths would be provided on both sides of each overcrossing, when possible. A minimum shoulder width of four ft should be provided for Class III facilities.

Figure 3-7.138: A wider sidewalk would enable these pedestrians to walk side by side

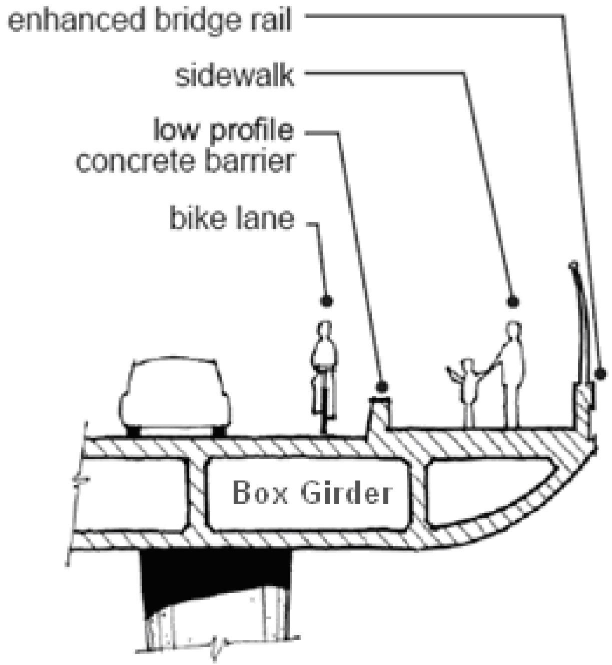


Figure 3-7.139: Sidewalk barrier separation section

Figure 3-7.140: An example of pedestrian amenities on the I-15 / El Cajon Boulevard overcrossing

Freeway Undercrossings

Bridge abutments would be of the same type on all four quadrants to give widened undercrossings a symmetrical appearance.

Bridge widening would be done using box girder construction wherever possible. Girders would be similar in appearance on both sides of the bridge to produce a symmetrical appearance.

In locations where street widening occurs, tie-back walls would be terrain-contoured walls, and receive architectural features consistent with those required for retaining walls and with community values and goals.

Pedestrian sidewalks 10 ft in width (minimum) would be provided at undercrossings on both sides of the street wherever possible. In all cases, existing sidewalk configurations on local streets would be continued across Caltrans right-of-way.

Bicycle shoulders, lanes, or paths would be provided at each undercrossing. The type of facility would consider regional and local planning goals. A minimum shoulder width of four ft would be provided for Class III facilities.

Enhanced pedestrian lighting including bridge soffit lighting would be provided at each undercrossing.

Slope paving at undercrossings would be enhanced with deeply textured facing materials such as scored veneer block or natural rock to add visual interest and deter graffiti.

Figure 3-7.141: Encinitas Boulevard undercrossing pedestrian and bicycle access could be improved

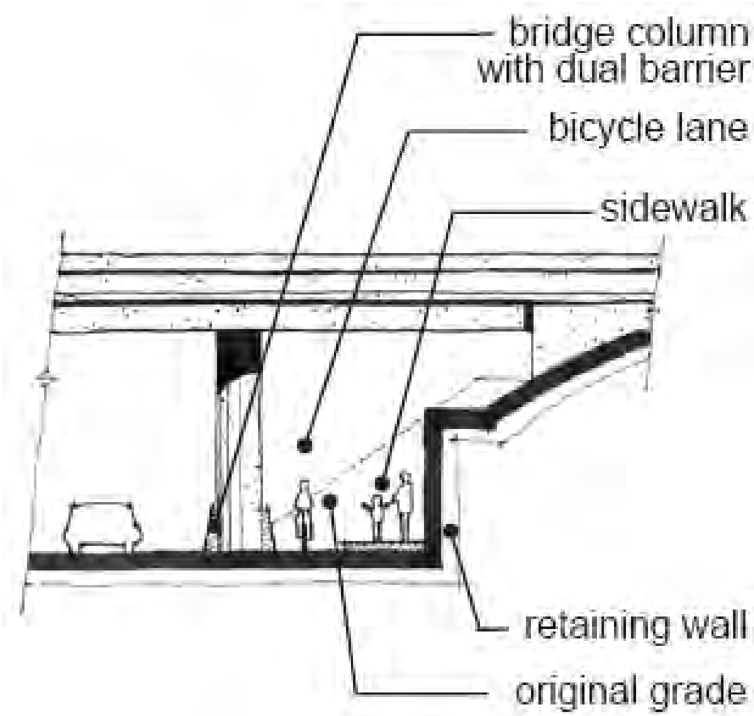


Figure 3-7.142: Pedestrian sidewalks and bicycle lanes section at undercrossing

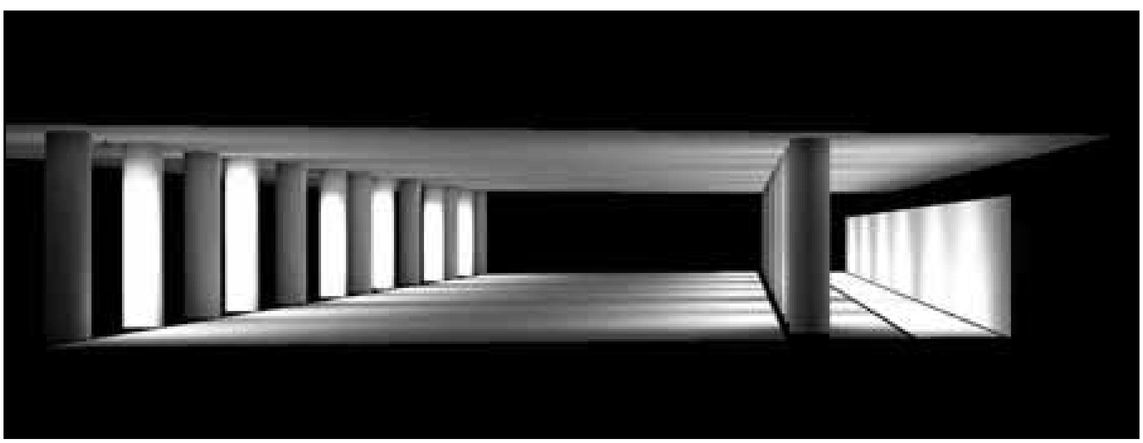


Figure 3-7.143: A lighting concept for Lomas Santa Fe Drive undercrossing integrates function and aesthetics

Bridges

Mitigation measures listed above for overcrossing and undercrossing structure symmetry, abutment design, tie-back walls, slope paving, sidewalks, bicycle routes, and streetscape features would also apply to freeway bridges as appropriate. See-through bridge rails such as Caltrans Type 80 rail would be used on freeway bridges with views to ocean, rivers, lagoons, or other scenic resources, unless noise abatement is necessary.

Figure 3-7.144: Type 80 bridge rail

Pedestrian Overcrossings

Pedestrian overcrossings would be a minimum of 15 ft in width.

Pedestrian lighting, enhanced fencing, railings, architectural features, and other urban amenities would be provided on each pedestrian overcrossing. Existing streetscape elements and design themes would be continued within Caltrans right-of-way.

Figure 3-7.145: Seating, lighting, and community identity elements enhance this pedestrian overcrossing entry

DAR Structures

DAR retaining walls would have a 15-ft maximum height, allowing approximately 10 ft of minimum vertical clearance under the connecting ramp structure.

Pedestrian and bicycle traffic on existing overcrossings to be converted to DAR overcrossings should be routed to a separate pedestrian overcrossing structure in the immediate vicinity, if possible.

On structures where pedestrians are present, sidewalks should be 15 ft in width on each side. Bridge barriers, fences, and sidewalks would be designed to provide standard stopping sight distance at DAR termini to enable pedestrians to be visible to drivers. Barrier separations between pedestrian and vehicular traffic would be provided if Caltrans policy requires bridge barriers to adhere to freeway crash standards.

Bicycle shoulders, lanes, or paths should be provided on both sides of each DAR overcrossing open to non-vehicular traffic. The type of facility would consider regional and local planning goals. A minimum shoulder width of four ft would be provided for Class III facilities.

Pedestrian lighting, enhanced fencing and railings, and other urban amenities would be provided on each DAR local street overcrossing and be consistent with local values and goals. Existing streetscape elements and design themes would be continued within Caltrans right-of-way at each DAR overcrossing. Local streetscape guidelines would be followed. Enhancements or enhancement features such as decorative lighting and street furniture would be incorporated if local agencies accept permanent maintenance responsibility. Container trees located on structures would also be provided in locations where the responsible local agency has requested them and agreed to maintain them in perpetuity.

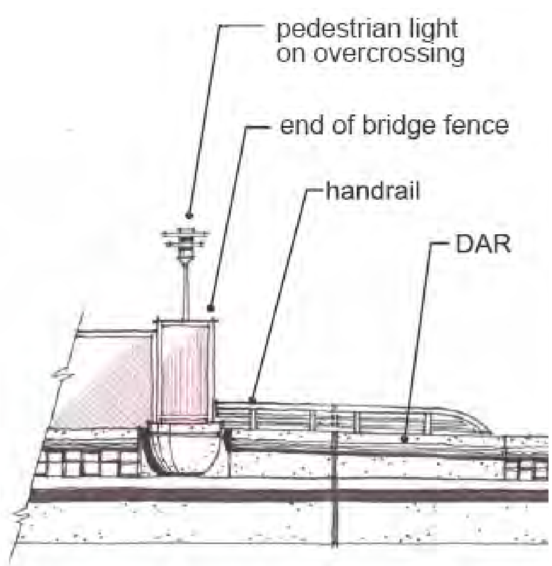


Figure 3-7.146: DAR (Elevation View)

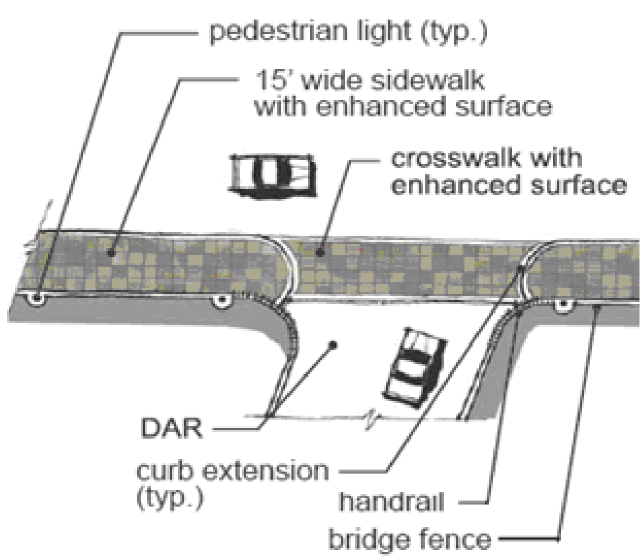


Figure 3-7.147: DAR (Plan View)

Freeway Interchanges

Interchanges are locations in which the large-scale, high-speed, high-volume, restricted-access realm of the automobile intersects the human-scale, multimodal, multi-use world of the community and street. The goal of the following mitigation measures is to preserve community character and continuity across the proposed freeway facility by creating a distinct visual and functional realm for pedestrians and bicyclists, providing landscape features that contribute to community goals, and designing freeway features and appurtenances that harmonize with the character of the community and street.

Interchange Configuration

Continuity of street and pedestrian facilities would be maximized wherever possible by converting existing non-stop freeway ramp entries and exits to ramp termini placed perpendicular to the street. The use of roundabouts would also be considered to create a more balanced relationship between interchange and community by decreasing required roadway width.

Pedestrian Facilities

Establishment of a continuous pedestrian realm on both sides of local streets as they pass through the interchange would be accomplished by utilizing design features such as street trees, pedestrian lighting, landscaped parkways located between sidewalk and curb, enhanced sidewalk paving that continues across freeway ramps, and islands of refuge in street and ramp medians. Pedestrian and transit facilities would conform to SANDAG Pedestrian Design Guidelines and any applicable local streetscape design standards and guidelines. Urban design features such as benches, bollards (short posts to divert or exclude automobiles), directional signage, and trash receptacles would also be included as appropriate. Specific guidelines and/or specific interchange streetscape plans were developed as part of the Design Guidelines: I-5 NCC Project.

Figure 3-7.148: A sidewalk along an I-15 freeway off-ramp becomes a pedestrian realm with the inclusion of human-scale street amenities

Figure 3-7.149: Pedestrians walking in the realm of the automobile

Bicycle Facilities

Bicycle facilities would be preserved or upgraded to conform to the San Diego Regional Bike Plan, applicable local standards, and General Plan circulation element goals.

Landscaping

Interchange landscaping would reflect the visual character and goals of its locality. Enhanced interchange landscaping would be considered in cases where the responsible local agency would provide maintenance in perpetuity. Entry features would be included as transitional visual elements into local communities where appropriate. Traditional decorative entry signage with text would not be used. Specific interchange landscape themes were developed as part of the Design Guidelines: I-5 NCC Project.

Storm Water Treatment Facilities

Detention basins located at freeway interchanges or in areas of high visibility would incorporate the following design features. Basins would be located at least 10 ft from clear recovery areas wherever possible to allow landscape screening to be installed. Basins would appear to be natural landscape features such as dry streambeds or riparian pools. They would be shaped in an informal, curvilinear manner, incorporate slope rounding, variable gradients, and be similar to the surrounding topography to de-emphasize a defined outer edge. Maintenance access drives would be located in unobtrusive areas away from local streets and should consist of inert materials or herbaceous groundcover that is visually compatible with the surrounding landscape. All visible concrete structures and surfaces would be of special design and adhere to the Design Guidelines: I-5 NCC Project. Rock slope protection would consist of aesthetically pleasing whole material of various sizes. Standpipes and other vertical appurtenances would be placed in unobtrusive locations and be painted an unobtrusive color. Where possible, bioswales would be located in non-obtrusive areas, be designed to appear as natural features, and incorporate applicable mitigation measures listed above for detention basins.

Street Appurtenances

The use of Caltrans standard freeway appurtenances on local streets would be avoided or minimized wherever possible. Crash cushions, metal beam guardrail, end anchor assemblies, concrete barriers, sign standards, light standards, signal standards, and chain-link fencing are examples of such features that are addressed in the Design Guidelines: I-5 NCC Project. The use of access control fencing at interchanges would be minimized and located in unobtrusive locations when its use is necessary. Electrical control cabinets and other utility boxes would be located in unobtrusive locations away from sidewalks wherever possible. Raised medians would be used wherever possible to allow for pedestrian islands of refuge, create a visual break in the ground plane, and provide space for street tree planting.

Manchester Avenue Transit Center

Site amenities for transit users would be provided; such as covered bus shelters, pedestrian lighting, benches, litter receptacles, tree grates, bollards, and bicycle racks. Landscaping and enhanced pedestrian paving would be an integral part of the station features. A sidewalk 10 ft in width would be provided along the west side of the transit center access road from the bus platform to Manchester Avenue. It would be located six ft from the back of curb to create a landscaped parkway.

Freeway Landscape

Corridor Landscaping

The Design Guidelines: I-5 NCC Project contain a landscape concept plan for the project. In general, freeway landscaping would utilize California native plants. The landscape design would be consistent with the character of adjacent community landscape. In communities that are characterized by ornamental landscaping, freeway landscaping would include native plants with an ornamental appearance in an enhanced design. Trees, shrubs and groundcover would be installed. In less-developed areas of the corridor, drought-tolerant native trees and shrubs would be planted in an informal design. Areas adjacent to native habitat would receive native plantings and hydroseed. Landscape plantings adjacent to habitat would be designed in consultation with the District Biologist. Landscaped areas would be irrigated with an underground automatic system. Reclaimed water would be used wherever possible. A thorough weed abatement/exotic removal program would be implemented prior to hydroseeding or planting and continue through plant establishment.

Freeway Planters

Since the project would result in the loss of a majority of existing landscaped roadside areas, steps would be taken to create new areas for mitigation replacement planting within the freeway facility at the edge of shoulder, between concrete median and separator barriers, or between barriers and walls wherever the available width allows. Minimum widths for planting are two ft between barrier and wall, and six ft between median or separator barriers. Where possible, safety barriers at the edge of shoulder would facilitate tree and shrub planting in roadside areas that are too narrow to allow standard clear recovery area planting setbacks to be used.

Median Oleander Preservation and Replacement Planting

Existing median oleanders would be preserved wherever possible. Since freeway widening would disturb the roots of existing plants, the following measures would be implemented. A new automatic irrigation system would be installed in the median and the oleanders would be irrigated and fertilized on a regular basis before, during, and after project construction. The oleanders would be watered, fertilized, and pruned under the direction of a certified arborist prior to the commencement of median grading. The oleanders would remain in place undisturbed during construction. Existing non-vigorous oleanders would be replaced with new oleanders planted from five-gallon containers at the direction of the Resident Engineer. Oleanders that do not survive during construction or plant establishment would be replaced using oleanders planted from containers. Existing weeds and volunteer plants within the median would be removed. A plant establishment period of one year would be provided. Following plant establishment, a mitigation monitoring period of three years would be implemented to ensure plant survival.

Local Frontage Roads

In locations where freeway widening brings traffic into close proximity to parallel local streets such as Ida Avenue in Solana Beach; Villa Cardiff Drive, Devonshire Drive, Orpheus Avenue, and Piraeus Street in Encinitas; Avenida Encinas in Carlsbad; and Brooks Street, Garfield Street, and Buena Street in Oceanside, landscape buffers would be created between the freeway and street. Buffers would include elements such as street trees and shrubs, sidewalks, and solid screen walls for access control. Inclusion of some buffers may require local street widths to be adjusted. Implementation of this mitigation measure is contingent on local agency approval and commitment to maintain the streetscape buffer in perpetuity.

Manufactured Slopes

Slopes would be graded 1:2 or flatter (vertical/horizontal) to support planting and irrigation. Steeper slopes may be possible if they are serrated and contain benches wide enough to accept plants from #15 containers. Grading would utilize techniques such as slope rounding, slope sculpting, and variable gradients to approximate the appearance of natural topography.

Lighting, Signage, and Miscellaneous Freeway Appurtenances

Signage, lighting, and miscellaneous freeway feature mitigation designs are detailed in the Design Guidelines: I-5 NCC Project.

Lighting and signage pedestals on structures would be placed at pilasters or be incorporated in other architectural features, where possible.

Freeway lighting and signage would conform to the Design Guidelines: I-5 NCC Project. The Guidelines include directing lighting away from sensitive habitats and reducing glare.

Concrete lighting and signage pedestals would be designed in such a way that vertical barrier transitions are not required.

Electrical and signal equipment at ramp termini would be placed in visually unobtrusive locations.

Median barriers would receive integral concrete color and the application of a heavy sandblast texture to barrier surfaces visible from the freeway. Heavy sandblast texture would create an irregular surface relief to a depth of 3/8 in.

Narrow landscape areas beyond the gore would be paved for worker safety. Paving would incorporate a tan color and rough surface texture consistent with corridor design themes. Concrete vegetation control would be a tan color.

Signage with movable elements or self-illuminated features such as changeable message signs would be excluded from viewsheds containing scenic resources if at all possible. The DLA would assist in the placement of all such signage.

Access Control Fencing

Access control fencing would be placed in visually unobtrusive locations of interchanges and bridges where possible. It is recommended that it be of special design and consist of enhanced materials where appropriate and maintained by the responsible local agency in perpetuity.

Where possible, retaining walls and soundwalls near right-of-way boundaries would be designed in such a way that access control fencing would not be needed. The "dead" spaces that occur between walls and fences would be avoided if at all possible.

Drainage and Water Quality Facilities

Concrete interceptor ditches would not be placed adjacent to residential property, at interchanges, or adjacent to pedestrian use areas if at all possible. Alternatives such as subterranean drainage placed below finish grade or planted geo-reinforced drainage surfaces would be used.

Detention basins located in areas visible to the public would incorporate the same mitigation features required for basins located at interchanges.

Bioswales and linear drainage ditches would be designed to appear as natural features and incorporate applicable mitigation measures listed above for detention basins.

Concrete drainage devices located in areas of high visibility would be located, designed, and colored to be unobtrusive in appearance.

Soft surface or segmented hard surface plantable alternatives to concrete ditches and rock slope protection would be utilized in all project areas visible to the public, where possible.

The use of pervious concrete for storm water pollution prevention should be considered. Project features such as interceptor ditches, inlet aprons, gutters, maintenance access roads, maintenance vehicle pullouts, and parking lots could consist of pervious concrete and perhaps reduce the project footprint.

Excess Real Estate Parcels

Real estate parcels in whole or in portion that are purchased for freeway improvements but not required for use as permanent State right-of-way would be considered as potential opportunities for community pocket parks or public open space. This would be considered at the request of the responsible local agency and relinquished to them to maintain in perpetuity.

Overhead Utility Relocation

Existing overhead utilities that are located near the freeway and requiring relocation due to freeway widening would be relocated underground where possible.

3.8 Cultural Resources

This section of the environmental document discloses the project's effects, or impacts, on cultural resources, how those impacts were determined, and whether and how impacts can be avoided, minimized, or mitigated. Not all information about cultural resources can be fully disclosed to the public. The location of archaeological sites is exempt from disclosure to the public by law, to protect sites from looters.

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.8.1 Regulatory Setting

"Cultural Resources" as used in this document refers to all "built environment" resources (structures, bridges, railroads, water conveyance systems, etc.), culturally important resources, and archaeological resources (both prehistoric and historic), regardless of significance. Laws and regulations dealing with cultural resources include:

The National Historic Preservation Act of 1966 (NHPA), as amended, sets forth national policy and procedures regarding historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places (NRHP).

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on such properties and to allow the Advisory Council on Historic Preservation the opportunity to comment on those undertakings, following regulations issued by the Advisory Council on Historic Preservation (36 CFR 800). On January 1, 2004, a Section 106 Programmatic Agreement (PA) between the Advisory Council, FHWA, State Historic Preservation Officer (SHPO), and Caltrans went into effect for Caltrans projects, both State and local, with FHWA involvement. The PA implements the Advisory Council's regulations, 36 CFR 800, streamlining the Section 106 process and assigning certain responsibilities to Caltrans.

Historic properties may also be covered under Section 4(f) of the U.S. Department of Transportation Act, which regulates the "use" of land from historic properties. See Appendix A for specific information regarding Section 4(f).

Historical resources are considered under CEQA, as well as California Public Resources Code (PRC) Section 5024.1, which established the California Register of Historical Resources (CRHR). PRC Section 5024 requires State agencies to identify and protect state-owned resources that meet NRHP listing criteria. It further specifically requires Caltrans to inventory state-owned structures in its rights-of-way. Sections 5024(f) and 5024.5 require State agencies to provide notice to and consult with the SHPO before altering, transferring, relocating, or demolishing state-owned historical resources that are listed on or are eligible for inclusion in the NRHP or are registered or eligible for registration as California Historical Landmarks.

3.8.2 Affected Environment

Cultural resource reports prepared for the project to date:

Historic Property Survey Reports (HPSR):

- [Original] HPSR (March 2007)
- First Supplemental HPSR (May 2008)
- Second Supplemental HPSR (May 2008)
- Supplemental HPSR (April 2009)
- Third Supplemental HPSR (July 2009)
- Fourth Supplemental HPSR (April 2010)
- Fifth Supplemental HPSR (March 2013)
- Sixth Supplemental HPSR (March 2013)

Technical Studies:

- [Original] Archaeological Survey Report (ASR) (2002)
- Supplemental ASR (December 2006)
- Second Supplemental ASR (July 2008)
- Third Supplemental ASR (July 2008)
- Fourth Supplemental ASR (March 2013)
- Archaeological Evaluation Reports (June 2004, December 2006)
- Extended Phase 1 Testing Report for CA-SDI-6882 (February 2005)
- Extended Phase 1 Testing Report for CA-SDI-6134 (February 2005)
- Phase I Geomorphic Assessment for Buried Archaeological Resources (May 2005)

Historic Resource Evaluation Reports (HRER) for historic structures:

- [Original] HRER (July 2005)
- First Addendum HRER (August 2006)

The project Area of Potential Effects (APE) for cultural resources was developed in consultation among the Project Archaeologist, Project Manager, and Project Engineers, with continuous input from Design and other Environmental functional units. The initial APE map was signed on December 20, 2006. The APE was established as the limits of future right-of-way for the roadway work; but it also considered other impacts related to soundwall locations outside the right-of-way, biological mitigation sites, and construction and utility easements. Additional biological mitigation site locales that might be subject to disturbance during implementation of biological mitigation were identified in 2008 through 2012, with respective APEs signed in 2008, 2009, and 2010, and incorporated into the current final APE in 2013.

The studies listed above served to identify and evaluate cultural resources located within the project APE. They include: archaeological and historic architecture field surveys to identify cultural resources; archaeological test excavations designed to determine the nature and significance of the sites within the APE; a geomorphic study to determine the potential for buried soils and cultural deposits to occur within the APE; data recovery plans for two sites that were initially anticipated to be adversely impacted by the proposed build alternatives; and an ESA action plan designed to prevent impacts to cultural resources located adjacent to, but outside, project construction activities. Also developed prior to circulation of the Draft EIR/EIS were a draft and unsigned Memorandum of Agreement (MOA) regarding treatment of potentially impacted resources (detailed in the Cultural Resources Treatment Plan, an appendix to the MOA), and an initial Finding of Effect (FOE) document, additionally described below. The data recovery plans, MOA, and initial FOE are no longer valid for the current project as refinement of the build alternatives has resulted in avoidance of sites originally anticipated to be impacted. The process of site identification and cultural resources planning is described in the remainder of this section.

Numerous archival sources were used to assist in the identification of resources within the APE, including the California Historical Resources Information System (CHRIS) repository at San Diego State University, local historical societies, Native American tribes and individuals, historical maps and photographs, and discussions with long-time area residents.

The 2007 HPSR and accompanying technical studies were sent to the SHPO on March 16, 2007, to: (1) document Native American consultation efforts; (2) identify cultural resources within the project APE; (3) seek its concurrence on NRHP/CRHR eligibility determinations; (4) identify then-anticipated project effects to eligible resources; and (5) propose methods to resolve adverse effects to those eligible resources.

Per PA Stipulation VIII.C.5, Caltrans requested concurrence on the following conclusions of eligibility:

- 10 archaeological sites were identified as not eligible for the NRHP/CRHR: CA-SDI-4553, CA-SDI-6831, CA-SDI-7296, CA-SDI-12120, CA-SDI-13484, CA-SDI-15678, CA-SDI-15679, CA-SDI-15680, CA-SDI-15685, and CA-SDI-17673

- 48 architectural properties over 50 years old were identified as not eligible for the NRHP

- Four archaeological sites were identified as eligible for the NRHP/CRHR: CA-SDI-603, CA-SDI-628, CA-SDI-12670, and CA-SDI-17928

- Three architectural resources were identified as eligible for the NRHP/CRHR: 767 Orpheus Avenue, 636 Leucadia Boulevard, and 510-514 La Costa Avenue

In accordance with PA Stipulation VIII.C.3, seven archaeological sites were considered eligible for the NRHP/CRHR for the purposes of the current undertaking only, including:

- CA-SDI-10965, CA-SDI-16637, CA-SDI-16638H, CA-SDI-16639, CA-SDI-17672, CA-SDI-17907H, and CA-SDI-17960 along I-5

The SHPO requested a 30-day extension for document review on April 29, 2007, but no subsequent letter of concurrence was received.

On July 2, 2007, Caltrans notified the SHPO in accordance with PA Stipulation VIII.C.5.a of its intent to move forward with the resolution of impacts to affected historic properties. This action preceded project refinement occurring in 2012, and assumed that two eligible archaeological sites would be adversely affected during construction of recommended project soundwalls. On December 4, 2007, an FOE Package was sent to FHWA, SHPO, the Advisory Council on Historic Preservation, and the following interested parties: Steve Banegas, Spokesman for the Kumeyaay Cultural Repatriation Committee (KCRC); the Weston family; Carmen Lucas, Kumeyaay Elder; and Mel Vernon, Luiseño Educator. On December 27, 2007, FHWA concurred with the FOE and wrote a letter to the SHPO to begin the consultation effort pursuant to Stipulation XI.A of the PA. On March 17, 2008, the SHPO responded by letter to FHWA and copied Caltrans that the SHPO agreed that the treatment of historic properties in the FOE was reasonable (*Figure 5-5.6)*.

In accordance with PA Stipulation VIII.C.3, six additional sites considered eligible for the NRHP/CRHR were located during post-2007 surveys of biological mitigation sites, including:

- CA-SDI-209, CA-SDI-607, CA-SDI-762, CA-SDI-6849, CA-SDI-7296, and CA-SDI-18917

A secondary request for concurrence on treatment of historic properties was submitted to the SHPO on April 14, 2010. That submittal addressed five supplemental HPSRs developed for proposed project-related biological mitigation sites (the First, Second, Third, Batiquitos, and Fourth Supplemental HPSRs) submitted pursuant to the PA and containing a Notification of No Adverse Effect Findings. On May 12, 2010, the SHPO responded to Caltrans via email and copied FHWA regarding concurrence that the standard conditions and project-established ESAs would suitably protect the sites (*Figure 5-5.7)*.

In the Fifth Supplemental HPSR (2013), Caltrans changed the CA-SDI-7296 effect finding from No Adverse Effect with Standard Conditions-ESA to No Historic Properties Affected. The site had been determined ineligible to the NRHP in the HPSR (2007), but was made an ESA in the Second Supplemental HPSR (2008) based on an error of fact. Pursuant to Stipulation II of the PA, this site by definition is not a historic property since it was determined ineligible to the NRHP. The Finding of No Adverse Effect with Standard Conditions-ESA designation at CA-SDI-7296 warranted re-evaluation, per Stipulation VIII.C.4, since the original justification was based on an error of fact.

The Sixth Supplemental HPSR (2013) documented the APE adjustments and the effect finding revision for the project as a whole. This report unified the entire project under a single APE, updating the original APE (2007) by adding the Biological Mitigation Projects (2008 to 2010) and new areas shaped by project redesign (2013), but removing site CA-SDI-17928 and built environment resource 510 to 514 La Costa Avenue from this undertaking that were avoided through project redesign.

Based on project redesign and the documentation in the Fifth and Sixth Supplemental HPSRs, Caltrans prepared a final FOE package in July 2013 that documented the effect finding change for the project as a whole to No Adverse Effect, pursuant to Stipulation X.B.i.a. As previously determined, this undertaking would not cause an adverse effect to the built environment historic property located at 767 Orpheus Avenue, since the sliver takes required for this project would not affect any of the qualities that make this property significant. The 2013 FOE reiterates the argument presented in 2007 FOE regarding the 767 Orpheus Avenue property. All other resources within the APE are protected by Environmentally Sensitive Area designations. As previously determined and pursuant to Stipulation X.B.2.a(ii), Caltrans is assuming that the following archaeological sites are eligible for the purposes of this undertaking only: CA-SDI-209, CA-SDI-603, CA-SDI-607, CA-SDI-628, CA-SDI-762, CA-SDI-6849, CA-SDI-10965, CA-SDI-12670, CA-SDI-16637, CA-SDI-16638H, CA-SDI-16639, CA-SDI-17672, CA-SDI-17907H, CA-SDI-17960, and CA-SDI-18917. Environmentally Sensitive Area (ESA) designations would be delineated at and around these sites and the 2013 ESA Action Plan (which updated the 2007 ESA Action Plan submitted to FHWA and SHPO on December 4, 2007 and approved by SHPO on March 17, 2008) would be enacted to ensure that the project will avoid these resources. Caltrans will now avoid all known adverse effects to historic properties (properties that were previously impacted and adversely affected are now avoided). As such, the 2007 draft

Memorandum of Agreement and 2007 Cultural Resources Treatment Plan are no longer required for this undertaking.

In a letter addressed to FHWA dated July 1, 2013, Caltrans notified FHWA of the APE revisions, requested FHWA's review and concurrent on the draft FOE for the project, and requested FHWA to consult with SHPO regarding the project's effects on historic properties within the APE (*Figure 5-5.8*). FHWA concurred with the FOE and initiated consultation with SHPO in a letter dated July 12, 2013 that requested concurrence on the FOE and notified SHPO of the APE revisions and Section 4(f) *de minimis* determination (*Figure 5-5.9*). On September 11, 2013 SHPO concurred with the finding of no adverse effect without standard conditions (see *Figure 5-5.10*).

Following all of the steps identified above, as well as project refinement efforts following circulation of the Draft EIR/EIS, no adverse effects to known eligible resources are currently anticipated to result from project implementation.

Archaeological Sites

All or portions of the following sites are presumed eligible for the NRHP/CRHR, with those contributing portions protected by ESAs.

- CA-SDI-209 was recorded in 1998 as a shell scatter (*Chione*, *Argopecten*, and *Donax*) with some stone artifacts; a 2008 survey found shell in a dirt road cut-bank. Extended Phase 1 archaeological testing completed for the proposed project and examination of historic aerial imagery/topographical mapping indicate that the lowland areas of the site appear to have been re-deposited during road construction. Although some pockets of intact deposits may exist in the originally recorded site knoll top area, substantial erosion has occurred and topsoil sediments appear to be absent.

- CA-SDI-603 was recorded in 1929 as a large site with midden, shell, charcoal, lithics, and ceramics. Excavations occurred from 1958 to 1961 and included the recovery of a human burial. The majority of the site area to the west is now developed and highway construction in the 1960s impacted those portions recorded within the right-of-way. Testing within the right-of-way/APE was performed in 2002. The remnant site portion in the right-of-way appears to be eligible for the NRHP/CRHR under Criterion D because of its research potential to contribute significant information concerning chronology and the organization of coastal exploitation during the early Holocene (6000 to 8000 years before present [B.P.]) period, and patterns of paleo-environmental change associated with Batiquitos Lagoon.

- CA-SDI-607 was originally recorded in 1959 as a concentration of shell in the cut bank for La Costa Avenue. The site has been identified with SDM-W-105 (recorded by Malcolm J. Rogers in the 1920s or 1930s), reported as a midden as deep as 48 ft. Testing in 1987 recovered marine shell (mostly *Chione* and *Argopecten*) and one lithic flake, and determined that the site had been largely destroyed by impacts from the construction of La Costa Avenue in 1966. During a 2009 survey for the proposed project, some shell (*Chione*, *Argopecten*, *Protothaca*, and *Chama*) was noted, possibly in fill rather than *in situ* contexts.

- CA-SDI-628 was initially recorded in 1929. The site consists of a large *Chione* shell midden, with some stone artifacts. Portions of the site were tested in 1994 and 2002. Despite severe impacts to the majority of the site through development and 1960s highway construction, the remaining site area within the right-of-way/APE appears to be eligible for the NRHP/CRHR under Criterion D because of its research potential to contribute significant information concerning chronology and the organization of coastal exploitation during the Holocene period, and patterns of paleo-environmental change associated with Batiquitos Lagoon.

- CA-SDI-762 was recorded in 1961 as an eroded shell midden, with a metate. Studies conducted in 1981 and 1982 distinguished eight loci within the site, consisting of light shell scatters, midden, occasional lithic artifacts, fire-affected rock, and brownware sherds. Further subsurface testing conducted in 1983 at five of the loci encountered some marine shell, a few pieces of flaked lithic debitage, and fire-affected rock. The 1983 investigators concluded that the relatively low yield, level of disturbance, and lack of variability at the five loci lessens their significance considerably and did not recommend further work at the site. During the project-related 2009 survey, a shell scatter was noted on a site knoll-top, among substantial amounts of modern refuse.

- CA-SDI-6849 was originally recorded in 1979, and was noted to consist of lithic and shell scatters, fire-affected rock, and midden deposits. Project-related survey in 2010 observed most identified site elements, including *Chione*, *Argopecten*, and *Ostreidae* shell, although groundstone implements and midden deposits were not relocated. The site boundary was extended to the west within the project area based on identification of additional artifacts during the 2010 survey.

- CA-SDI-10965 was initially recorded in 1929. It is a long-term habitation site dating to the early Holocene, as shown by extensive shell (*Chione* with *Argopecten* and an unidentified gastropod), anthropogenic soils, and artifactual material. Adjacent private property has been graded. Portions of the site were excavated in 1983 to 1984, 1988, and 2002. Portions within the APE (a light shell scatter only, with little depth and no artifacts) are clearly peripheral to the main site area outside the APE. Within the APE, the deposits retain very poor integrity, and Caltrans recommended that the portion to be impacted does not contribute to the significance of this site.

- CA-SDI-12670 was initially recorded in 1929. Testing in 2002 identified a remnant portion of the once large shell midden dating from the beginning of the middle Holocene period (ca. 4500 to 6000 years B.P.). Although large portions of the site have been severely impacted by development to the west and highway construction to the east, a small portion retains integrity and is eligible for the NRHP/CRHR under Criterion D. This relates to its research potential to contribute important information concerning chronology; the organization of human coastal exploitation during the middle Holocene period; and the patterns of paleo-environmental (climate and vegetation) and change associated with Batiquitos Lagoon.

- CA-SDI-16637 was recorded in 2002 as a sparse artifact (ground stone and a hammerstone/core) and shell (*Chione* sp.) scatter. Artifacts appear to be eroding out of a steep embankment that borders the site to the south.

- CA-SDI-16638H was recorded in 2003 and represents the remains of a house and related features that were used in the 1950s.

- CA-SDI-16639 was recorded in 2003. It consists of a hearth feature and a small number of lithic artifacts and pieces of *Chione* shell. A portion of the site was tested in 2006, and appears to be a diffuse surface scatter of shell, with some lithics, that appears to be redeposited by erosion.

- CA-SDI-17672 was recorded in 2005 as a moderately dense scatter of marine shell and flaked lithics. A portion of the site was tested, and revealed a highly disturbed diffuse scatter of shell from a secondary deposit.

- CA-SDI-17907H is the historic Buena Vista Cemetery. The inhumations were removed in the 1960s when I-5 was originally built. Subsequently, the land was developed (cut and filled), and a restaurant is now situated there.

- CA-SDI-17960 was recorded in 2006 as one modified cobble and three lithic flakes. The site area has been impacted over the years by agricultural practices and currently is within a commercial strawberry field. Ground visibility was severely hampered by the strawberry operation.

- CA-SDI-18917 was recorded in 2008 and consists mainly of sparsely scattered surface fragments of *Chione*, *Argopecten*, and *Donax* shell and an intact midden deposit. Extended Phase 1 archaeological subsurface testing conducted in 2009 for the proposed project recovered a pottery sherd, fire-cracked rocks, and lithics from a small midden deposit. Only one of eight testing locations encountered an intact subsurface deposit.

The following prehistoric archaeological site is now outside the project APE and would no longer be impacted by the undertaking due to project redesign.

- CA-SDI-17928 was initially recorded in 2006 as a deposit of marine shell, which was reported to have also contained flaked lithics and ground stone. Testing in 2006 identified a substantial cultural deposit. The site is eligible for the NRHP/CRHR under Criterion D for its research potential, related to the potential to shed light on the chronology of changing subsistence strategies during the Middle and Early Holocene.

The remaining sites inside the APE—CA-SDI-4553, CA-SDI-6831, CA-SDI-6882, CA-SDI-7296, CA-SDI-12120, CA-SDI-12121, CA-SDI-13484, CA-SDI-15678, CA-SDI-15679, CA-SDI-15680, and CA-SDI-17673—were deemed not eligible for the NRHP/CRHR for various reasons, including: lack of cultural remains, no further research potential, no identified Native American concerns, and/or highly disturbed or displaced deposits. These conclusions are based on the results of archaeological investigations and Native American consultations.

Built Environment Resources (Over 50 Years Old)

One built environment resource is eligible for listing in both the NRHP/ CRHR:

- 767 Orpheus Avenue is a 1936 residence in Encinitas built in the English Arts and Crafts style with a detached garage. It meets NRHP/CRHR eligibility Criterion C, at the local level of significance, as a distinctive example of its style and period and one of the most architecturally distinguished residences in the City of Encinitas. Contributing features to this designation include the house, garage, and a row of palm trees at the west end of the property's front yard.

The following two built environment resource are now outside the project APE and would no longer be impacted by the undertaking due to project redesign:

- 510-514 La Costa Avenue is a 1920s agricultural property in Leucadia that meets the criteria for listing in the NRHP/CRHR under Criterion A at the local level of significance, for its association with floriculture in the Encinitas, Leucadia, and Carlsbad areas in the early to mid-20th century. It is an intact, representative example of an increasingly rare property type, as suburban growth consumes much of the former agricultural land in the coastal communities of northern San Diego County.

- 636 Leucadia Boulevard was built in 1932; it is a Spanish Eclectic style residence that exhibits an unusually high degree of craftsmanship and detailing. It meets NRHP/CRHR Criterion C, at the local level of significance, as a distinctive example of its style and period and one of the most architecturally distinguished residences in the City of Encinitas. The boundary of the NRHP/CRHR property coincides with the current parcel boundary.

Seventy-three other built environment resources were evaluated for their potential NRHP/CRHR eligibility; they were deemed to be not eligible because they lacked associations with important people or events, lacked architectural merit, did not represent the work of a master builder or architect, and did not have the ability to convey important information in history or architectural history.

All highway bridges within the APE were previously determined not significant in accordance with Caltrans Statewide 1987 historic bridge inventory, which was reconfirmed with the 2006 update.

3.8.3 Environmental Consequences

Effects to cultural resources would apply equally to all the build alternatives. Project effects to historic properties/historical resources are determined to assess if the proposed undertaking would adversely affect the qualities that make each eligible for the NRHP/CRHR. An historic property could either be not affected, not adversely affected, or adversely affected, depending on the resource type and the nature of project impacts to that resource. Not affecting an historic property means the project is avoiding the resource completely. Not adversely affecting means the project might be impacting the resource in some way, but that the impact is not so severe as to diminish the qualities that make the resource significant. Adversely affecting a resource means the project is severely impacting all or some of the characteristics that make that resource significant, usually as a consequence of destruction, demolition, or relocation. A list of Native American Heritage Commission (NAHC) and Native American consultation and coordination is provided in *Table 5.4* of this EIR/EIS.

Build Alternatives

Archaeological Sites

Known and eligible or potentially eligible archaeological sites along I-5 (CA-SDI-603, CA-SDI-628, CA-SDI-10965, CA-SDI-16637, CA-SDI-16638H, CA-SDI-16639, CA-SDI-17960, CA-SDI-17672, CA-SDI-17907H, CA-SDI-12670, and CA-SDI-17928), as well as sites known from proposed biological mitigation parcels (CA-SDI-209, CA-SDI-607, CA-SDI-762, CA-SDI-6849, and CA-SDI-18917), would not be adversely affected because they would be protected from impact, in accordance with PA Stipulation VIII.C.3. This stipulation enables Caltrans to establish an ESA to protect the sites from project-related impacts. Caltrans can make a determination of eligibility without testing in accordance with Stipulation VIII.C.3.

Built Environment Resources

None of the three built environment resources determined eligible for the NRHP/CRHP would be adversely affected by the undertaking. Both 510-514 La Costa Avenue and 636 Leucadia Boulevard are located outside the APE and would not be affected. At 767 Orpheus Avenue, small right-of-way sliver takes at the perimeter of the property would be required to construct the project and/or build a soundwall. The evaluation of the property results in determining which elements within the property boundary contribute to the significance. This might include various buildings, landscaping, walls, pools, and other features. The sliver takes required for this project would require some vegetation/landscaping and outbuildings at the east end of the parcel. It would not affect any of the qualities that make the property eligible, as no contributing buildings, landscaping, or other contributing features would be impacted. This type of effect is called a No Adverse Effect, because the qualities that make the resource eligible would not be adversely affected.

For Section 4(f) purposes, 767 Orpheus Avenue would require a Section 4(f) finding, which for the purposes of this undertaking is proposed as *de minimis*. The use is proposed as *de minimis* under 4(f) because the small sliver takes to the properties would not result in an adverse effect or diminish the qualities or character-defining features that qualify this resource for the NRHP/CRHR. On July 12, 2013, FHWA notified SHPO that a Section 4(f) *de minimis* determination was made for this historic property (see *Figure 5-5.9* in *Chapter 5* of this Final EIR/EIS).

No Build Alternative

Archaeological Sites

The No Build alternative would not result in any impacts to prehistoric archaeological sites.

Built Environment Resources

The No Build alternative would not result in any impacts to built environment resources.

3.8.4 Avoidance, Minimization, and/or Mitigation Measures

Build Alternatives

Caltrans would avoid all adverse effects to known eligible cultural resources within the project's APE. Adverse effects to the NRHP/CRHR-eligible historic built environment property at

767 Orpheus Avenue that were identified in the Draft EIR/EIS would be avoided due to project design changes. Due to project refinement since 2010, avoidance of known eligible archaeological resources within the APE is also possible.

As noted in this Final EIR/EIS *Executive Summary* and *Section 3.15, Noise*, several soundwalls for secondary consideration have been identified. If, following project approval, these walls become "reasonable" to construct (as described in *Section 3.15*), a conformity analysis would be completed to ensure that the footprints and environmental effects associated with these soundwalls fall within the existing analysis. If the soundwall is not adequately covered under existing analysis, new evaluation would occur under both CEQA and NEPA.

Archaeological Sites

Continuous efforts to avoid cultural resources were implemented by utilizing all practical design techniques. Many archaeological sites that initially were within the project's APE were avoided through project redesign. At the time of Draft EIR/EIS circulation in 2010, two archaeological sites deemed eligible for the NRHP/CRHR, CA-SDI-12670 and CA-SDI-17928, were anticipated to be adversely affected due to soundwall construction. Based on ongoing design and identification of those soundwalls as not being feasible, those impacts are no longer anticipated. Project refinement resulted in avoidance of these sensitive resources.

Caltrans would undertake efforts to avoid causing impacts to archaeological sites. Prior to construction, a Cultural Resources Treatment Plan would be developed. This plan would include an Archaeological Monitoring Area (AMA) Action Plan and an ESA Action Plan. Combined, these plans would delineate AMA and ESA locations where a "qualified" archaeological monitor and a Native American monitor would be present during construction, identify the individuals involved, and their roles and responsibilities.

AMA and ESAs would be depicted on the design/construction plans. A letter would be sent to the Resident Engineer's file, along with a copy of the AMA and ESA Action Plan. The archaeologist and Native American monitor would be present at the preconstruction meeting.

The archaeologist and Native American monitor would work with Caltrans Construction Liaison to accurately delineate the boundaries of those sites requiring the establishment of ESAs. Fencing would be placed around ESA sites, as appropriate. ESA sites would be avoided by all construction activity.

The construction contract also would contain language related to unanticipated discoveries should they be made during construction, including diverting activities away from such finds until an archaeologist could assess their nature and significance. If unanticipated discoveries occur, Section 106 consultation with the SHPO would be reopened, if appropriate. If cultural materials are discovered during construction, all earth-moving activity within and around the immediate discovery area would be diverted until a qualified archaeologist can assess the nature and significance of the find.

If unanticipated human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities would cease in any area or nearby area suspected to overlie remains, and the County Coroner would be contacted. Pursuant to PRC Section 5097.98, if the remains are thought to be Native American, the Coroner would notify the NAHC, who would then notify the Most Likely Descendant (MLD). At the same time, the person who discovered the remains would contact the District 11 Chief of the Environmental Resources Branch so that they could work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 would be followed, as applicable.

No Build Alternative

Archaeological Sites
Avoidance, minimization, and/or mitigation measures would not be required under the No Build alternative.

Built Environment Resources
Avoidance, minimization, and/or mitigation measures would not be required under the No Build alternative.

PHYSICAL ENVIRONMENT

3.9 Hydrology/Drainage (and Floodplains)

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.9.1 Regulatory Setting

EO 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The FHWA requirements for compliance are outlined in 23 CFR 650 Subpart A.

In order to comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments
- Risks of the action
- Impacts on natural and beneficial floodplain values
- Support of incompatible floodplain development
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project

The base floodplain is defined as “the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year.” An encroachment is defined as “an action within the limits of the base floodplain.”

3.9.2 Affected Environment

Location Hydraulic Studies (Hydrology and Floodplain Analysis)

This section in based primarily upon the February 2008 and February 2009 Location Hydraulic Studies, which are incorporated by reference. The lagoon bridge optimization studies are addressed below. These studies present the results of the Hydrologic Engineering Centers River Analysis System (HEC-RAS) modeling for the floodplains identified below.

The lagoons, creeks, and rivers crossed or potentially affected by the *I-5 NCC Project* were modeled to determine the potential impacts created by the proposed improvements of I-5 from Sorrento Valley to Oceanside in San Diego County. The proposed improvements would widen I-5 from an 8-lane (4 mixed flow lanes in each direction) to a 12-lane (4 mixed flow lanes and 2 Managed Lanes in each direction) or 14-lane facility (5 mixed flow lanes and 2 Managed Lanes in each direction). Location Hydraulic Studies have been performed for the following water bodies, the majority of which are designated as Federal Emergency Management Agency (FEMA) floodways or floodplains:

- Soledad Canyon Creek – FEMA Zone AE Floodway
- Los Peñasquitos Creek – FEMA Zone AE Floodway
- Carmel Creek – FEMA Zone AE Floodway
- San Dieguito River – FEMA Zone A Floodplain
- San Elijo Lagoon – FEMA Zone A Floodplain
- Cottonwood Creek – No FEMA Floodplain
- Batiquitos Lagoon – FEMA Zone A Floodplain
- Encinas Creek – No FEMA Floodplain
- Agua Hedionda Lagoon – FEMA Zone A Floodplain
- Buena Vista Lagoon – FEMA Zone A Floodplain
- Loma Alta Creek – FEMA Zone AE Floodway
- San Luis Rey River – FEMA Zone A99 Floodplain

Soledad Canyon Creek

The 100-year flood boundary is shown on the FEMA Floodway Boundary and Floodway Map, panels 1338 and 1389, effective date June 19, 1997. The 100-year peak discharges used for the study described herein were obtained from the FEMA Flood Insurance Study, San Diego County, California, Volume 1 of 7, revised July 2, 2002. The floodplain in relation to the project is depicted in *Figure 3-9.1*.

The project area is located in Sorrento Valley in the City of San Diego, and is approximately 3 mi upstream of the mouth of Los Peñasquitos Lagoon at the Pacific Ocean. Soledad Canyon Creek, located within the Los Peñasquitos Watershed, covers a watershed area of 100 square mi. Soledad Canyon Creek is fed by Carroll Canyon Creek, which originates southeast of the Miramar Reservoir in the neighborhood of Scripps Miramar Ranch in the City of San Diego, and discharges into the Pacific Ocean via Los Peñasquitos Lagoon.

Soledad Canyon Creek has been channelized through Sorrento Valley in a concrete lined trapezoidal channel for approximately 0.5 mi. Downstream, the creek joins with the Los Peñasquitos Creek and flows in a natural channel until it reaches Los Peñasquitos Lagoon. The lagoon contains extensive mudflats, saltpan, salt marsh, and one relic sand dune, with shallow water channels and broad tidal pans.

The watershed is drained by Carmel Creek, Los Peñasquitos Creek, Carroll Canyon Creek, and Soledad Canyon Creek. The creeks accumulate storm water runoff from residential and commercial development, but typically exhibit low flow during the summer. The watershed is highly urbanized with a population of approximately 400,000 residents.

The existing floodplain was analyzed using the HEC-RAS v.3.1.3 and aerial topography. The area of analysis ranges from approximately 4000-ft upstream to 1100-ft downstream of the I-5 crossing. In this region, the flow is 6,700 cubic ft per second (cfs) from Carroll Canyon Creek into the upstream boundary of Soledad Canyon Creek, and is joined with the flows from Los Peñasquitos creek after the I-5 crossing for a total 100-year flow of 19,500 cfs. During the 100-year storm event the majority of the floodwaters would flow down the canyon's center through the middle of the Sorrento Valley Business Park, with velocities ranging from 5.5 ft per second (ft/s) to 14.8 ft/s. The structures located in the creek's overbanks would be inundated by 2 ft to 9 ft of water.

Los Peñasquitos Creek

The 100-year flood boundary is shown on the FEMA Floodway Boundary and Floodway Map, panels 1338 and 1389, effective date June 19, 1997. The floodplain in relation to the project is depicted on *Figure 3-9.2*.

The project area located in the City of San Diego just north of Sorrento Valley Road/Roselle Street includes the Los Peñasquitos Creek located within the Los Peñasquitos watershed basin. The 170-square mi hydrologic unit includes the Cities of San Diego, Poway, Del Mar and unincorporated regions of San Diego County. The major basins within the Los Peñasquitos Lagoon watershed are Carroll (Soledad) Canyon, Los Peñasquitos Canyon, and Carmel Valley. These basins flow in a westerly direction towards the Pacific Ocean. These watersheds drain a highly urbanized region located almost entirely west of I-15 in coastal San Diego County. Elevations within the watershed range from mean sea level to 2900 ft above mean sea level (AMSL) in the upper watershed. Collectively and individually, the basins support a variety of water supply, economic, recreational, and habitat-related beneficial uses. Los Peñasquitos water bodies are especially sensitive to the effects of pollutants due to restricted or intermittent tidal flushing.

The Los Peñasquitos Creek watershed encompasses a land area of approximately 67 square mi including portions of the Cities of San Diego, Poway, and Del Mar. The watershed is highly urbanized with a population of approximately 400,000 residents. Los Peñasquitos Creek contains extensive mudflats, saltpan, salt marsh, and one relic sand dune, with shallow water channels and broad tidal pans. The creek was historically intermittent; however, due to development within the upper watershed, the creek now supports year-round flow. Los Peñasquitos Creek is concrete-lined along two stretches in its lower reach. Urban runoff from storm drains contributes inflows during winter storms as well as runoff from local landscaping.

The I-5 HOV/Managed Lanes freeway-to-freeway connector would span the entire Los Peñasquitos Creek floodplain, therefore no studies were required.

Carmel Creek

The 100-year flood boundary is shown on the FEMA Floodway Boundary and Floodway Map, panel 1336, effective date June 19, 1997. The 100-year peak discharges used for the study described herein were obtained from the FEMA Flood Insurance Study, San Diego County, California, Volume 1 of 7, revised July 2, 2002. The floodplain in relation to the project is depicted on *Figure 3-9.3*.

The project area located in the City of San Diego just south of Carmel Valley Road includes Carmel Creek, located within the Los Peñasquitos Lagoon watershed basin, and covers a watershed area of 170 square mi. The watershed includes the Cities of San Diego, Poway, and Del Mar, and unincorporated regions of San Diego County. The major basins within the Los Peñasquitos Lagoon watershed are Carroll (Soledad) Canyon, Los Peñasquitos Canyon, and Carmel Valley. These basins flow in a westerly direction towards the Pacific Ocean. Elevations within the watershed range from 2900 ft AMSL in the upper watershed to mean sea level.

The creek within the 15.7-square-mi Carmel Valley sub-basin flows through the valley in a westward direction from its headwaters on Black Mountain to the Los Peñasquitos marsh area. The creek was historically an ephemeral drainage; however, due to development within the upper watershed, the creek now supports year-round flow. Carmel Creek is slightly incised within its upper reaches. Material eroded from the Carmel Creek network is deposited downstream in gradients as the drainage approaches the lagoon. Runoff from Carmel Creek enters the Los Peñasquitos Lagoon within the northeastern corner.

The existing floodplain was analyzed using HEC-RAS v.3.1.3 and aerial topography. The Carmel Creek model begins upstream of the El Camino Real Bridge crossing. After the crossing, the creek opens up into a heavily vegetated plain over 700-ft wide and 1400-ft long. Several cross sections were defined in the open plain between El Camino Real and I-5 to accurately depict the back water effects that would occur due to the triple box culvert located at Sorrento Valley Road. The creek narrows as it passes beneath the I-5 bridges and becomes completely constricted as it passes through the 40-ft wide Sorrento Valley Road triple box culvert.

Immediately west of I-5, the Sorrento Valley Road triple box culvert was modeled using the HEC-RAS culvert option to represent existing conditions. For proposed conditions, the existing culvert was removed and replaced with a bridge. The proposed Sorrento Valley Road/Roselle Street Bridge replaces the triple box culvert with a 440-ft long pedestrian bridge with 13 pier rows in the floodplain.

The final bridge of interest was the Carmel Creek Truck Connector. Since the bottom soffit of this bridge would be built far above any anticipated 100-year flood levels, only the piers of the bridge would cause any effect on the floodplain. Approximately 1050 ft west of the connector bridge, the model terminates, as Carmel Creek ties into Los Peñasquitos Lagoon.

San Dieguito River

The 100-year flood boundary is shown on the FEMA Floodway Boundary and Floodway Map, panels 1307 and 1326, effective date June 19, 1997. The 100-year peak discharges used for the study described herein were obtained from the FEMA Flood Insurance Study, San Diego County, California, Volume 1 of 7, revised July 2, 2002. The floodplain in relation to the project is depicted on *Figure 3-9.4*.

The project area located in the City of Del Mar in the west-central region of San Diego County includes the San Dieguito River basin and occupies an area of approximately 346 square mi, including portions of the Cities of Del Mar, Escondido, Poway, San Diego, and Solana Beach, and unincorporated areas of San Diego County. Starting from Santa Ysabel, the watershed expands northwest to San Pasqual, southwest to Ramona, and west to the Cities of Del Mar and Solana Beach with three primary major water bodies: San Dieguito River, San Dieguito Lagoon, and Lake Hodges. Approximately 88 percent of the total drainage area is controlled by the Lake Hodges Dam. The watershed extends through a diverse array of habitats from its eastern headwaters in the Volcan Mountains to its outlet at the Pacific Ocean. There are several important natural areas within the watershed that sustain a number of threatened and endangered species. Among these are the 55-mi long, 125-square mi San Dieguito River Park; the 150-acre San Dieguito River; and water storage reservoirs including Lake Hodges, Lake Sutherland, and Lake Poway.

The existing floodplain was analyzed using HEC-RAS v.3.1.3 and aerial topography. The area of analysis ranges from 6500-ft upstream to 1500-ft downstream of the I-5 bridge. In this region, 42,800 cfs of water passes through the opening beneath the interstate bridge from a 5000-ft-wide floodplain. During a 100-year storm event, a broad slow moving river would flow through the floodplain with the I-5 bridge serving as the only major constriction. Downstream of the I-5 bridge, the floodplain opens up to the north and floods the Del Mar Fairgrounds. Within the floodplain study limits, the floodplain bottom elevations range from 9 ft to -4 ft using the North American Vertical Datum of 1988 (NAVD 88).

San Elijo Lagoon

The 100-year flood boundary is shown on the FEMA Floodway Boundary and Floodway Map, panels 1044 and 1063, effective date June 19, 1997. The 100-year peak discharges used for the study described herein were obtained from the FEMA Flood Insurance Study, San Diego County, California, Volume 1 of 7, revised July 2, 2002. The floodplain in relation to the project is depicted on *Figure 3-9.5*.

The project area is located in a coastal wetland between the Cities of Encinitas and Solana Beach, and is approximately 20-mi north of the City of San Diego. The existing watershed of the San Elijo Lagoon encompasses 77 square mi and is fed by two main water sources, Escondido Creek and San Elijo Creek, also known as Orilla Creek. It has been determined that these creeks generate a 100-year discharge of 23,255 cfs. In the late 1870s, San Elijo Lagoon was a low-lying marshy plain. Fresh and salt water exchanges took place regularly, which enabled a stable wetland environment capable of supporting unique plant and animal life. In more recent years, numerous manmade structures have substantially decreased the amount of tidal flow exchange in the lagoon. Dikes, railroads, and highways have all been built within the wetlands, and have altered the environmental characteristics and capabilities of the lagoon to the point where it can no longer support consistent tidal exchanges.

The existing floodplain was analyzed using HEC-RAS v.3.1.3 and aerial topography. The area of analysis ranges from where San Elijo and Escondido Creeks join to the Pacific Ocean. The two creeks meet in a wide portion of the lagoon with narrow, shallow channels during normal flow. In a 100-year storm event, the top width of the flow would range from 0.25-mi to 0.5-mi wide until it is channeled underneath the existing I-5 bridge. Moving westward toward the ocean, the lagoon flow would then expand into a large basin. The majority of the storm flow would pass under the NCTD Railroad and South Coast Highway bridges, whereas higher flood waters would stay under the bridges, yet overtop the berm to the south. Finally, the water would discharge into the ocean. Along its path to the ocean, the 100-year storm flow would frequently flood Manchester Avenue, including the undercrossing at I-5.

Cottonwood Creek

Cottonwood Creek is not presently within a FEMA floodplain and has been highly channelized and undergrounded east of I-5 throughout the City of Encinitas. The expected 100-year storm runoff inundation area (i.e., floodplain) upstream of the entrance to the I-5 drainage crossing has been estimated and its relation to the project is depicted on *Figure 3-9.6*.

The project area is located in the City of Encinitas and is approximately 3800-ft upstream of the creek mouth at the Pacific Ocean. The Cottonwood Creek watershed is located within the Carlsbad Watershed and covers an area of 3.4 square mi. The creek drains the western slopes of the ridge running parallel to and west of El Camino Real and the Encinitas Creek drainage. Cottonwood Creek discharges into the Pacific Ocean via a storm drain at Moonlight State Beach. The elevation within the watershed ranges from 400 ft AMSL to sea level.

The area of analysis ranges from approximately 200-ft upstream to 900-ft downstream of the I-5 crossing. In this region, Cottonwood Creek would experience a peak flow of 1,670 cfs during the 100-year storm event. The culvert system crossing beneath I-5 changes shape twice after crossing under I-5 before it outfalls into a natural channel section of the creek. The cross culvert begins as a 10-ft concrete arch culvert for 713 ft, then transitions to a 6-ft x 8-ft double box culvert for 544 ft, and finally transitions again to a 7-ft x 4-ft triple box culvert for 116 ft before it ends downstream at a triple box headwall. A peak flow analysis determined the headwater elevation upstream of the cross culvert to be 91.8 ft.

Bentley CulvertMaster v3.1 was used to analyze the culvert hydraulics and determine the headwater elevation upstream of I-5. The culvert system was determined to be operating under inlet control and therefore was analyzed as a 1373-ft long, 10-ft concrete arch culvert. The changes in the shape of the culvert system would have little effect on the computed headwater since the system operates under inlet control. In addition to CulvertMaster, Bentley StormCAD v5.6 was used to analyze the culvert system crossing beneath I-5. The three sections of the culvert system were modeled to study the transitions between and the characteristics of each section as they affect each other.

Batiquitos Lagoon

The 100-year flood boundary is shown on the FEMA Floodway Boundary and Floodway Map, panels 1033 and 1034, effective date June 19, 1997. The 100-year peak discharges used for the study described herein were obtained from the FEMA Flood Insurance Study, San Diego County, California, Volume 1 of 7, revised July 2, 2002. The floodplain in relation to the project is depicted on *Figure 3-9.7*.

The project area is located in a coastal wetland between the Cities of Carlsbad and Encinitas, includes Batiquitos Lagoon, and is located within the Carlsbad Watershed. The primary tributaries to the watershed are San Marcos Creek and Encinitas Creek. San Marcos Creek originates on the western slopes of the Merriam Mountains in west central San Diego County and discharges into the Pacific Ocean via Batiquitos Lagoon. Encinitas Creek originates in the hills southwest of Questhaven Road and parallels El Camino Real before its confluence with San Marcos Creek at the southeastern corner of Batiquitos Lagoon.

The existing floodplain was analyzed using HEC-RAS v.3.1.3 and aerial topography. The area of analysis ranges from approximately 5500-ft upstream to 3800-ft downstream of the I-5 crossing. The upstream portion of the study reach was initiated at the convergence between the San Marcos Creek and Encinitas Creek. Within the study limits, the I-5 bridge serves as a major constriction point. Once past the I-5 bridge, the lagoon opens up to approximately 1000 ft. Other major constrictions occur downstream at the railroad tracks and the Carlsbad Boulevard Bridges. The model terminates at the Pacific Ocean.

Encinas Creek

Currently there is no 100-year FEMA Floodway Boundary and Floodway Map for Encinas Creek. The estimated 100-year storm runoff inundation area upstream of the entrance to the I-5 drainage crossing has been determined and is depicted on *Figure 3-9.8*.

The project area is located in the City of Carlsbad, south of the Palomar Airport Road Interchange in Las Encinas Canyon, includes the Encinas Creek watershed, and is within the Carlsbad Watershed that covers 4.1 square mi. It is the only drainage basin within the watershed that does not empty into a lagoon before entering the Pacific Ocean. Encinas Creek begins behind an industrial park on the eastern edge of the basin. From there the creek parallels Palomar Airport Road to the south for three mi. It then crosses Paseo Del Norte and under I-5 before entering a concrete lined channel. Prior to emptying into the Pacific Ocean, the creek enters a natural basin located between South Carlsbad Boulevard (Coast Highway 101) and the NCTD rail line.

There is little disturbance to the creek's floodplain boundary at the project site.

The existing floodplain was analyzed using HEC-RAS v.3.1.3 and the project topography. The area of analysis ranges from approximately 364-ft upstream to 144-ft downstream of the current I-5 crossing. The peak flow for Encinas Creek at the I-5 crossing would be approximately 1,880 cfs during the 100-year storm event according to 1989 study titled, Hydrologic/Hydraulic Analysis for the Encinas Creek Channel between Paseo del Norte and Interstate Hwy 5, by Cooper Engineering and Associates. The culvert crossing beneath I-5 is a 10-ft x 5-ft triple box culvert that empties into a concrete lined channel west of the freeway.

Agua Hedionda Lagoon

The 100-year flood boundary for Agua Hedionda Lagoon is shown on the FEMA Floodway Boundary and Floodway Map, panels 764 and 768, effective date June 19, 1997. The 100-year peak discharges used for the study described herein were obtained from the FEMA Flood Insurance Study, San Diego County, California, Volume 1 of 7, revised July 2, 2002. The floodplain in relation to the project is depicted on *Figure 3-9.9.*

The project area is located in a coastal wetland in the City of Carlsbad and is approximately 35 mi north of the City of San Diego. Agua Hedionda Lagoon is located within the Carlsbad Watershed, which covers a watershed area of 210 square mi. Agua Hedionda Creek originates on the southwestern slopes of the San Marcos Mountains, in west-central San Diego County, and discharges into the Pacific Ocean via Agua Hedionda Lagoon.

Agua Hedionda Lagoon is unique among San Diego County lagoons, in that recreational and commercial uses are permitted; yet the lagoon is a healthy tidal body with large wetlands supporting several endangered species. The majority of the lagoon is owned and maintained by Encina Power, owners of a 900-MW power plant located on the outer segment of the lagoon. The entire 400-ac lagoon, created in 1954, was completely re-dredged in 1998 to an average depth of 8 to 11 ft, increasing tidal flushing. An extensive eelgrass planting program was initiated after the dredging, resulting in additional marine nursery areas.

Three aquaculture facilities enjoy the tidal health of the lagoon. These include a white seabass research facility jointly managed by Hubbs/Seaworld, the California Department of Fish and Wildlife (CDFW; previously California Department of Fish and Game) and a commercial mussel growing facility. In 2000, CDFW acquired 186 ac of wetland located at the eastern end of the lagoon for an Ecological Reserve. The Agua Hedionda Lagoon Foundation opened a 3800-square ft Nature Center in 2001, with educational displays and foot access planned for the wetlands and lagoon.

The watershed is drained by Agua Hedionda and Macario Creeks and is a component of the Carlsbad Hydrologic Unit. The creeks accumulate storm water runoff from continuing residential and commercial development, but typically exhibit low flow during the summer. The lagoon and wetland form a major element of Carlsbad's Habitat Management Program and are connected by corridors to other elements of the program. The wetlands and surrounding slopes of CSS provide habitat for sensitive species, including the California gnatcatcher, least Bell's vireo, and light-footed clapper rail.

The existing floodplain was analyzed using HEC-RAS v.3.1.3 and aerial topography. The area of analysis ranges from approximately 3450-ft upstream to 3350-ft downstream of the I-5 crossing. In this region, 9,850 cfs passes from a 2000-ft wide channel through the opening beneath the existing interstate bridge. During a 100-year storm event, a broad, slow moving river would form in the lagoon's easterly basin and funnel through the bridge. From there it would expand into the middle lagoon before the flow would again be constricted under the railroad crossing. The flow would open up into Agua Hedionda's outer lagoon before the final constriction under Carlsbad Boulevard. Once past Carlsbad Boulevard, Agua Hedionda Lagoon would discharge into the Pacific Ocean.

Buena Vista Lagoon

The 100-year flood boundary for Buena Vista Lagoon is shown on the FEMA Floodway Boundary and Floodway Map, panels 761 and 762, effective date June 19, 1997. The 100-year peak discharges used for the study described herein were obtained from the FEMA Flood Insurance Study, San Diego County, California, Volume 1 of 7, revised July 2, 2002. The floodplain in relation to the project is depicted on *Figure 3-9.10*.

The project area is located in a coastal wetland between the Cities of Carlsbad and Oceanside, and is approximately 37 mi north of the City of San Diego. Buena Vista Lagoon is located within the Carlsbad Watershed, which covers an area of 210 square mi. The watershed extends from Lake Wolhford to the Pacific Ocean. Seasonal flows in Buena Vista Creek are typical of most coastal drainages in San Diego County, although artesian springs provide some surface flow even during the summer dry season. During wet winter weather or flood events, surface flow increases significantly. Natural surface flows are currently augmented by urban and agricultural runoff.

Buena Vista Lagoon was originally an intermittent tidal system, although a weir was constructed in 1940 across the mouth of the lagoon to eliminate tidal flow. The result was that Buena Vista Lagoon now functions as a freshwater lake with a fringing freshwater marsh.

Most of the recreational uses are focused along the lower portions of Buena Vista Creek and around Buena Vista Lagoon, which is heavily used as a bird watching location. The Buena Vista Audubon Society operates a Nature Center at the western end of the lagoon. Some of the largest areas of freshwater marsh habitat in San Diego County are present around Buena Vista Lagoon. Sedimentation could pose a long-term threat to the freshwater marsh and open water mosaic that currently exist at the lagoon.

The existing floodplain was analyzed using HEC-RAS v.3.1.3 and aerial topography. The area of analysis ranges from approximately 3300-ft upstream to 4600-ft downstream of the I-5 crossing. During a 100-year storm event, 8,500 cfs would flow from a 1500-ft-wide channel through the opening beneath the I-5 bridge. Channel bottom elevations range from below 7 ft to 7 ft using the NAVD 88. Within the study limits, the I-5 bridge serves as a major constriction point. Once past the I-5 bridge, the lagoon opens up to approximately 2000 ft. Other major constrictions occur downstream at the Carlsbad Boulevard and railroad bridges. The model terminates at the Pacific Ocean.

Loma Alta Creek

The 100-year flood boundary for Loma Alta Creek is shown on the FEMA Floodway Boundary and Floodway Map, panel 753, effective date January 19, 2001, and panel 761, effective date June 19, 1997. The 100-year peak discharges used for the study described herein were obtained from the FEMA Flood Insurance Study, San Diego County, California, Volume 1 of 7, revised July 2, 2002. The floodplain in relation to the project is depicted on *Figure 3-9.11.*

The project area is located in the City of Oceanside, in the northwestern region of San Diego County, and includes the Loma Alta Creek Watershed. The Loma Alta Creek Watershed is located within the Carlsbad Watershed and includes an area of 9.8 square mi. Loma Alta Creek forms the western portion of the northern border of the Carlsbad Hydrologic Unit. The watershed extends inland approximately 7.3 mi and is almost completely contained within the City of Oceanside. Three tributaries drain into Loma Alta Creek with Garrison Creek being the largest of the three.

Land uses within the watershed are predominantly residential and urban development. Much of the length of Loma Alta Creek has been channelized in the past to prevent private property flood damage. Flood prevention is a top priority of the City of Oceanside within the lower sections of the watershed. I-5 spans the entire width of the watershed near the coast and Oceanside Boulevard, which parallels the drainage of Loma Alta Creek.

The existing floodplain was analyzed using HEC-RAS v.3.1.3 and aerial topography. The area of analysis ranges from approximately 2400-ft upstream to 3500-ft downstream of the I-5 crossing. The upstream portion of the study reach was initiated where the floodplain widens. In this part of the floodplain, the main creek flows through a concrete channel while the rest flows through a commercial district. Downstream of I-5, the floodplain is within Cavalier Mobile Estates between two concrete channels. The study concludes where the concrete channels converge to one channel to show the combined back water effects near I-5. FEMA water surface elevations were known and used as the boundary conditions.

San Luis Rey River

The 100-year flood boundary for the San Luis Rey River is shown on the FEMA Floodway Boundary and Floodway Map, panels 734 and 753, effective date January 19, 2001. The 100-year peak discharges used for the study described herein were obtained from the FEMA Flood Insurance Study, San Diego County, California, Volume 1 of 7, revised July 2, 2002. The floodplain in relation to the project is depicted on *Figure 3-9.12.*

The project area is located on the northern border of the City of Oceanside, in the northwestern region of San Diego County, and includes the San Luis Rey River Watershed. The San Luis Rey River Watershed encompasses 558 square mi, and is the largest drainage basin in the San Diego region. The watershed is bounded by the Monserate Mountains to the north, the Cleveland National Forest and Camp Pendleton to the northwest, and Escondido, San Diego, and other cities to the south. The basin is roughly 50-mi long by 16-mi wide and is divided into two hydrologic units by Henshaw Dam, which controls 36 percent of the watershed.

Unlike most major rivers in southern California, the San Luis Rey River has undergone relatively little channelization. The only segment of the River that has been channelized is within the City of Oceanside. However, the cumulative impacts of various land use practices in the basin appear to be degrading the river's environmental value. Operations such as sand mining have contributed an increasing rate of bed erosion in the central reaches of the River.

The existing floodplain was analyzed using HEC-RAS v.3.1.3 and aerial topography. The area of analysis ranged from 3200-ft upstream to 2500-ft downstream of the I-5 and San Luis Rey River. In this region, constrictions occur as the flow passes under I-5, North Coast Highway, the railroad, and Pacific Street. The channel top widths range from 425 ft to 685 ft. Within the project limits, the channel bottom elevations range from 2.2 ft to 6.7 ft (NAVD 88). West of Pacific Street, the San Luis Rey River opens and outlets into the Pacific Ocean. A corrugated metal pipe arch under Pacific Street serves as the last major constriction in the San Luis Rey River downstream of I-5. Pacific Street was rebuilt approximately 500 ft east of its present location. This opened up the mouth of the San Luis Rey River and eliminated the prior major backflow effects. The Pacific Street Bridge was assumed as existing for the effective model.

Lagoon Bridge Optimization Studies

In addition to the hydrology and floodplain analyses described above, the following detailed studies were conducted and circulated as part of the Supplemental Draft EIR/EIS regarding the hydrology of the six coastal lagoons and related waterways within or adjacent to the project corridor.

- I-5 Lagoons Marine Resource Investigation, June 2006
- San Elijo Lagoon Bridge Optimization Study, April 2012
- Batiquitos Lagoon Bridge Optimization Study, April 2012
- I-5 Bridge Study at Buena Vista Lagoon, May 2012
- Hydrodynamic Approach to Wetland Restoration by Optimization of Bridge Waterways, October 2010

These studies included input from lagoon scientists, such as representatives from the Scripps Institute of Oceanography, to determine the most appropriate ("optimal") bridge and channel dimensions to reduce "tidal muting" (i.e., restrictions to fresh/salt water exchange from man-made features such as levees or bridge supports) and address associated effects related to sea level rise and water quality. This new information was detailed in the August 2012 Supplemental Draft EIR/EIS, with pertinent information outlined below and in *Section 3.9.3, Environmental Consequences*, as well as in *Tables 3.17.5* through *3.17.10* in *Section 3.17, Natural Communities*.

As noted above under the discussion of Location Hydraulic Studies, a number of additional potential constraints to tidal exchange are present along downstream reaches of several of the coastal lagoons, including crossing structures associated with Coast Highway, rail lines, and local roadways. While these facilities are not directly related to the *I-5 NCC Project*, the associated effects to tidal exchange (and flooding) are important considerations in the evaluation and design of I-5 crossing structures. Specifically, it is imperative that the design of all applicable lagoon bridges be coordinated to maximize tidal exchange and overall lagoon system function. That is, no individual lagoon bridge design would produce optimal results if one or more of the other crossing structures continue to result in ongoing tidal and/or flood flow restrictions. A summary of existing conditions and related concerns in the six coastal lagoons is provided below.

Los Peñasquitos Lagoon

As indicated above, I-5 does not cross the lagoon proper, although it does cross waters flowing into the lagoon in three locations: Carmel Creek at the north end of the lagoon, and at Los Peñasquitos and Soledad Canyon Creeks southeast of the lagoon. Due to the distance from the ocean inlet, none of the I-5 crossings is affected by ocean tidal activity in the lagoon.

Four major north-south transportation facilities cross Los Peñasquitos Lagoon west of I-5; the Coast Highway (one crossing) and rail lines (three crossings). These facilities result in existing downstream constraints as previously described. The Coast Highway Bridge (immediately east of the beach at Torrey Pines) was replaced in 2005 to reduce fill and maintain tidal influence to the extent feasible. The new bridge has a design life of 75 years and there are no plans to change it in the foreseeable future. The railroad crossing includes three single-track railroad bridges, which cross both the main channel and a side channel on fill. The California Coastal Commission (CCC) recently approved the replacement of these older wood trestle railroad bridges with in-line concrete bridge structures under federal consistency certification (CC-059-09). Alternative proposals are under consideration for the potential future double tracking of these railroad bridges across the lagoon; including a potential realignment that would remove the rail from the lagoon by tunneling under Del Mar Heights Road and siting it along I-5. Because design and technical studies are scheduled for a future (2041 to 2050) phase, it is unknown at this time which alignment or structures ultimately would be built by the railroad. If feasible, however, removal of some or all of the railroad fill would likely enhance both tidal and flood flow conditions between the lagoon and the ocean.

The existing I-5 crossings at Los Peñasquitos Creek and Soledad Canyon Creek can accommodate 100-year flows, while the existing I-5 Bridge over Carmel Creek and the Sorrento Valley Road Culverts through Carmel Creek (which would be replaced by a bike/pedestrian bridge, as described below in *Section 3.9.3*) currently cannot accommodate a 100-year flood event.

San Dieguito Lagoon

Several north-south transportation facilities cross the San Dieguito River Valley and lagoon system, resulting in constriction points on flood flows and sediment transport. From west to east, these facilities include the Coast Highway, railroad bridge, Jimmy Durante Boulevard Bridge, and the I-5 bridge. The LOSSAN project plans to double-track and replace the railroad bridge across San Dieguito Lagoon in the 2021 to 2030 time period. Plans currently are preliminary, however, and detailed technical information for the proposed crossing is under development. Coast Highway and Jimmy Durante Boulevard are not proposed for any expansion and/or reconstruction at this time. These two downstream facilities would continue to result in constraints on tidal range within the lagoon.

Approximately 140 ft of the existing 650-ft I-5 bridge span is located over the flowing river channel bottom, with the depth of the main channel at -4.0 ft National Geodetic Vertical Datum of 1929 (NGVD; a datum system used to measure elevation [altitude] above and below mean sea level [MSL]). The remainder of the bridge span is located outside the active channel and is open to flood flows. An approximately 400-ft wide open area occurs south of the channel and beneath the bridge, with the north bank of the San Dieguito River channel and the southern abutment of the San Dieguito Bridge armored with riprap.

A large San Dieguito Lagoon restoration project, the Southern California Edison (SCE) San Onofre Nuclear Generating Station (SONGS) project, is underway. SONGS restoration began in 2006, and in addition to habitat restoration, this project opened the lagoon inlet and will continue to dredge the inlet to keep it open permanently. The SONGS restoration project was modeled and planned to accommodate the existing I-5 bridge span and channel dimensions. An important component of the restoration involved keeping flows within the channel at a level sufficient to transport sand to the beach in Del Mar (with the SONGS project required to maintain a condition of no decrease in downstream sand transport). The SONGS restoration project also is expected to increase the tidal "prism" (the difference between tide-related high and low water levels) of the lagoon by up to 13 percent. The associated identification of maximum tidal range is the difference between the lowest and highest observed water level. Specifically, the greater the tidal range, the lower the effects of tidal muting within the lagoon system. More complete drainage associated with greater variation in water levels also improves tidal exchange, resulting in improved water quality as indicated by higher dissolved oxygen and reduced areas of nutrient concentrations.

Agua Hedionda Lagoon

Agua Hedionda Lagoon is a relatively deep, open water system with three basins (west, central, and east), located in the City of Carlsbad. Three transportation facilities cross Agua Hedionda Lagoon and control associated water flow. Specifically, the lagoon inlet flows under the Coast Highway Bridge and is stabilized by fixed jetty structures that maintain the inlet in an open condition. The next crossing upstream is the railroad crossing, with construction ongoing for double tracking in this location (Federal Consistency Certification CC-075-09). The approved LOSSAN double tracking project will result in a second rail bridge that is 213 ft long and 22 ft wide, supported on four columns based on 4-ft concrete pilings. I-5 is the easternmost crossing of the lagoon, and is located upstream of the railroad bridge. The existing I-5 bridge at Agua Hedionda Lagoon is 191 ft long, and 157.5 ft wide, with four rows of 32 1-ft diameter columns. Riprap protection at the I-5 crossing occurs throughout the channel and abutment slopes.

The Encina Power Plant and the planned Poseidon Desalination Plant are located adjacent to the west lagoon basin. The intake of the power plant, located in the west basin, has been determined to have an "iron lung effect" on the lagoon (i.e., it artificially forces water flow from east to west), resulting in the effective draining of the eastern basin. The Encina Power Plant also regularly dredges the lagoon every two years to maintain a clear inlet to the ocean. The Poseidon Desalination Plant plans to continue similar maintenance dredging and will use the lagoon water intake for their operations (Coastal Development Permit E-06-013).

San Elijo Lagoon

San Elijo Lagoon is located in the City of Solana Beach and contains three basins divided by existing transportation facility crossings. Furthest west is the ocean inlet that flows under Coast Highway and through a narrow sinuous channel into the western basin. The channel then flows under the railroad crossing into the central basin. The main channel flows primarily along the northern edge of the central basin, and then under the I-5 bridge into the eastern basin. The existing I-5 bridge is 340 ft long and 157.5 ft wide and consists of separated north- and southbound lanes. The existing channel bottom is 130 ft wide, with a channel depth of -6.0 ft NGVD and 1:1 (horizontal to vertical) grade slopes supported by riprap.

Concurrent with the *I-5 NCC Project*, and given constraints presented by surrounding existing/current development, the San Elijo Lagoon Restoration Project (SELRP) is in the planning stage, with the objective of restoring the lagoon's hydrologic/hydraulic functions and habitat values to the extent feasible. Four options are under consideration for the SELRP, including: (1) No Project, which would be limited to maintenance dredging only; (2) Alternative 1A, which limits physical changes in the lagoon predominantly to enlarging and redirecting the main feeder channel; (3) Alternative 1B, which involves more substantial changes such as creating a subtidal basin in the central basin and expanding the eastern basin, while preserving the existing inlet; and (4) Alternative 2A, which would entail creating a new tidal inlet and subtidal basin in the western/central basins, as well as substantially enlarging the eastern basin channel.

Batiquitos Lagoon

Batiquitos Lagoon includes approximately 600 acres within a watershed that includes San Marcos and Encinitas Creeks, and is located at the very southern extent of the City of Carlsbad. As noted above under the discussion of Location Hydraulic Studies, three transportation corridors cross Batiquitos Lagoon from west to east, and form the boundaries of three basins (west, central, and east). The Coast Highway (with separated north- and southbound lanes) crosses over new inlet jetties and comprises the western edge of the west basin, with the railroad bridge separating the west and central basins. The I-5 bridge is the easternmost lagoon crossing, and separates the central and east basins. The east basin is the largest of the three, and is located east of I-5. These three crossings and the development around the lagoon are constraints to the lagoon's hydraulic flows and potential expansion, respectively.

The existing I-5 facility is divided into north and southbound bridges, each of which is approximately 68 ft wide (with a 19.2-ft gap in between) and approximately 219 ft long. Current channel design features include a bottom width of 66 ft with 4:1 grade slopes to the edges of the abutment (with approximately 106 ft between abutments), a shoaled depth of -5.3 ft NGVD,[1] and a 2:1 grade slope at the abutments covered with riprap.

A large-scale restoration project was completed by the Los Angeles Port District in Batiquitos Lagoon in 1997. As part of this effort, a new inlet was constructed concurrent with a new Coast Highway Bridge, and the inlet was stabilized with jetties. The lagoon was also dredged and riprap was placed at a depth of -7.0 ft NGVD throughout the entire I-5 channel. Additional dredging occurs periodically to maintain tidal flows.

Currently, floodwaters backup in the east basin behind the I-5 bridge, with a smaller backup noted in the central basin, and the largest backup occurring in the west basin between the inlet and the railroad bridge. Tidal velocity during the dry season varies with lagoon conditions and dredging status (i.e., whether it is dredged or shoaled). Regular maintenance (dredging) of the lagoon mouth is required to remove accumulated sediment, primarily in the west and central basins. Tidal velocity at I-5 currently is 4.3 ft/s at flood tide and 3.9 ft/s at the ebb tide.

[1] The existing channel is lined with riprap at -7.0 feet, but has filled with sediment to a current depth of -5.3 feet at the channel bottom.

Buena Vista Lagoon

Buena Vista Lagoon is the northernmost lagoon in the corridor, bordered by the City of Carlsbad on the south and the City of Oceanside on the north. The lagoon is segmented into four basins by four hydraulic connections that include channels under the LOSSAN rail and I-5 bridges, culverts under Coast Highway, and a weir and natural sand "berm" between the lagoon and the ocean. The four basins are named from west to east according to their associated downstream hydraulic connections; Weir Basin, Railroad Basin, Coast Highway Basin, and I-5 Basin. The three north-south transportation facilities between the basins constrain water flow within the lagoon. The existing channel at the railroad bridge is 17 ft wide at the channel bottom and 280 ft wide at the surface, with a maximum depth of -2.5 ft NGVD. Side slopes under the railroad bridge vary from 2:1 on the north abutment to 7:1 on the south abutment, with the bottom of the railroad bridge at an elevation of 11.1 ft NGVD. The Coast Highway culverts support the bottom of the road at an elevation of 8.2 ft NGVD, with the existing culvert channel varying from 25 to 29 ft wide and -6 to -3 ft deep (NGVD). The existing I-5 Bridge over Buena Vista Lagoon is approximately 102 ft long and 184 ft wide, with an associated channel bottom width of 24 ft. The channel exhibits depths of -2 ft NGVD, and 99 ft at the maximum water surface elevation.

Buena Vista Lagoon has developed into a primarily freshwater system, due to the presence of the sand berm that is naturally deposited along the beach and acts as a physical barrier to fresh and salt water interaction. The elevation (NGVD) of this berm is variable with conditions including tidal and wave action. The berm is regularly lowered by the City of Oceanside to prevent flooding of the Coast Highway, however, which allows water in the lagoon to discharge into (and mix with) the ocean. This process lowers the water elevation in the lagoon until it reaches the invert level (5.6 ft NGVD) of the existing weir structure at the mouth of the lagoon, which then controls the minimum water surface of the lagoon (i.e., it prevents discharge from the lagoon below 5.6 ft NGVD). The sand berm is then restored through natural deposition, which again restricts fresh and salt water interaction, raises the water level in the lagoon, and submerges the weir. A feasibility study and some restoration concepts were completed several years ago as part of a regional planning effort that focused on restoration of Buena Vista Lagoon. Those studies identified several options for a Buena Vista Lagoon restoration plan, including a saltwater alternative restoring tidal flow to the entire lagoon, a modified saltwater alternative, and two freshwater alternatives.

3.9.3 Environmental Consequences

There are no floodplain encroachments parallel to the direction of water flow, also called longitudinal encroachments, associated with the proposed improvements to the 12 described water crossings included in the *I-5 NCC Project* area. Floodplain effects were identified in the Draft EIR/EIS. *Table 3.9.1*, located at the back of this section, details these conservative numbers. No substantial impacts were identified. Since circulation of the Draft EIR/EIS, design refinement has continued, as addressed throughout this Final EIR/EIS. The effects of the project on floodplains have been clarified as a result of design refinement. FEMA mapping reflecting the most recent hydrologic conditions due to the project would be completed prior to construction.

As previously described, two of the six existing lagoon bridges (i.e., crossing Carmel Creek at Los Peñasquitos and San Dieguito Lagoons) are relatively new and are not proposed for replacement under the *I-5 NCC Project*. The remaining four lagoon bridges (San Elijo, Batiquitos, Agua Hedionda, and Buena Vista) would be replaced due to the age of the existing structures and the increased widths required for the project. Three of these four bridge designs (San Elijo, Batiquitos, and Buena Vista) also incorporate longer bridge spans than those described in the Draft EIR/EIS, based on the described Lagoon Bridge Optimization Studies. The associated conclusions support the findings in the Draft EIR/EIS, and have also resulted in refinement of the proposed project design to incorporate optimal bridge and channel dimensions if the project is approved. Specifically, the described analyses concluded that: (1) the two existing bridges crossing Carmel Creek at Los Peñasquitos and San Dieguito Lagoons are relatively new, and transportation improvements proposed under the *I-5 NCC Project* would not require bridge replacement; (2) the remaining four bridge crossings at San Elijo, Batiquitos, Agua Hedionda, and Buena Vista Lagoons would require replacement as part of the project; (3) the proposed new bridge at Agua Hedionda Lagoon would not vary from that described in the Draft EIR/EIS, as no substantial benefits would be derived from altered bridge/channel dimensions; and (4) proposed bridge and channel configurations at San Elijo, Batiquitos, and Buena Vista Lagoons have been modified from those described in the Draft EIR/EIS to reflect the optimal designs that would improve tidal exchange and fluvial flows, and enhance the overall health and function of the lagoon systems.

A summary of proposed improvements under the build and No Build alternatives is provided below, followed by analyses of related potential effects associated with floodplain encroachment and hydrology/hydraulics for all six lagoons and related waterways within the project corridor. It should be noted that wherever it is proposed to implement suspended bike/pedestrian bridges hanging below I-5 bridges, the bike/pedestrian facilities would be closed in case of flooding. The suspended pedestrian bridges were not included in the floodplain studies. If the floodwaters reach the pedestrian bridges and they do not fail, they can act as debris "catchers" and could raise the water surface elevation higher than the studies indicate.

Build Alternatives

The build alternatives are similar and combined here for analysis of hydrology and floodplains, as well as assessment of the described Lagoon Bridge Optimization Studies. The Draft EIR/EIS analyzed all the alternatives for floodplains to an equal level as presented on *Table 3.9.1.* Caltrans and FHWA assessed that there would only be minor differences between the floodplain impacts for all build alternatives. Therefore, because there would be no substantial difference among build alternatives, only the refined 8+4 Buffer alternative (Preferred Alternative) was modeled, with the impacts presented on *Table 3.9.2*.

Soledad Canyon Creek

The improvements proposed for the I-5 HOV/Managed Lanes Connector through the I-5 / 805 merge may include six rows of two piers per row within the floodplain of Soledad Canyon Creek. The connector itself would be 863 ft long and built well above the water surface elevation of the 100-year storm.

Table 3.9.2: 100-Year Floodplain Impacts for the 8+4 Buffer (Preferred Alternative)

Evaluation Criteria	Measured Parameter	No Build	8+4 Buffer (Preferred Alternative)			
Total Project Impacts to FEMA 100-year floodplains	Acres	none	**31.9**			
Specific Project Impacts to FEMA 100-year floodplains			Bridge Widening	Roadway Widening	Fill Slopes	Bridge Columns
	Acres	none	**6.9**	**7.3**	**17.6**	**0.1**
Individual Floodplain Impacts						
Soledad Canyon Creek	Acres	none	0.86	0	0.08	n/a
Los Peñasquitos Creek	Acres	none	0.21	0	0	n/a
Carmel Creek	Acres	none	0.25	0.30	0.14	n/a
San Dieguito River	Acres	none	1.15	1.36	3.21	0.03
San Elijo Lagoon	Acres	none	1.51	0.02	5.27	0.01
Cottonwood Creek	Acres	none	n/a	0	0	n/a
Batiquitos Lagoon	Acres	none	0.77	2.56	3.30	0.01
Encinas Creek	Acres	none	n/a	0	0.25	n/a
Agua Hedionda Lagoon	Acres	none	0.49	1.39	2.62	0.01
Buena Vista Lagoon	Acres	none	0.51	1.09	2.24	0.01
Loma Alta Creek	Acres	none	0.48	0.55	0.45	0.01
San Luis Rey River	Acres	none	0.69	0	0.05	0.06

The 8+4 Buffer alternative was identified as the LPA in July of 2011 and is the least impactive per the Draft EIR/EIS. Therefore, floodplain impacts were only calculated for the refined 8+4 Buffer (Preferred Alternative).

Los Peñasquitos Creek

The proposed I-5 HOV/Managed Lanes freeway-to-freeway connector spans the Los Peñasquitos Creek floodplain. The proposed bridge would be 3609 ft long and built above the existing I-5 median and high above the 100-year floodplain of Los Peñasquitos Creek and Soledad Canyon Creek (including 100-year flood levels that incorporate a conservatively "high" projected sea level rise of 4.5 ft in year 2100,[2] based on interim guidance released by the Coastal Ocean Climate Action Team [CO-CAT] in March 2011 as well as Caltrans). The two proposed bridge bents would be located on either side of the Los Peñasquitos Creek floodplain boundary.

Carmel Creek

The proposed improvements require that the existing 421-ft long Carmel Creek I-5 bridge be widened to the west. The existing Sorrento Valley Road Culvert is also proposed to be replaced with a 443-ft long pedestrian bridge, with the bridge deck to be elevated above the 100-year flood level (including consideration of a 4.5-ft sea level rise). This proposed pedestrian bridge would relieve the existing constriction of the creek at the existing Sorrento Valley Road Culvert, as well as the related floodplain issues at the I-5 bridge.

San Dieguito River

The improvements proposed for the 650-ft long I-5 bridge would include widening by approximately 40 ft on each side of the existing structure for a total proposed width of 258 ft.

San Elijo Lagoon

The proposed replacement of the I-5 Bridge over San Elijo Lagoon would entail widening the bridge to correspond to the Manchester Avenue on- and off-ramps. Specifically, the new slight arch span bridge would require a width of between 303 and 388 ft to accommodate the proposed construction area. This bridge would also be lengthened to 560 ft. A 261-ft channel bottom width is also proposed, pursuant to the optimization analysis from the lagoon bridge optimization studies. The existing I-5 structure consists of two bridges spaced 21.5 ft apart.

Cottonwood Creek

The area of flood water inundation at the inlet to the culvert conveying Cottonwood Creek under I-5 is located between the existing northbound off-ramp to Encinitas Boulevard and the right-of-way fence. The majority of the proposed widening would occur between I-5 and this ramp. The ramp would be widened approximately 5 ft to the east and would include a retaining wall along the eastern shoulder. This retaining wall would allow the widening to occur while eliminating the need to place fill material into the floodwater inundation area, therefore not impacting the area of ponding.

Batiquitos Lagoon

The new I-5 bridge configuration would be similar to the existing bridge (i.e., two bridge structures with a gap separating the north- and southbound lanes). Replacing the existing I-5 bridge would entail widening the bridge structure on each side, with the gap between the two bridges to remain. The proposed bridge would be 282 ft long. The channel bottom would be 183.5 ft wide, with a depth of -7 ft NGVD. The new channel would be a trapezoid with a level

[2] Following completion of the lagoon bridge optimization studies, the State of California provided a policy on sea level rise that assumes a maximum rise of 3.1 ft in 2100, making the I-5 NCC Project 2012 analyses conservative for this issue.

bottom between the abutments. The dimensions of the bottom would result in the same overall cross section as the optimized bridge with the same modeled dimensions at -1.0 foot elevation (NGVD). The existing riprap within the channel bottom would be removed, while the channel slopes would be armored with riprap due to the higher anticipated tidal velocities and fluvial flows. Riprap would not extend onto the channel bottom or bridge columns.

Encinas Creek
The proposed improvements would require the freeway to be widened approximately 50-ft on both sides of the freeway at the Encinas Creek crossing. The upstream end of the triple box culvert would need to be extended to accommodate this widening. The related placement of fill into the storm water inundation area at the inlet would move the culvert's headwater ponding area upstream accordingly. This would result in a slight increase in the water surface elevation upstream of the inlet.

Agua Hedionda Lagoon
Replacement for the I-5 bridge would retain the existing bridge length of 191 ft, with the bridge width to be increased from 158 to 269 ft to accommodate additional lanes.

Buena Vista Lagoon
The replacement I-5 bridge would be lengthened from the existing 102.4 ft to 197 ft. The proposed bridge would also be widened approximately 63 ft on each side to a total width of 310 ft.

Loma Alta Creek
The existing I-5 structure spans Loma Alta Creek. The Loma Alta Creek Bridge is 139 ft long. This bridge would be replaced with a bridge of equal length.

San Luis Rey River
The proposed improvements to the I-5 bridge over the San Luis Rey River would require that the bridge be widened. The existing I-5 structure consists of two bridges spaced 24 ft apart. Widening would occur in the median (approximately 30 ft) and to the east of the east bridge (approximately 35 ft). Both the left bridge (57-0713L) and right bridge (57-0713R) contain five rows of columns with supporting pier walls. To accommodate the widening, the pier walls would be extended to the east. The existing I-5 bridge would be widened minimally to the west due to its close proximity to the Coast Highway Bridge, located approximately eight ft downstream.

No Build
Implementation of the No Build alternative would not result in any changes to the existing floodplain and hydrology. Impacts to the beneficial uses from changing the number of piers and lengthening of the bridge would not occur.

Impacts on Natural and Beneficial Floodplain Boundaries

Soledad Canyon Creek
Within Soledad Canyon Creek, the I-5 HOV/Managed Lanes Connector would cause a negligible 0.04-ft increase to water surface elevations upstream. No significant increase to the area of the flood boundary would occur and no increase in flooding would result from the construction of this bridge.

Los Peñasquitos Creek

For Los Peñasquitos Creek, the I-5 HOV/Managed Lanes freeway-to-freeway connector bridge would entirely span the floodplain, and therefore would not affect the associated floodplain boundary or the water surface elevations.

Carmel Creek

The proposed improvements to Sorrento Valley Road/Roselle Street and the additional columns required to widen the I-5 bridge would not cause an increase to the flood boundary or related water surface elevations. The replacement of the Sorrento Valley Road Culvert would remove an existing constriction point in Carmel Creek and lower the base floodplain by approximately 4.4 ft upstream of the proposed Sorrento Valley Pedestrian Bridge.

San Dieguito River

There is widening of the I-5 bridge within the San Dieguito River. Upstream and downstream of I-5, the San Dieguito River is completely flat with large areas of ponding and stagnant flows. The 100-year storm event would produce a slow moving river with a water surface profile dropping roughly 1 ft every 5000 ft. Because of these pond-like conditions, the bridge widening would uniformly raise the floodplain upstream by a small amount (0.3 ft) and would taper down slowly upstream. The entire floodplain study reach is located in a FEMA Zone A floodplain, and ties into a Zone AE floodplain 2000 ft downstream. Because the rise is so slight and the proposed floodplain lies primarily within the established FEMA floodplain, impacts to the existing floodplain are considered negligible.

San Elijo Lagoon

The proposed I-5 bridge would be replaced with a longer and wider bridge. If no lengthening occurred, the widening alone would increase the upstream water surface elevation by 0.3 ft. Since the San Elijo Lagoon is a fairly flat waterway, the rise to the water surface elevation remains fairly uniform upstream of the bridge. In effect, the lagoon's flat bottom lacks the change in elevation to achieve higher flow velocities, and thus produces an extremely level water surface profile until the flow passes the South Coast Highway. With the lengthening, effects on upstream water surface elevations are anticipated to be less.

Cottonwood Creek

The proposed improvements to the I-5 near the pipe arch culvert, where the Cottonwood Creek flows, would not impact the floodplain and therefore, would not cause an increase to the flood boundary.

Batiquitos Lagoon

The proposed improvements to the I-5 bridge would not cause an increase to the flood boundary or associated water surface elevations. The replacement of the Batiquitos Lagoon Bridge would reduce an existing constriction point in the lagoon and lower the base floodplain by approximately 0.7 ft upstream of the I-5 bridge. While the associated channel widening would result in slightly higher water levels in the central basin (west of the I-5 bridge), no infrastructure would be affected and the associated impacts would be minimal.

Encinas Creek

The placement of additional fill into the existing ponding area (floodplain boundary) would increase water surface elevations at the new extended inlet location 0.22 ft. This increase would perpetuate proportionally upstream for 288 ft, at which point the water surface elevations would be unaffected by the proposed freeway widening. Because the banks of the ponding area between I-5 and Paseo del Norte are so steep, this small rise in water surface elevation would cause a negligible effect on the existing floodplain boundary.

Agua Hedionda Lagoon

Within the Agua Hedionda Lagoon, the proposed I-5 bridge replacement would cause a negligible 0.1-ft increase to water surface elevations upstream. There would be no significant increase to the area of the flood boundary and no increase in flooding from the construction of this bridge.

Buena Vista Lagoon

The proposed improvements to the I-5 bridge would not cause an increase to the flood boundary or the water surface elevation. Replacement of the Buena Vista Creek Bridge would widen the existing constriction point in the lagoon and lower the base floodplain by approximately 0.4-ft upstream of the I-5 bridge.

Loma Alta Creek

Within the Loma Alta Creek floodplain, the replacement of the I-5 bridges would not cause a significant increase to the area of the flood boundary or the water surface elevation. The water surface elevation upstream of the proposed replacedI-5 bridges would increase by 0.04 ft.

San Luis Rey River

Proposed improvements to the I-5 bridge would not cause a significant increase to the area of the flood boundary or the water surface elevation. The widening of the San Luis Rey River Bridge would increase the floodplain by approximately 0.03 ft upstream of the I-5 bridge.

Risks of the Action

None of the proposed bridge improvements create longitudinal encroachments to the following floodplains. The most current bridge planning studies were used to create the hydraulic models for each water body. Hydraulic losses through the bridges were computed by various methods provided in the HEC-RAS models. Four methods of computing losses through a bridge are available, including the Energy Equation and the Momentum Equation. The modeler is allowed to select any or all of the methods for the computation and the program will use the method that computes the greatest energy loss through the bridge. Based on the ongoing nature of the project design process, most or all of the associated HEC-RAS models may require updating during the final design phase of the project. FEMA mapping would be completed prior to construction.

Soledad Canyon Creek

The HEC-RAS model for this project was developed from the advance planning study (APS) for the I-5 HOV/Managed Lanes freeway-to-freeway connector that would span the Soledad Canyon Creek floodplain, and it was determined that there would not be a significant increase in the water surface elevation. Therefore, the proposed improvements do not have any major risks associated with their implementation.

Los Peñasquitos Creek

The I-5 HOV/Managed Lanes freeway-to-freeway connector bridge over Los Peñasquitos Creek would be designed to span the entire floodplain; therefore, the proposed improvements would not have any major risks associated with their implementation.

Carmel Creek

The HEC-RAS model for this project was developed from the I-5 Carmel Creek Bridge APS, November 2004. No APS was available for the Sorrento Valley Road/Roselle Street Bridge, a single span bridge with no columns within the floodplain was assumed for the modeling. The floodplain model would require updating during the design phase. Based on the impacts to the Carmel Creek floodplain boundary, it was determined that there would be a decrease in the water surface elevation. Therefore, the proposed improvements do not have any major flooding risks associated with their implementation.

San Dieguito River

The HEC-RAS model for this project was developed from the I-5 San Dieguito River Bridge APS, October 2004. Within the San Dieguito River, the widened I-5 bridge would cause a decrease to flood water elevations upstream. The original floodplain model used the "bridge replacement" column layout and thus resulted in a "decrease to flood water elevations upstream." With the current plan to widen the existing bridge with the same (existing) column layout extended upstream, the flood water elevations would slightly increase rather than decrease upstream, assuming no widening or dredging of the channel is planned. Since the 100-year flood would still be contained within the floodplain boundaries, there would be no increased risk to life or property associated with the proposed improvements. The floodplain model would require updating during the design phase.

San Elijo Lagoon

The HEC-RAS model for this project was developed from the optimal length alternative for the I-5 bridge, to reduce the existing flooding of Manchester Avenue. However, the only APS available was for the widening alternative of the Manchester Avenue UC, dated January 2005. The floodplain model would require updating during the design phase to reflect the currently proposed bridge length and width, previously described, and developed based on coordination with the County of San Diego, the San Elijo Lagoon Conservancy, and CDFW.

Within San Elijo Lagoon, the replacement I-5 bridge would cause a decrease to flood water elevations upstream. The impacts to the floodplain would not be considered a significant or longitudinal encroachment, and there would be no increased risk to life or property associated with the proposed improvements. No additional roadways beyond existing flooding conditions would flood upstream from the proposed I-5 bridge. Therefore, no transportation routes would be interrupted or terminated beyond existing conditions.

Cottonwood Creek

Cottonwood Creek flows beneath I-5 within a 10-ft pipe arch culvert, and the proposed improvements to the I-5 corridor would have no effect on the flood level anticipated during the 100-year storm. According to the Floodplain Studies, analysis of the culvert system revealed that the storm water elevation upstream of I-5 would reach 91.84 ft during the peak of the 100-year storm. The flood waters would be contained within the basin located in the southeastern quadrant of the I-5 / Encinitas Boulevard Interchange and would not damage life or property beyond levels which currently exist. There is no existing regulatory floodplain, as the creek has not been included in the standard FEMA floodplain documents.

Batiquitos Lagoon

The HEC-RAS model for this project was developed from the I-5 Bridge Across Batiquitos Lagoon APS, September 2004. Within Batiquitos Lagoon, the replacement I-5 bridge would cause a decrease to flood water elevations upstream. While the associated channel widening would result in slightly higher water levels in the central basin as previously noted (i.e., west of the I-5 bridge), no infrastructure would be affected and the impacts to the floodplain would not be considered significant. Since the 100-year flood would still be contained within the floodplain boundaries, there would be no increased risk to life or property associated with the proposed improvements. No additional roadways would flood upstream from the proposed I-5 bridge replacement. Therefore, no transportation routes would be interrupted or terminated beyond existing conditions. The floodplain model would require updating during the design phase.

Encinas Creek

The HEC-RAS model for this creek was developed and based on available existing and proposed topographical information. The analysis of the culvert system shows that there would be minimal impact to the existing flood boundary and minimal increase to the water surface elevation within the study area. The structures adjacent to the creek would not be flooded since they are located considerably above and outside of the calculated 100-year floodplain boundary. A floodplain boundary definition has been developed using the HEC-RAS model, although there is no regulatory (FEMA) floodplain on record for this creek. Because the changes in the floodplain boundary have been minimized, there are no beneficial values harmed by the proposed action.

Agua Hedionda Lagoon

The HEC-RAS model for this project was developed from the I-5 Agua Hedionda Creek Bridge APS, September 2004. Within Agua Hedionda Lagoon, the replacement I-5 bridge would cause a negligible rise to flood water elevations upstream. The impacts to the floodplain would not be considered significant. Since the 100-year flood would still be contained within the floodplain boundaries, there would be no increased risk to life or property associated with the proposed improvements. No additional roadways would flood upstream from the proposed I-5 bridge replacement. Therefore, no transportation routes would be interrupted or terminated beyond existing conditions. The floodplain model would require updating during the design phase.

Buena Vista Lagoon

The HEC-RAS model for this project was developed from the I-5 Buena Vista Creek Bridge APS, November 2004. Within Buena Vista Lagoon, the replacement I-5 bridge would cause a negligible rise to the flood water elevations upstream. The impacts to the floodplain would not be considered significant. Since the 100-year flood would still be contained within the floodplain boundaries, there would be no increased risk to life or property associated with the proposed improvements. No additional roadways would flood upstream from the proposed I-5 bridge replacement. Therefore, no transportation routes would be interrupted or terminated beyond existing conditions. This assessment assumes implementation of future restoration in the lagoon, however, as described below under the discussion of *Hydrologic/Hydraulic Impacts on Lagoons and Related Waterways*. To avoid downstream flood increases if restoration does not occur prior to I-5 bridge construction, fill may be left within the extended bridge footprint until the restoration is underway. The floodplain model would require updating during the design phase.

Loma Alta Creek

The HEC-RAS model for this project was developed from the I-5 Loma Alta Creek Bridge APS, November 2004, and the Oceanside Blvd Bridge APS, November 2004. Within the Loma Alta Creek floodplain, the widening to the I-5 bridges modeled for the Draft EIR/EIS was projected to cause a slight increase to flood water elevations upstream. The Draft EIR/EIS concluded that impacts to the floodplain would not be considered significant and there would be no increased risk to life or property associated with the proposed improvements. No additional roadways beyond the existing conditions would flood upstream from the proposed I-5 bridge widening. Therefore, no transportation routes would be interrupted or terminated beyond existing conditions. Subsequent to circulation of the Draft EIR/EIS, the project has been revised to propose replacing the Loma Alta Creek Bridge; therefore, changes to the floodplain would not be greater than previously anticipated. The floodplain model would require updating during the design phase.

San Luis Rey River

The HEC-RAS model for this project was developed from the I-5 San Luis Rey River Bridge APS, July 2005. The I-5 bridge widening would occur entirely above the 100-year floodplain and only requires the pier walls to be extended into the 100-year floodplain, thus minimal impacts would occur below the 100-year floodplain elevation. As proven in the hydraulic analysis, the extension of the pier walls would not prevent the San Luis Rey River from conveying the 100-year storm within the existing limits both upstream and downstream of the proposed widening. Since the I-5 pier wall extension would cause only a very minimal change on the floodplain, the natural and beneficial Floodplain Values of the San Luis Rey River would not be harmed by the proposed freeway widening.

Floodplain Encroachment

The proposed bridges would result in minor floodplain encroachment and would not result in incompatible floodplain development. Since the 100-year flood would still be contained within the existing floodplain boundaries at each location, there would be no increased risk to life or property associated with the proposed improvements. No additional roadways would flood upstream from the proposed I-5 bridges. Therefore, no transportation routes would be interrupted or terminated beyond existing conditions. No new access and no direct access to the affected floodplains would be provided by the proposed build alternatives. Access to the facility would be controlled, and the freeway would cross any rivers on structures above the base floodplain elevations.

Hydrologic/Hydraulic Impacts on Lagoons and Related Waterways

As previously described, bridges at San Elijo, Batiquitos, and Buena Vista Lagoons were identified as potentially posing more substantial constrictions (e.g., relative to tidal circulation and flood flow) and exhibiting a potential for optimization, with additional technical studies undertaken to identify how the replacement bridges could be designed to optimize tidal and fluvial flows Potential hydrologic and hydraulic effects at these and the other three coastal lagoons, as well as related waterways, are outlined below.

Los Peñasquitos Lagoon

Minimal changes are proposed to the I-5 bridges in the vicinity of Los Peñasquitos Lagoon, as the majority of widening required for HOV/Managed Lanes was completed in the 1990s and early 2000s as part of the I-5 / I-805 / SR-56 interchange projects. Specifically, the proposed I-5 Bridge over Carmel Creek would be limited to minor widening on the western side of the bridge, Los Peñasquitos and Soledad Canyon Creeks would be crossed by an HOV/Managed Lanes flyover bridge added to I-5 at the I-5 / I-805 merge, and the old Sorrento Valley Road culvert crossing of Carmel Creek would be replaced with a bike/pedestrian bridge.

As previously noted, the existing I-5 Bridge over Carmel Creek and the Sorrento Valley Road culverts associated with Carmel Creek currently cannot accommodate a 100-year flood event. Following completion of I-5 widening across Carmel Creek and replacement of the culverts under Sorrento Valley Road with a bike/pedestrian bridge, the main lanes of I-5 would continue to have a flood flow deficiency of approximately 0.7 ft of "freeboard" at the Carmel Creek I-5 bridge crossing (with freeboard defined as the area between the height of the flood flow and the bottom of the bridge, or soffit). A deficiency of 0.7 ft of freeboard would not result in flooding all lanes of the freeway at this crossing even if all of the conservative assumptions in the FEMA model occurred. Rather, this 0.7 ft freeboard deficiency represents a temporary build up of water east of I-5, with freeway access anticipated to be maintained. Removal of the culverts under Sorrento Valley Road and construction of the elevated bike/pedestrian bridge would improve existing conditions and accommodate 100-year flood flows, while also removing some of the existing flow constraint responsible for the current freeboard deficiencies at the Carmel Creek I-5 Bridge crossing. The new bike/pedestrian bridge would be expected to have a freeboard of 3.2 ft during a 100-year flood event.

Currently, tidal flow does not reach the I-5 Bridge over Carmel Creek. If future sea level rise allows for tidal flows to extend upstream to the bridge, it would be minimal and Caltrans could implement adaptation strategies to ensure continued access across Carmel Creek during a 100-year flood event. These strategies could include removing additional sediment from under the bridge, replacing the bridge, and/or other feasible design strategies available at that time.

Based on the height of the proposed flyover bridge at Soledad Canyon and Los Peñasquitos Creeks, freeboard would be anticipated to range from 28.5 to 35.1 ft during a 100-year flood. Assuming a reduction in projected freeboard for a 100-year flood event, combined with a conservatively projected 4.5-foot sea level rise, the remaining freeboard would still be 24 to 30.6 ft. While some of the columns supporting the bridge over Soledad Canyon Creek would be in the floodplain, they would not be in the creek channel itself. The potential impacts associated with the exacerbating effects of sea level rise on channel erosion, storm surge and flooding would be further minimized through the existing location and design of the bridge support structures, and their distance from the ocean, which reduces concern regarding impacts due to wave action, tidal inundation and/or flooding.

In summary, the existing I-5 bridges are upstream of effects associated with existing tidal circulation, erosion, and scour. Although 100-year surface flows are constricted for the Carmel Creek Bridge as noted, the existing bridge length functions during normal conditions and periods for which "back up" could occur under 100-year storm events, combined with high sea level rise, are considered to be of short duration and can be accommodated. Accordingly, the existing design is functional and the bridges are appropriate lengths for Los Peñasquitos Lagoon.

San Dieguito Lagoon

The *I-5 NCC Project* proposes to maintain the existing auxiliary lanes across the lagoon and widen the existing San Dieguito Lagoon Bridge to accommodate the proposed freeway expansion, rather than replace the bridge. Specifically, the bridge width would be expanded, while the length would remain at the current 650 ft.

A new bike/pedestrian path is proposed on the western freeway slopes across San Dieguito Lagoon. This would cross the lagoon in an area where no crossing currently exists, and would be suspended from the existing I-5 bridge where it actually crosses the lagoon (refer to *Figure 2-2.7*).

The proposed I-5 bridge widening would not constrict the SONGS-improved tidal prism, as the existing bridge span was modeled for the restoration and widening the structure would not change its effect on tidal flow. Existing downstream structures at Jimmy Durante Boulevard and Coast Highway, however, would continue to constrain the channel and the tidal flow east to the I-5 bridge and beyond. Modifications to the proposed I-5 bridge would not achieve additional tidal enhancement as a result of these downstream constraints. The proposed I-5 bridge complies with the previously described SONGS condition regarding sedimentation, in that it would not result in a decrease in downstream sediment transport.

The 100-year flood event for the proposed I-5 Bridge over San Dieguito River was modeled pursuant to FEMA requirements. Specifically, FEMA requires a worst-case scenario analysis, with the 100-year flood combined with the highest spring tides and storm wave run-up occurring within a channel that is not scoured. Based on this analysis, the proposed bridge would have only 0.7 ft of freeboard at its lowest bridge elevation (refer to *Table 3.17.6* of this Final EIR/EIS). Additional focused hydraulic studies were conducted as part of the Phase 2 lagoon studies, incorporating the SONGS restoration project and a restoration project at location W19, and assuming channel scour (Chang 2011). This more "real world" model predicted 6 ft of freeboard being maintained during 100-year flood flows for the proposed bridge. Combining that more realistic freeboard assumption of six ft with a conservative estimate of area available to pass a 100-year flood occurring during a projected sea level rise scenario (conservatively, 4.5 ft by year 2100) would result in adequate freeboard of 1.5 ft being available. The potential for sea level rise to exacerbate the effects of tidal flows and associated channel erosion, storm surge, and flooding on the I-5 bridge support structures would be minimized due to location and design of these support structures. That is, they are not expected to be subject to wave action, tidal inundation, or flooding due to the distance from the ocean and available flood-flow freeboard.

Modeling conducted to date for the proposed widened I-5 bridge and upstream mitigation (San Dieguito Lagoon W19 Restoration Project Feasibility Study 2011) did not identify any associated increase in flow velocity under the bridge. Accordingly, armoring the south bank is not anticipated to be necessary. Review of the bridge found that scour of the bridge footings could potentially occur to a maximum depth of -5.2 ft NGVD during a 100-year flood. This is well above the footings required for the bridge and would not damage the structure. The bridge is presently built to allow for scour around the columns, and therefore, armoring would only be placed along the abutments by the freeway slopes.

In summary, the existing distance between the I-5 bridge and the San Dieguito River/Lagoon opening to the ocean, combined with the existing length of the I-5 bridge structure (and associated accommodation of flood flows, wildlife movement, etc.) support the conclusion that the current I-5 crossing is an appropriate length. Specifically, any increase in bridge length would result in only minimal benefits relative to the associated additional cost. Project improvements would therefore not require any new or expanded shoreline protection and would not adversely affect the implementation and success of the ongoing SCE SONGS restoration project.

Agua Hedionda Lagoon

The proposed bridge would retain the 191-ft length, but would be widened to accommodate auxiliary lanes in both directions. Fewer support columns would be used, resulting in less obstruction in the channel, and therefore, lower potential to slow flow through the bridge. The proposed bridge would have a channel bottom width of 76 ft, equal to the existing bridge cross section, with 2:1 channel slopes (refer to *Table 3.17.9* in *Section 3.17)*.

Tidal circulation in the east basin of Agua Hedionda (including the maximum area of tidal inundation) was examined during studies comparing a number of bridge options (refer to *Table 3.17.9* in *Section 3.17*). The bridge studies also included an assessment of alternative I-5 channel and bridge designs utilizing flow fence technology (armoring features that funnel water for more hydraulic efficiency). Due to agency comments and concerns about the feasibility and local application of the technology, however, flow fence concepts are no longer under consideration.

Additional Design Considerations for Lagoon Crossing Alternatives

Hydraulic studies of tidal and fluvial flows through the I-5 Bridge at Agua Hedionda Lagoon were completed for the proposed design and several bridge alternative options (Phase 2 studies; UCSD et al. 2010). *Table 3.17.9* in *Section 3.17* contains alternative options specifics and cost differentials. The bridge options were proposed to optimize water exchange on either side of I-5 and increase tidal inundation in the wetlands east of the freeway. Each alternative was developed to reduce tidal muting east of I-5 and enhance wetland habitat and water quality. Three alternative options were proposed for Agua Hedionda: the double length bridge span alternative, the Chang channel bridge alternative, and the fill removal alternative.

The double length bridge span proposes a doubled channel bottom width of 152 ft, crossed by a bridge 267 ft long and 267 ft wide. This bridge would cost $6.6 million more than the proposed I-5 bridge. The Chang channel bridge proposes a wider bottom channel (128 ft in width) with steeper sides at a 1:1 grade supported by concrete. This bridge would cost $5.8 million more than the proposed I-5 bridge.

As previously described for San Dieguito Lagoon, the maximum tidal range is the difference between the lowest and highest observed water levels, with a higher range representing reduced tidal muting effects (and vice versa). Accordingly, a higher tidal range and corresponding lower muting would also indicate more complete drainage of the east basin during low tide. These conditions would improve tidal flushing, resulting in improved water quality as indicated by higher dissolved oxygen and reduced areas of nutrient concentrations. Tidal and fluvial modeling of the proposed bridge structure at I-5 and alternate bridge configurations showed minimal change to tidal muting and related effects, as summarized in *Table 3.17.9* of *Section 3.17*. Specifically, if the power plant were to discontinue operations, and the desalination plant were to either not be implemented or discontinue operations in the future, the I-5 crossing would not provide the primary constriction point in the lagoon.

Based on the noted analyses of tidal circulation, the proposed I-5 bridge design would result in an additional 1.1 ac of tidal inundation over the existing condition. The double length bridge span would result in 2.3 ac of additional intertidal area and loss of a corresponding amount of subtidal habitat, both in the east basin. The noted 2.3 ac would represent an increase of 1.2 ac over the proposed project, corresponding with 1.2 ac of additional inundated area. The Chang Channel bridge would result in 1.3 ac of additional inundated area (0.2 ac more than the proposed project) with a corresponding decrease of intertidal habitat in the east basin.

Although there would be some decrease in the maximum flood currents due to a wider and deeper channel with this project design, future currents would still exceed the minimum velocities required to mobilize beach sand (0.6 ft/s). Although flood currents through the bridge structures would be sufficient to mobilize sand, slower moving eddies in the basins would not be fast enough to transport fine sand and sediment, and localized shoaling (sand deposits) would result.

Based on the previously described "iron lung effect" from the power plant, a longer I-5 bridge would not appreciably increase water quality, decrease tidal muting, or result in increased wetland habitat. In addition, alternative bridge designs were shown to have a negligible effect on fluvial sedimentation and sediment transport within the system and shoreline sand supply.

Based on the FEMA 100-year flood calculations, the bridge would have at least 6.4 ft of freeboard at the Agua Hedionda Lagoon crossing, assuming a high spring tide and storm wave run-up. According to the hydraulic and scour studies by Chang for the Phase 2 studies (UCSD et al. 2010), the proposed bridge would not change flood elevations, and 100-year flood events would continue to be contained within the existing floodplain boundary. That is, the tidal cycle would not change the height of the 100-year flood at I-5 due to the higher water surface elevations during the flood, as well as the distance of I-5 from the ocean. The previously described conservatively projected sea level rise of 4.5 ft by 2100 would correspondingly increase the 100-year flood elevation at I-5; however, at least 1.9 ft of freeboard would remain at the new I-5 bridge under this scenario.

In summary, the lack of substantial difference in benefits provided by the I-5 lagoon crossing alternatives discussed above in this section, together with the substantial increases in costs associated with those alternatives, supports identification of the proposed project as the appropriate bridge. Specifically, due to the fixed inlet and railroad bridge cross sections, an increase in the I-5 cross section would provide little ecological benefit to the lagoon for the associated cost. The results of the Phase 2 studies (UCSD et al. 2010), as summarized above and in *Table 3.17.9* of *Section 3.17*, indicate that a longer bridge or deeper channel would not appreciably change tidal muting, erosion and scour, floodplain effects, or water quality in the lagoon. Although a crossing alternative with a longer bridge, and a channel that is twice as wide as the existing crossing of 152 ft, would result in fewer impacts to waters of the U.S./State (approximately 0.7 ac less) from roadbed fill, the potential benefits do not correlate with the additional bridge costs of $6.6 million.

San Elijo Lagoon

Construction of the new, slight arch span, 603.1-ft long bridge would entail a variable width to accommodate the widening required for the on- and off-ramps to Manchester Avenue, with a 261-ft wide channel bottom also proposed.

In addition to the pedestrian path on the southern abutment and along the eastern fill slopes (similar to existing conditions), a proposed bike/pedestrian path connection would be provided on the western side of I-5 from Lomas Santa Fe to Manchester Avenue on a secondary bridge suspended from the I-5 structure (refer to *Figure 2-2.7*).

Concurrent with the *I-5 NCC Project*, the SELRP is in the planning stage, with the objective of restoring the lagoon's functions and habitat values to the extent feasible, given the constraints presented by surrounding existing/current development. Four options are under consideration for the SELRP, each of which was evaluated in an optimization technical study completed for the lagoon (San Elijo Lagoon Bridge Optimization Study 2012), are discussed below:

- No Project Alternative proposes no grading within the lagoon except for maintenance dredging of the inlet channel.

- Alternative 1A would result in minimal physical changes to the lagoon, with the exception of enlarging the main feeder channel throughout and redirecting its course just west of I-5. This design option could be implemented with a 370-ft long bridge costing $26.8 million, which is considered the baseline bridge cost.

- Alternative 1B would result in a more substantial change to the existing lagoon to create a greater diversity of habitats while maintaining the existing lagoon inlet. A new subtidal basin off the main channel would be created in the central basin. The channel in the eastern basin would be significantly enlarged to promote more tidal exchange east of I-5. This design option could be implemented with a 603.1-ft long bridge, which would cost $16.1 million more to implement than baseline bridge costs.

- Alternative 2A would result in changes to the existing lagoon to create a greater diversity of habitats than presently exists. Seawater would enter the lagoon via a new tidal inlet located south of the existing inlet and a new subtidal basin would be created just landward of the new inlet in the western and central basins. The channel in the eastern basin would be significantly enlarged to promote more tidal exchange east of I-5 (identical to Alternative 1B). This design option, which could be implemented with a 603.1-ft-long bridge, also would cost $16.1 million more to implement than baseline bridge costs.

The Draft EIR/EIS for the *I-5 NCC Project* stated that regardless of the I-5 build alternative selected, if the project is approved, ultimate bridge dimensions would include the channel dimensions for the lagoon restoration option selected for the SELRP. At the time the Draft EIR/EIS was released for public review, however, the bridge length over the channel was not confirmed, and impacts were therefore based on widening the freeway while maintaining the existing bridge length. The currently proposed I-5 bridge in this area has undergone further design, including design to accommodate the 261-ft optimized channel width identified for restoration Alternatives 1B and 2A.

Should the No Project or Alternative 1A be implemented from the SELRP, it is important to note that the existing channel dimension beneath the I-5 bridge would be the optimized channel. This conclusion in the optimization technical study is based on the fact that the existing lagoon inlet and the associated channel between Coast Highway and the railroad bridge represent the primary constrictions for tidal and flood flows, and these features would not be modified for the No Project or Alternative 1A. Accordingly, increasing the I-5 bridge channel dimension would not effectively improve tidal or flood flow conditions for these alternatives. The existing I-5 bridge channel also helps to reduce flooding on Manchester Avenue in the central basin, by attenuating peak flows in the east basin (which results in higher flood levels in the east basin, but little or no flooding in the central basin). Therefore, if the I-5 existing bridge channel were widened under the No Project or Alternative 1A scenarios, substantial flooding along Manchester Avenue would occur in both the east and central basins.

Tidal and fluvial hydraulic modeling also analyzed a range of channel widths under each bridge structure crossing the lagoon to identify which would provide the optimum feasible tidal and fluvial flows. These analyses are presented in the San Elijo Lagoon Bridge Optimization Study (2012). The selection of optimum channel widths was based on a sensitivity analysis conducted for each bridge crossing under typical dry weather tidal fluctuations and extreme storm conditions (100-year storm and 100-year plus a conservative projection of sea level rise combined water levels). Tidal range was used as the primary indicator for benefits to the wetland ecosystem, and extreme flood elevations were modeled to evaluate the potential for flooding of Manchester Avenue. Using these indicators, optimal bridge lengths were identified; i.e., lengths at which tidal range and flood conveyance were most favorable, and further increase in bridge length would bring only minimal benefit. *Table 3.9.3* presents the optimum channel widths for each bridge under each SELRP alternative.

Table 3.9.3: Summary of San Elijo Lagoon Optimized Channel Dimensions for Each SELRP Alternative (in feet)

Alternative	Hwy 101 Bridge		Railroad Bridge		I-5 Bridge	
	Bottom Width	Channel Invert (NGVD)	Bottom Width	Channel Invert (NGVD)	Bottom Width	Channel Invert (NGVD)
No Project	105	-4	161	-5.5	130	-6
1A	115	-4	161	-5.5	130	-6
1B	130	-4	161	-5.5	261	-6
2A	200	-6.5	590	-15.0	261	-6.5

Upon completion of the optimization technical study, the I-5 bridge was designed to accommodate the optimal 261-ft channel bottom associated with SELRP lagoon restoration Alternatives 1B and 2A, as well as other features under consideration such as bike/pedestrian paths and wildlife crossings.

The tidal and fluvial benefits of the proposed structures would be dependent on the SELRP restoration alternative selected. For the No Project and Alternatives 1A and 1B, the tidal and fluvial flows would be primarily dependent on the existing inlet and associated sinuous channel in the west basin that regulates the flows into and out of the lagoon (i.e., the previously described channel between the Coast Highway and railroad bridges). The maximum tidal ranges at I-5 with the optimized I-5 channel dimensions specified in the table above would be between 5.06 and 5.43 ft for No Project and Alternative 1A. The maximum tidal ranges at I-5 with the 261-ft channel under I-5 would be 4.66 and 8.06 ft for Alternatives 1B and 2A, respectively (refer to *Table 3.17.7* in *Section 3.17).* The tidal range would be lower for

Alternative 1B because the larger volume of water accommodated following dredging would not be able to fully drain from the lagoon before the next high tide. Residence time is the average time a particle resides in a hydraulic system; it provides a useful measure of the rate at which waters in the hydraulic system are renewed. Accordingly, residence time provides a means for assessing the water quality of the hydraulic system. Specifically, a shorter residence time means that sediment passes through the lagoon more quickly; indicating better circulation, more water exchange, less sediment deposition, and therefore better water quality within the lagoon. The No Project lagoon design would not provide enough volume of tidal waters east of I-5, so no residence time was determined. Alternative 1A would result in a 12.7-day residence time in the east basin, while Alternatives 1B and 2A show a much quicker turn over, with 7.5 and 4.5 days of residence time, respectively (refer to *Table 3.17.7* in *Section 3.17*).

As noted, fluvial flows during storm events are also an important consideration for optimization analyses, with several portions of Manchester Avenue bordering the north side of the lagoon currently within the 100-year floodplain. With the No Project or Alternatives 1A and 1B, flows would be constrained through the existing inlet, and the related downstream channel between the Coast Highway and railroad bridges would continue to be constrained. Conversely, the lengthened I-5 bridge with an optimized channel bottom width of 261 ft for Alternative 1B would result in the majority of Manchester Avenue being removed from the floodplain (with the exception of small areas in the east and central basins). As indicated in the study, however, further expansion of the I-5 channel width to 392 ft under the Alternative 1B scenario would not result in a demonstrable difference in the flooded area. Alternative 2A is the only scenario that would remove all of Manchester Avenue from the 100-year floodplain, by combining the optimized 261-ft wide channel bottom width with a slightly deeper channel invert than Alternative 1B, and by creating a new lagoon inlet and associated railroad bridge.

Sediment transport within the lagoon is related to the flow velocity of water therein. During dry periods, flow velocity and sediment movement are dependent on tidal flows, while during storms, sedimentation is related to flood velocities. As anticipated, the results demonstrating effective sediment transport vary depending on the alternative. Tidal flow velocities would be lower at I-5 with the No Project Alternative, due to minimal tidal volume. Tidal flow velocities for Alternatives 1A and 1B at I-5 would only be slightly higher than for the No Project Alternative, although the greater volume of water movement and optimized channel at the inlet and railroad crossing under these scenarios would allow the channels to scour and reduce deposition, thereby maintaining the channel cross sections for a longer period. Flow velocities and the ability to carry sediment would be highest at I-5 for Alternative 2A, due to the increased volume and the new inlet and railroad bridges.

During peak storm flows, modeling indicated that sediment would be carried through the main channels to the mouth of the lagoon for all alternatives. Flow velocities would decrease more quickly away from the channels in Alternatives 1A and the No Project, however, due to a smaller volume of water and narrower channels.

A conservative projection of sea level rise of 4.5 ft in year 2100 also was modeled with the 100-year flood storm condition to determine flow velocities and amount of freeboard available to pass flows at each of the bridges. For all alternatives, the 100-year flood height would increase by approximately 2 ft. The velocities were shown to actually decrease because the channels would be deeper, thereby providing for a greater cross section to accommodate the flow. The Coast Highway Bridge would have the least amount of available freeboard, with only approximately 0.4 to 0.8 ft assuming the noted sea level rise. The railroad bridge in its current location would have over 6 ft of freeboard, while the new railroad bridge location under SELRP Alternative 2A would have approximately 7.9 ft of freeboard. The I-5 bridge would have between 19.5 and 21.1 ft of freeboard depending on the SELRP restoration alternative selected, and therefore would accommodate the described sea level rise.

In summary, the optimized I-5 bridge would extend 603.1 ft over San Elijo Lagoon and would encompass a channel bottom width of 261 ft. The proposed bridge length is slightly longer than recommended as a result of the Bridge Length Optimization Study and is included here as an enhancement component. Along with implementation of the other features of SELRP Alternatives 1B or 2A, this optimized I-5 bridge would result in increased tidal range and fluvial flow characteristics, with associated benefits for lagoon habitats, residence time, water quality, and flood control, at a cost of $42.9 million.

Batiquitos Lagoon

The I-5 Bridge over Batiquitos Lagoon is proposed to be 282 ft long, broken into separate north- and southbound bridges with a 19.2-ft gap between them (refer to *Table 3.17.8* in *Section 3.17*). The channel bottom would be 183.5 ft wide, with a depth of -7 ft NGVD. The new channel would be a trapezoid with a level bottom between the abutments, with these dimensions resulting in the same overall cross section as the optimized bridge with the same modeled dimensions at -1.0 ft elevation (NGVD). The existing riprap within the channel bottom would be removed.

Additional Design Considerations for Lagoon Crossing Alternatives

Two studies have been completed to look at different design options for construction of the I-5 bridge. The Phase 2 Hydrodynamic Study was completed by Jenkins, Chang, and WRA (UCSD et al. 2010). This study identified four bridge options, two of which were considered acceptable by the resource agencies. The double wide channel would increase the channel under the I-5 bridge from 106 ft to 212 ft[3] while retaining existing shoaled depth (-5.3 ft) and 2:1 side slopes supported by riprap. This bridge option would cost $7.13 million more than a $13.4 million baseline I-5 bridge measuring 246 ft in length. The Chang Channel would allow a deeper and wider channel by using steeper slopes. Specifically, this option would deepen the channel to -7.0 ft, and increase the side slope grades to 1:1 (also supported by riprap), which would result in a channel bottom that is 180 ft wide and -7.0 ft deep. Armoring of the channel bottom or bridge columns is not proposed for either option. Both options would increase tidal range in the eastern basin and reduce flow velocities under the I-5 bridge (refer to *Table 3.17.8* in *Section 3.17*). This bridge option would cost $1.26 million more than a baseline I-5 bridge measuring 246 ft in length.

Optimization Analysis

The resource agencies requested additional study of the lagoon to determine potential system-wide improvements that could be realized by looking at a wider cross section of I-5 bridge channel dimensions, and also at optimizing the railroad bridge and channel design features. The resulting optimization technical study (the Batiquitos Lagoon Bridge Optimization Study 2012) indicated a wider/deeper channel would be needed similar to the Chang Channel,

[3] Phase 2 studies modeled the channel as a trapezoid with a flat bottom width of 106 ft and a depth of -5.3 ft. The subsequent optimization study model was based on the as-built channel with a 66-ft-wide bottom sloping up at 4:1 (131 ft at -1.0 ft) to meet the 2:1 slope.

but with side slopes of 2:1. Final optimized channel dimensions were determined to include a 134-ft wide channel bottom at -7.0 ft deep, with 2:1 slopes armored with riprap (refer to *Table 3.17.8* in *Section 3.17* and the optimization technical study). Riprap would not extend onto the channel bottom. The proposed channel incorporates the described 134-ft wide channel that would transition (as a 4:1 slope channel) into a 183.5-ft channel of similar to slightly larger cross section. Additional widening of the channel beyond those specifications would result in only 0.25 in of tidal range for another 40 ft of channel width. The fluvial flows would also be optimized at the I-5 bridge, although the limitations of the coastal inlet would cause 100-year floodwater to back up upstream of the inlet. Although the 100-year flood fluvial flows remain slightly elevated upstream of each bridge, no infrastructure would be impacted and additional channel widening provides minimal change. The studies showed that the railroad bridge would also benefit from a wider and deeper channel. The railroad channel would be optimized with an increase in the channel bottom width from 162 to 202 ft, and an increase in the channel depth from -6.35 to -7.0 ft.

Since both the railroad and I-5 bridges are proposed for replacement as part of the LOSSAN double tracking effort and *I-5 NCC Project,* the optimization technical study provided modeling for optimizing tidal and fluvial flows through both of these bridges. Because the Pacific Coast Highway 101 Bridge and inlet were recently installed and designed for inlet stability utilizing a previously modeled flow regime, changes to the inlet were not modeled as part of the project optimization technical study.

The combination of the wider railroad and I-5 bridges would result in maximum tidal ranges of 7.35 ft in the eastern basin and 7.4 ft in the central basin (refer to *Table 3.17.8* in *Section 3.17*). The ocean has a maximum tidal range of 8.37 ft in this area; however, the gauge at the eastern end of the ocean inlet (west of the railroad and I-5 bridges) mutes the tide to 7.51 ft under existing conditions. Therefore, minimal muting (0.16 to 0.11 ft) is attributable to the railroad and I-5 bridges. The increase of tidal range would result in additional intertidal habitat in the east basin. The increased channel dimensions would also decrease flow velocities under the bridges, resulting in reduced scour under the I-5 and railroad bridges.

Fluvial flows associated with the 100-year flood were modeled for both the existing and the optimized channel dimensions. As noted, floodwaters currently backup in all three Batiquitos Lagoon basins. By increasing the channel dimensions of both the I-5 and the railroad bridges, there would be a lower water level in the east basin, but a higher level in the central basin. All proposed bridge dimensions would pass the 100-year flood with at least 6.6 ft of freeboard.

For the optimized I-5 bridge in the dredged condition (i.e., sediment removal at the central basin, as well as the I-5, railroad, and inlet channels), tidal velocity would decrease from 4.3 to 2.4 ft/s at flood tide, and from 3.9 to 2.3 ft/s at ebb tide. By comparison, these velocities would only change to 2.2 ft/s at flood tide and 2.0 ft/s at ebb tide under the shoaled optimized condition; which was modeled with the pre-dredged bathymetry in 2008. The reduced velocities for the optimized condition would allow for reduced scour under the bridge, while still transporting sand and sediments to the inlet. Inlet velocities would remain similar to existing conditions due to the fixed nature of the recently modified inlet.

Sediment transport under extreme flood velocities also would be decreased with the optimized channels under the bridges, resulting in less scour and erosion along the channels. The velocity in the optimized channel would reduce the time for the flood flows to travel through the east basin from 0.7 hour to 0.6 hour, thereby reducing the time for sediment to settle. Accordingly, the sediment transport capacity under the optimized bridge would be slightly improved compared to existing conditions.

The overall residence time in Batiquitos Lagoon is less than one week, indicating that circulation in the lagoon is good. With the optimized channel improvements, the residence time in the eastern basin would be reduced from 5.8 days to 5.4 days.

- A conservative projection of sea level rise of 4.5 ft in the year 2100 would result in the 100-year flood surface water levels increasing by approximately 2 ft at both the railroad and I-5 bridges. The water surface elevation would increase by approximately 0.1 ft with the optimized versus the existing channel. Both the railroad and I-5 bridges would be expected to pass the 100-year flood flows with sea level rise as noted. Assuming the replacement railroad bridge has a similar soffit height to the existing bridge, it would have a freeboard of at least 7.0 ft. The optimized I-5 bridge would have a slightly lower soffit than the existing I-5 bridge, but would have a projected freeboard of approximately 4.8 ft during the 100-year flood with sea level rise. The only bridge that would not pass the projected 100-year flood with sea level rise is the East Coast Highway Bridge, which is slightly lower than the West Coast Highway Bridge, and would have a projected freeboard deficit of 0.1 ft. As noted, above, however, the projected sea level rise of 4.5 ft is conservative and the most recent State policy reflects a projected sea level rise of 3.1 ft. With a sea level rise projection that is 1.4 ft less than the value used in the models for this EIR/EIS, there would be no freeboard deficit for the East Coast Highway Bridge.

In summary, the proposed bridge (at a cost of $3.85 million over baseline costs) would provide optimal function without over engineering (i.e., project modeling as part of Phase 2 studies showed that additional length would provide only minimal benefit relative to the associated cost). The proposed bridge length is recommended as a result of the Batiquitos Lagoon Bridge Length Optimization Study and is included here as an enhancement component. The proposed bridge cross section would have a flat-trapezoid when built; therefore, the channel dimensions would be different from those modeled. The proposed channel dimensions would be 183.5 ft wide at the bottom with 2:1 slopes on the abutments. The channel width at -1 ft NGVD remains 200 ft, which is the same cross section modeled at this elevation. The resulting cross section of the designed bridge is similar to, but slightly larger, than modeled. The trapezoid design would be a more hydrologically efficient design (Moffat & Nichol 2012: personal communication). Based on the above discussion, the optimized I-5 bridge would result in increased tidal range of 0.7 ft in the east basin and 0.5 ft in the central basin. The increased tidal range would result in increased salt marsh and other intertidal habitats, with less subtidal habitats. The increased area would enhance flushing and reduce residence time, thereby increasing water quality within the lagoon. Additional widening of the channel (requiring a longer bridge) beyond proposed specifications would result in only 0.25 inch of tidal range improvement for another 40 ft of channel width.

Buena Vista Lagoon

The current enhanced I-5 Bridge over Buena Vista Lagoon is proposed to be 197 ft long, with the channel bottom estimated at 105 ft wide and -6.0 ft NGVD (refer to *Table 3.17.10* in *Section 3.17*). The cost of this enhanced bridge is $14.6 million, while the cost of the I-5 bridge proposed in the Draft EIR/EIS was $7.6 million.

Additional Design Considerations for Lagoon Crossing Alternatives

The Draft EIR/EIS originally proposed to replace the I-5 bridge with bridge dimensions to be specified in, and required by, the Buena Vista Lagoon restoration plan that was under preparation. A number of Buena Vista Lagoon restoration plan alternatives were developed under the direction of several federal and State agencies, including the California State Coastal Conservancy (SCC), U.S. Fish and Wildlife Service, and CDFW. Due to issues with the private ownership of the lagoon mouth, however, Buena Vista Lagoon restoration plan activities were suspended. The resource agencies have asked that Caltrans model four potential Buena Vista Lagoon restoration plan alternatives to determine an optimal bridge length for I-5 that would not limit potential future Buena Vista Lagoon restoration plan activities. This modeling was completed as part of the I-5 Bridge Study at Buena Vista Lagoon (2012). These four alternatives were selected because the proposed grading and outlet/inlet configurations represent a reasonable range of potential restoration conditions for the Buena Vista Lagoon plan. Analysis of the alternatives provided ranges of dimensions for potential hydraulic connections, which would in turn affect the design of the bridge structure. The four alternatives represent options for retention of the lagoon as a primarily freshwater resource and returning it to a saltwater regime, and include:

- Saltwater Alternative 2-1
- Saltwater Alternative SW2-A
- Freshwater Alternative 1
- Freshwater Alternative FW-A

Saltwater Alternative 2-1 represents the Buena Vista Lagoon restoration plan configuration of a salt water hydrologic regime originally developed for the Buena Vista Lagoon restoration project in 2008. This alternative would achieve Buena Vista Lagoon restoration plan objectives primarily through elimination of the existing exotic vegetation, dredging to remove excess sediment, and establishment of continuous tidal exchange. Specifically, under this alternative the existing weir would be replaced with a tidal inlet, and it is assumed that the previously described sand berm would be regularly maintained (lowered) to provide continuous tidal exchange between the lagoon and ocean. The tidal inlet would require stabilization with two jetties that would extend to the Mean Lower Low Water (MLLW) contour. The bottom elevation of the Railroad and Weir Basins would be dredged to between -12 and -15 ft NGVD to provide a sediment trap for sand entering the lagoon from the ocean. Prominent features of this alternative were described in the 2008 Hydraulic Study Report (Everest 2008).

Saltwater Alternative SW2-A is the most recent salt water Buena Vista Lagoon restoration plan alternative developed for the lagoon. In this alternative, a channel would trend along the center of the I-5 and Coast Highway Basins at -3.3 ft NGVD, with the two banks of the channel being graded to a slope not to exceed 8:1. Downstream of the railroad bridge, the channel would widen and form a basin with a uniform depth of -3.3 ft NGVD. The tidal inlet channel would be constructed with an initial bottom elevation of -2.0 ft NGVD, but no jetties would be constructed to stabilize the inlet channel. Prominent features of this alternative were described in the 2011 technical memo (Everest 2011a).

Freshwater Alternative 1 represents retention of the freshwater hydrologic regime analyzed as part of the Buena Vista Lagoon Restoration Project Feasibility Study in 2004. This alternative would achieve Buena Vista Lagoon restoration plan objectives primarily through elimination of the existing exotic vegetation and dredging to remove excess sediment. The existing ocean outlet weir would be replaced with an 80-ft wide weir, consistent with a weir widening project proposed by the City of Oceanside. The invert elevation of the weir would be kept at the existing weir invert elevation, which is 5.6 ft NGVD. The bottom elevation of the Railroad and Weir Basins would be dredged to between -12 and -15 ft NGVD. Prominent features of this alternative were described in the 2008 fluvial hydraulics report (Everest 2008).

Freshwater Alternative FW-A is the most recent freshwater alternative developed for the lagoon. The central portions of each basin would be dredged to maintain a water depth of about 6 ft (bottom elevation of about 0 ft NGVD) to minimize the future encroachment of reeds (cattails) throughout the lagoon. This alternative includes similar assumptions regarding the existing weir and sand berm as noted above for Saltwater Alternative 2-1.

Optimization Analysis

The fluvial hydraulic analysis studied the impact of a 100-year return period storm along Buena Vista Creek. To evaluate impacts due to storms of lesser magnitudes, five other flood events (2-year, 5-year, 10-year, 25-year, and 50-year) were included in the analysis of one of the salt water alternatives. The flood impact of storms coupled with high tides was assessed by applying the peak of the storm hydrograph, timed to match a tide elevation of mean higher high water (MHHW). In addition to evaluating impacts due to storms under current water levels, the storm impact coupled with high tides in Year 2100 was analyzed with a higher water level to evaluate the impact of a conservative projection of sea level rise.

In the initial model run for each alternative, the hydraulic connections beneath the bridges were modeled using as-built dimensions. In subsequent simulations, the dimensions of the hydraulic connections were modified until the simulation results indicated that the storm flow through these hydraulic connections would be unimpeded. This process was conducted for fluvial flow coupled with both the current tide level and Year 2100 tide level with sea level rise (refer to the optimization technical study).

Multiple scenarios were modeled for each alternative that either increased the channel width, depth, or a combination of width and depth to determine the optimal configuration of all three bridge crossings over the lagoon. The fluvial flows were modeled as the controlling factors of the channel dimensions. The optimized channel configurations were defined as the dimensions where the surface water levels were very similar between basins, showing little or no flow constriction.

The results of the optimization technical study found that the railroad bridge was sufficiently wide, and that the channel only required dredging from -2.5 to -6 ft NGVD (*Table 3.9.4*). The Coast Highway crossing, however, would require a wider and deeper channel, as well as potential elevation of the road itself to accommodate the flow under the road, particularly if the conservative projection of sea level rise occurs.

Table 3.9.4: Lagoon Restoration Design Guidelines for Bridge Dimensions

Bridge	Parameters	As-Built	Salt Water Alts	Fresh Water Alts	Design Guideline
Railroad	Invert Elevation (ft, NGVD)	-2.5	*-4*	*-4*	*-6***
	Bottom Width @ Invert (ft)	17	17	17	17
	Channel Width @ MWE (ft)	280	280	280	280
	Soffit Elevation (ft, NGVD)	11.1	*	*	*
	Max Water Elevation (ft, NGVD)	--	*10.1*	*14.1*	*15*
Coast Hwy	Invert Elevation (ft, NGVD)	-6/-3	*-6*	*-6*	*-6*
	Bottom/Top Width (ft)	25/29	*110*	*110*	*110*
	Soffit Elevation (ft, NGVD)	8.2	*	*	*
	Max Water Elevation(ft, NGVD)	--	*10.3*	*14.3*	*15*
I-5	Invert Elevation (ft, NGVD)	-2	*-6*	*-6*	*-6*
	Bottom Width @ Invert (ft)	24	*105*	*105*	*105*
	Width (ft) @ Existing Soffit	99	*180*	*180*	*180*
	Channel width @ MWE (ft)		*147*	*157*	*160*
	Existing Soffit Elevation (ft, NGVD)	23.1			
	Max Water Elevation (ft, NGVD)	--	*10.4*	*14.4*	*15*

Italics = different from as-built**.**
* Proposed soffit elevation should be max water elevation + value (such as freeboard) based on design criteria
**Two ft added to the desired invert elevation for fluvial flows to accommodate the near full tide range.

The optimized I-5 bridge improvements over Buena Vista Lagoon would deepen the channel from -2 to -6 ft NGVD, and increase the bottom width of the channel from the existing 24 ft to 105 ft (refer to *Table 3.9.4* and *Table 3.17.10*). The top width of the channel would be 160 ft at the maximum water surface elevation of 15 ft.

The optimized channel cross sections would be adequate to accommodate flows assuming the conservative projection of sea level rise (4.5 ft) in Year 2100 with the following exceptions: (1) the soffit elevation of Coast Highway would be too low to pass the flow; and (2) the soffit elevation of the railroad would be too low for freshwater alternative FW-A under current conditions, and too low for all Buena Vista Lagoon plan restoration alternatives with future sea level rise. The railroad soffit elevation would have to be raised from 11.1 to 13.6 ft plus freeboard to accommodate the 100-year flood and sea level rise for all alternatives (refer to *Table 3.17.10* in *Section 3.17*).

Residence times were modeled for the saltwater alternatives with the optimized crossings. Alternative SW-A performed better than Alternative A-1 in the I-5 Basin with a maximum residence of 6 days versus 26 days.

In summary, based on the above discussion, a bridge length of 197 ft at a cost of $14.6 million has been identified as optimal; i.e., the length at which tidal range and flood conveyance would be most favorable, and further increase in bridge length would bring only minimal benefit. This is approximately double the $7.6 million cost of simply replacing the existing length bridge with a greater width. The proposed bridge length is recommended as a result of the Bridge Length Optimization Study and is included here as an enhancement component. Specifically, bridge optimization would increase flow through the lagoon and improve water quality. These optimized channel configurations would support a range of Buena Vista Lagoon restoration plan alternatives. The I-5 and railroad bridge improvements anticipated as part of the current project and LOSSAN double-tracking would support the Buena Vista Lagoon restoration plan alternatives. Localized downstream flooding in the Coast Highway Basin could occur, however, if the Coast Highway crossing is not changed during I-5 crossing optimization.[4]

3.9.4 Avoidance, Minimization, and/or Mitigation Measures

Build Alternatives

The proposed project has been designed to avoid and/or minimize impacts where possible, by taking the reduced amounts of right-of-way and limiting the grading footprint to minimize impacts to existing structures while still meeting project objectives. Specifically, the structures over Los Peñasquitos Creek were designed to entirely span the floodplain, the replacement of the Sorrento Valley Road Culvert would remove an existing constriction point in Carmel Creek and lower the base floodplain, and the replacement of the Batiquitos Lagoon Bridge would reduce an existing constriction point in the lagoon and lower the base floodplain. In addition, standard engineering practices would be used, where feasible, to facilitate drainage. Minimization measures for floodplain impacts include:

- Limiting the area affected by construction with utilization of barriers or fences to protect sensitive areas
- Employing best management practices (BMPs) to control erosion and runoff
- Designating ESAs to demarcate and protect floodplain habitats

No Build

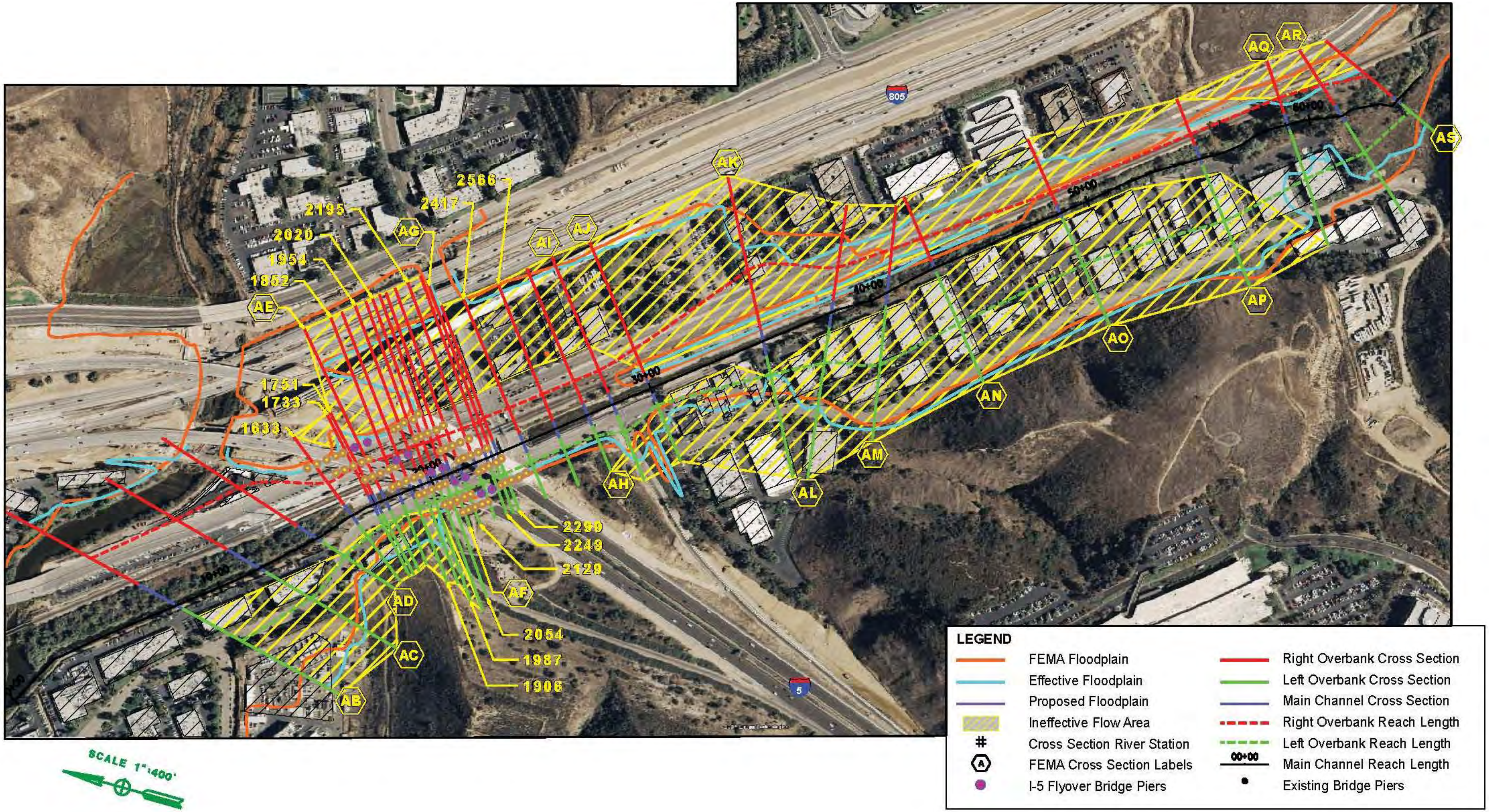
Implementation of the No Build alternative would not result in changes to the floodplain patterns, natural and beneficial floodplain values.

[4] The resource agencies may identify replacement of the Coast Highway crossing as part of the resource enhancement plan for mitigating the *I-5 NCC Project*. The benefit of the bridge lengthening will not be fully evident until a restoration project is identified and implemented in Buena Vista Lagoon.

Table 3.9.1: 100-Year Floodplain Impacts Comparison

Evaluation Criteria	Measured Parameter	No Build	10+4 Barrier				10+4 Buffer				8+4 Barrier				8+4 Buffer			
Total Project Impacts to FEMA 100-year floodplains	Acres	none	**34.6**				**29.1**				**31.2**				**25.2**			
Specific Project Impacts to FEMA 100-year floodplains			Bridge Widening	Roadway Widening	Fill Slopes	Bridge Columns	Bridge Widening	Roadway Widening	Fill Slopes	Bridge Columns	Bridge Widening	Roadway Widening	Fill Slopes	Bridge Columns	Bridge Widening	Roadway Widening	Fill Slopes	Bridge Columns
	Acres	none	**7.7**	**11.9**	**14.8**	**0.2**	**5.8**	**11.7**	**11.4**	**0.2**	**7.4**	**11.3**	**12.3**	**0.2**	**6.2**	**8.7**	**10.1**	**0.2**
Individual Floodplain Impacts																		
Soledad Canyon Creek	Acres	none	0.86	0	0.08	0.02	SAME WIDENING & IMPACTS FOR ALL ALTERNATIVES				SAME WIDENING & IMPACTS FOR ALL ALTERNATIVES				SAME WIDENING & IMPACTS FOR ALL ALTERNATIVES			
Los Peñasquitos Creek	Acres	none	0.21	0	0	0												
Carmel Creek	Acres	none	0.25	0.30	0.14	0.01												
San Dieguito River	Acres	none	1.60	2.85	4.69	0.04	1.01	2.50	3.31	0.03	1.44	2.52	3.42	0.04	1.15	1.36	3.21	0.03
San Elijo Lagoon	Acres	none	1.93	4.42	3.12	0.01	1.14	4.97	1.37	0.01	1.79	4.36	1.65	0.01	1.26	4.44	0.74	0.01
Cottonwood Creek	Acres	none	n/a	0	0	n/a	n/a	0	0	n/a	n/a	0	0	n/a	n/a	0	0	n/a
Batiquitos Lagoon	Acres	none	0.55	1.33	3.28	0.01	0.34	1.31	3.12	0.01	0.57	1.42	3.29	0.01	0.42	0.52	3.08	0.01
Encinas Creek	Acres	none	n/a	0.18	0.24	n/a	n/a	0.12	0.21	n/a	n/a	0.12	0.18	n/a	n/a	0	0.26	n/a
Agua Hedionda Lagoon	Acres	none	0.93	1.51	1.78	0.01	0.63	1.19	1.59	0.01	0.88	1.29	2.04	0.01	0.65	0.81	1.09	0.01
Buena Vista Lagoon	Acres	none	0.22	0.72	1.01	0.01	0.21	0.72	1.08	0.01	0.22	0.72	1.01	0.01	0.21	0.72	1.01	0.01
Loma Alta Creek	Acres	none	0.48	0.55	0.45	0.01	SAME WIDENING & IMPACTS FOR ALL ALTERNATIVES				SAME WIDENING & IMPACTS FOR ALL ALTERNATIVES				SAME WIDENING & IMPACTS FOR ALL ALTERNATIVES			
San Luis Rey River	Acres	none	0.69	0	0.05	0.06												

The 100-year floodplain impact acreage identified in the table is a measure of the four impacts identified that fall within the 100-year floodplain shape files that reside in Caltrans District 11 G:\gisdata\fema\shape directory.
These measured impacts include the four proposed widening alternatives and DAR identified to date.
"Bridge Widening" is the additional bridge deck area above the floodplain limits. (Shading impact)
"Roadway Widening" is the additional roadway area within the floodplain limits. (Footprint impact)
"Fill Slopes" are the additional roadway hinge and fill slope area within the floodplain limits. (Footprint impact)
"Bridge Columns" are the additional bridge column (cross-sectional) area within the floodplain limits. (Waterway impact)
These 100-year floodplain impact quantities are not a measure of the estimated change in the inundation boundary of the 100-year floodplain resulting from the change of character of the freeway corridor. They are merely the measure of the physical encroachment within the existing defined floodplain boundary without regard to the change of the boundary, if perceptible, that results from the impacts themselves.
This table provides a comparative analysis of the effects of the project build alternatives on floodplains as described in the Draft EIR/EIS. After refinement of design, including incorporation of construction footprints, phasing considerations, and quantification of alternative footprints, the areas of floodplain impacts for each of the build alternatives would be larger than shown on this table from the Draft EIR/EIS. The Preferred Alternative would remain the smallest of the build alternatives, however, and would have the least amount of impacts. See *Table 3.9.2* for impacts associated with the refined 8+4 Buffer alternative (Preferred Alternative).

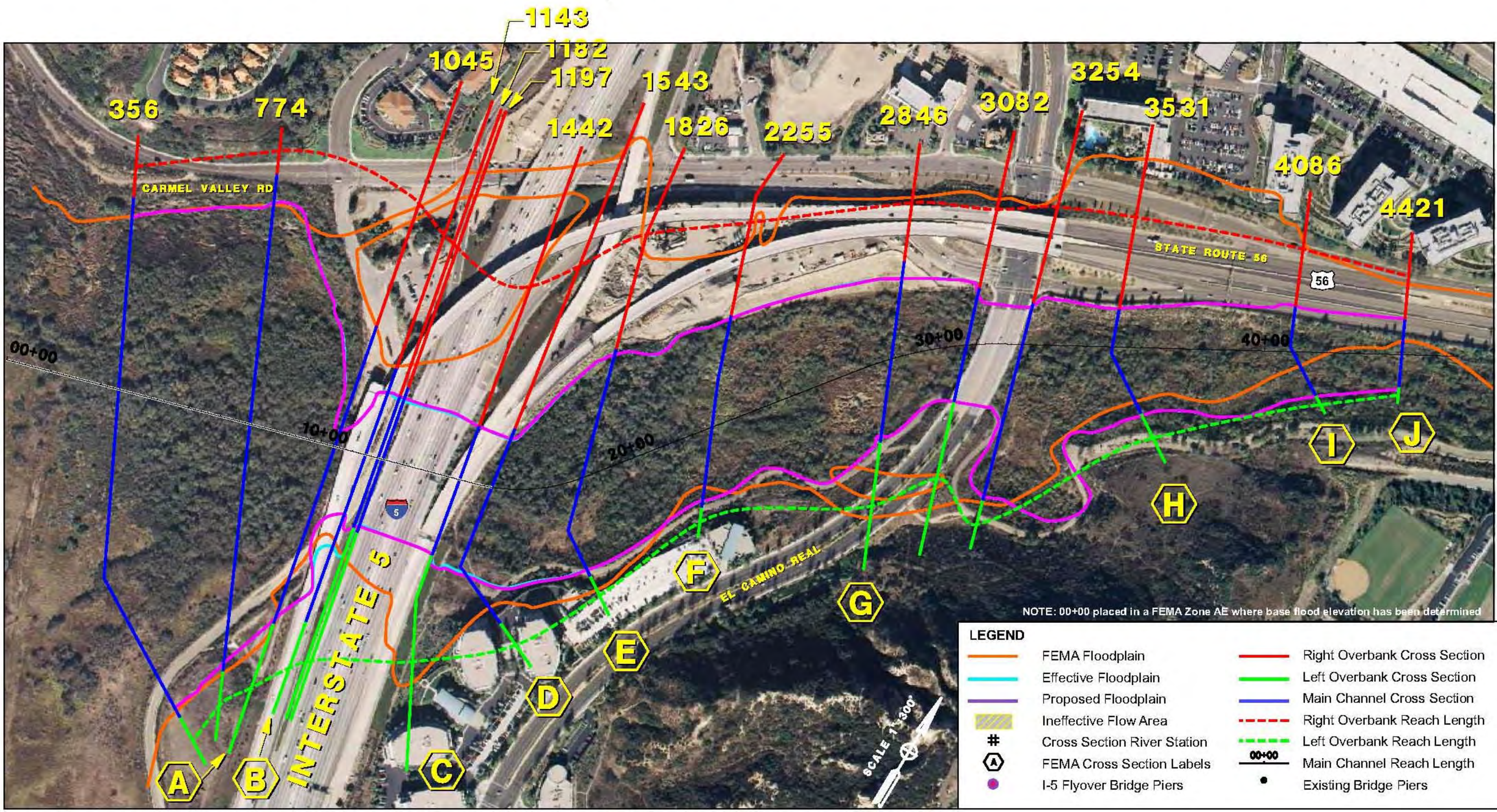


Source: Interstate 5 North Coast Floodplain Studies, Books 1, 2, and 3, February 2008 and February 2009

Figure 3-9.1: Soledad Canyon Creek Floodplain within the Project Area

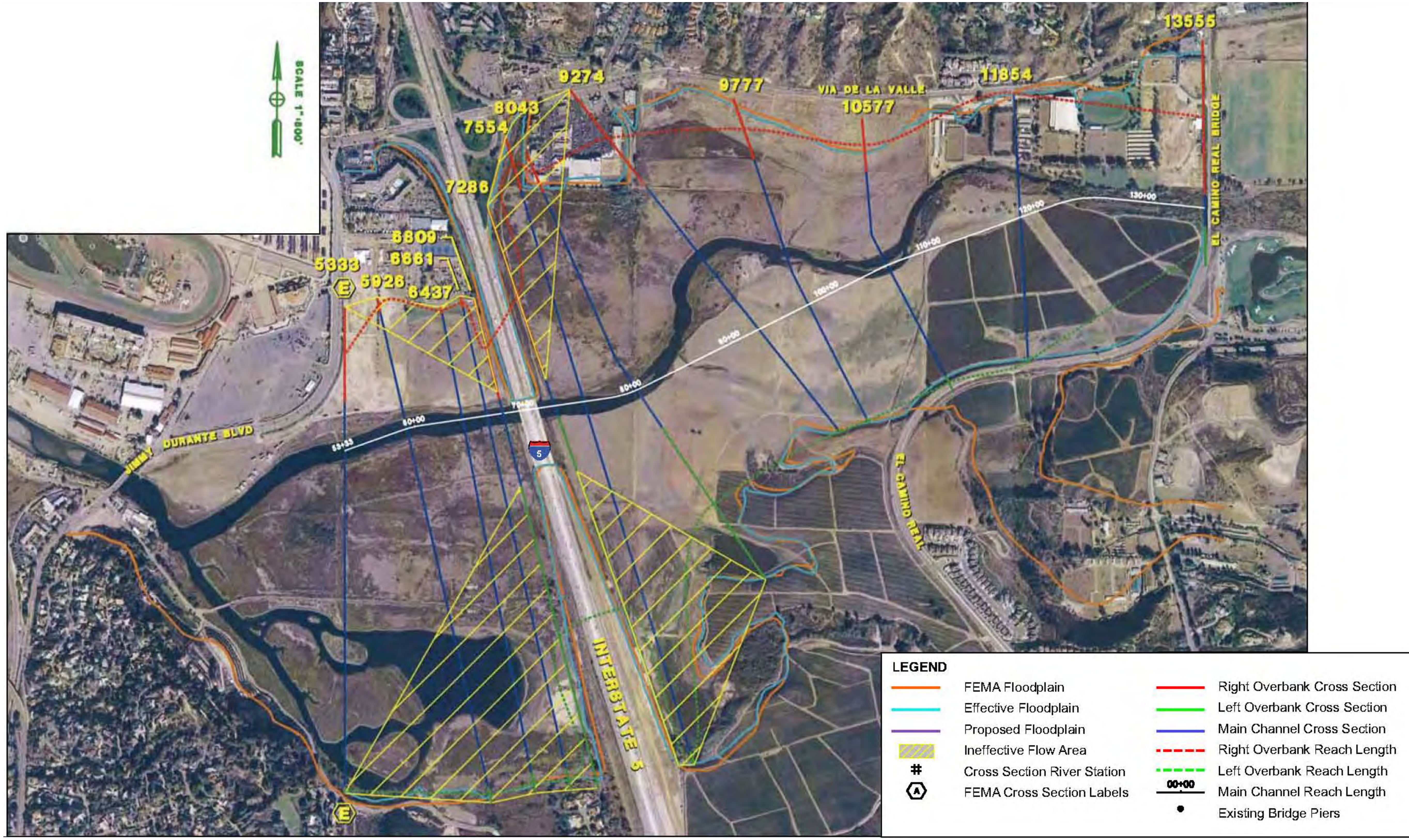
Source: Interstate 5 North Coast Floodplain Studies, Books 1, 2, and 3, February 2008 and February 2009

Figure 3-9.2: Los Peñasquitos Creek Floodplain within the Project Area



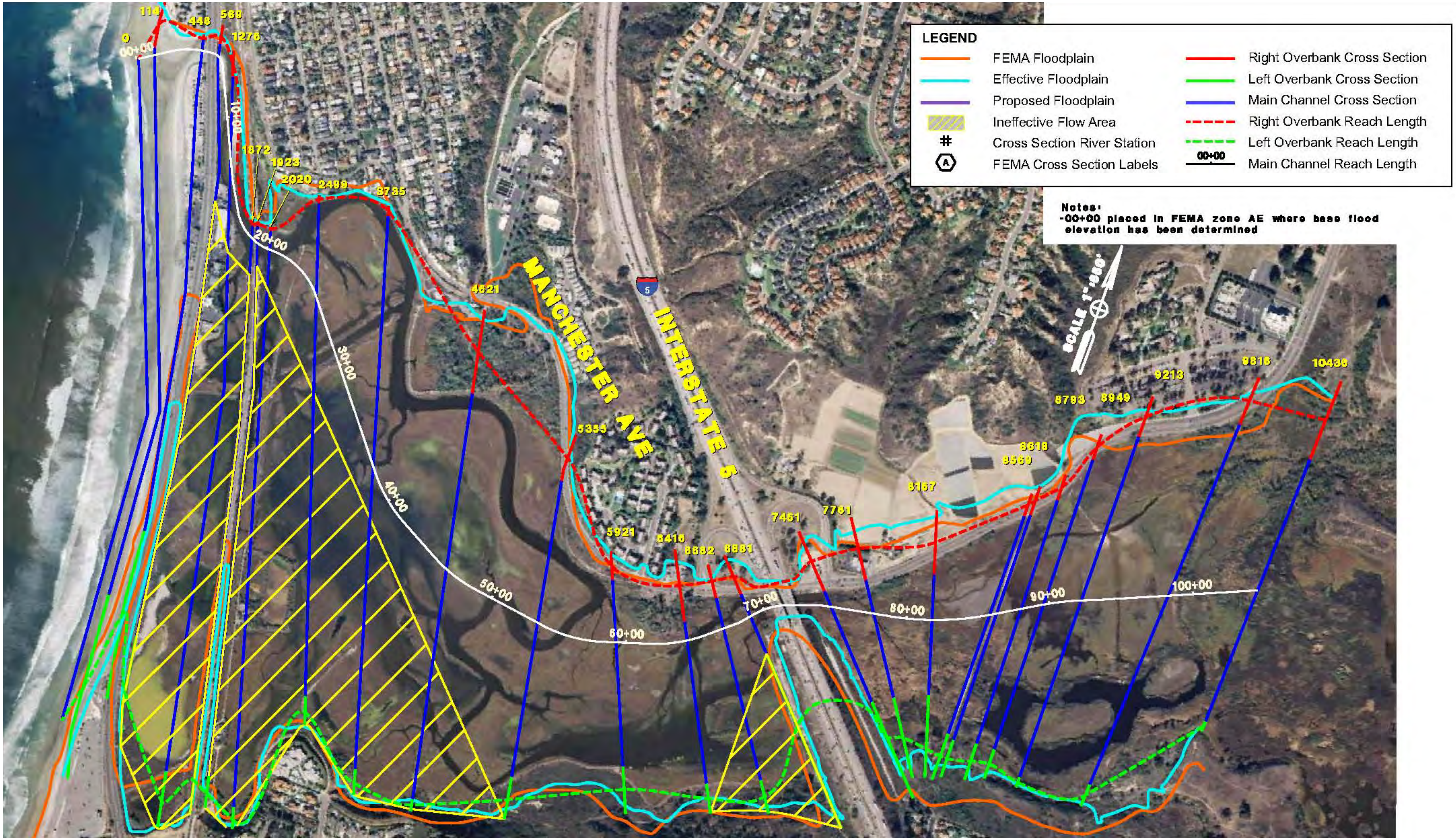
Source: Interstate 5 North Coast Floodplain Studies, Books 1, 2, and 3, February 2008 and February 2009

Figure 3-9.3: Carmel Valley Creek Floodplain within the Project Area



Source: Interstate 5 North Coast Floodplain Studies, Books 1, 2, and 3, February 2008 and February 2009

Figure 3-9.4: San Dieguito River Floodplain within the Project Area

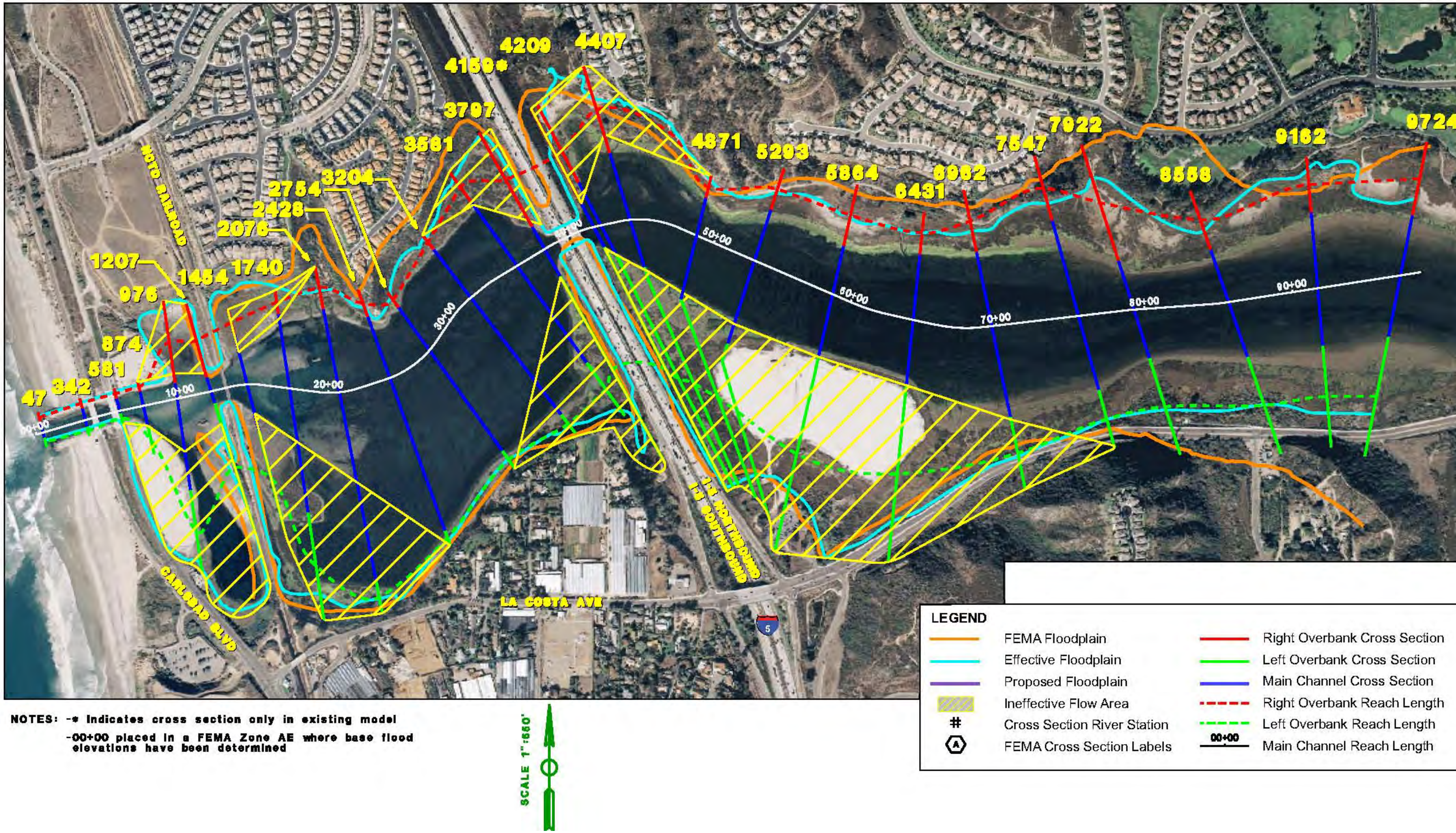


Source: Interstate 5 North Coast Floodplain Studies, Books 1, 2, and 3, February 2008 and February 2009

Figure 3-9.5: San Elijo Lagoon Floodplain within the Project Area

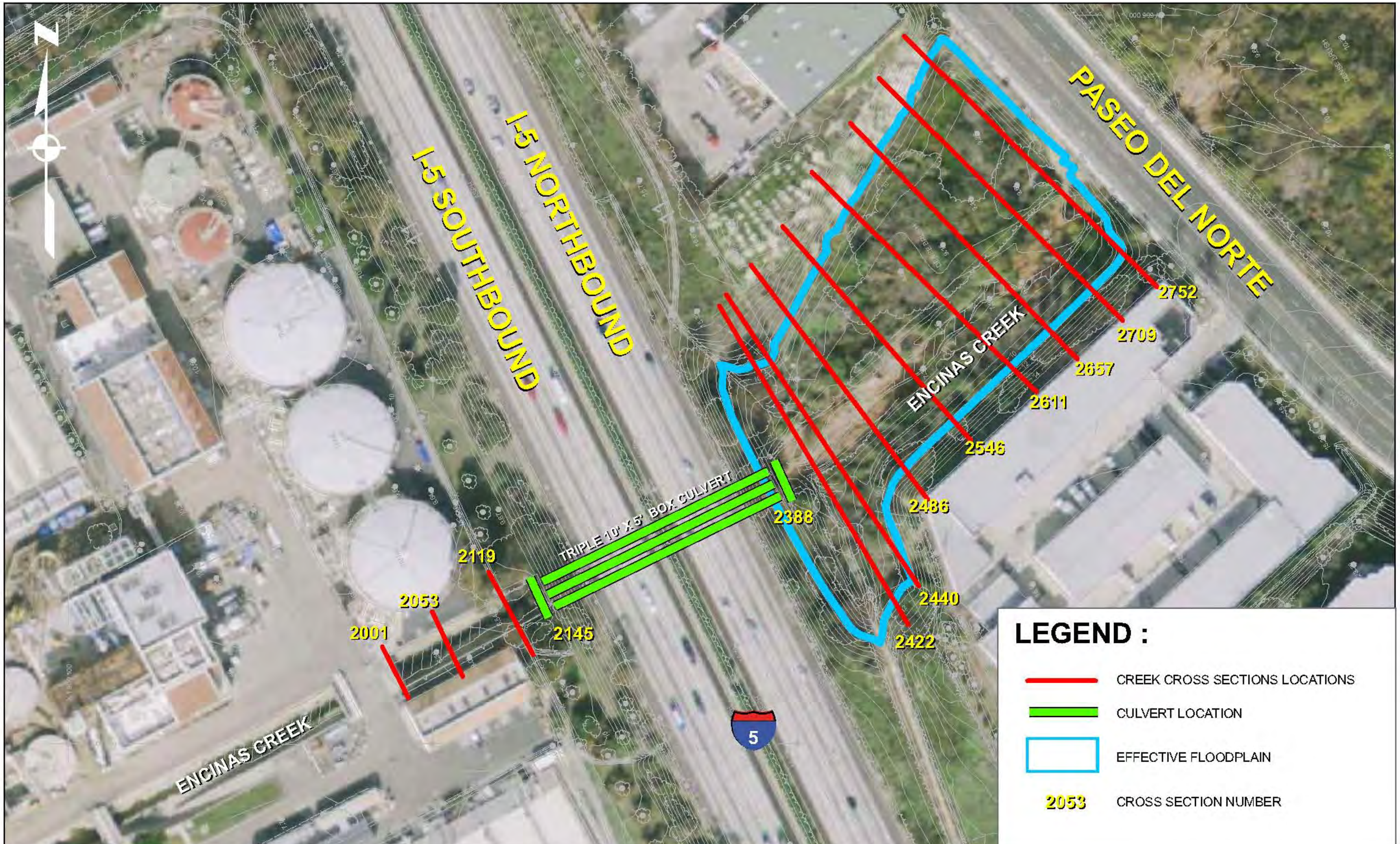
Source: Interstate 5 North Coast Floodplain Studies, Books 1, 2, and 3, February 2008 and February 2009

Figure 3-9.6: Cottonwood Creek Floodplain within the Project Area



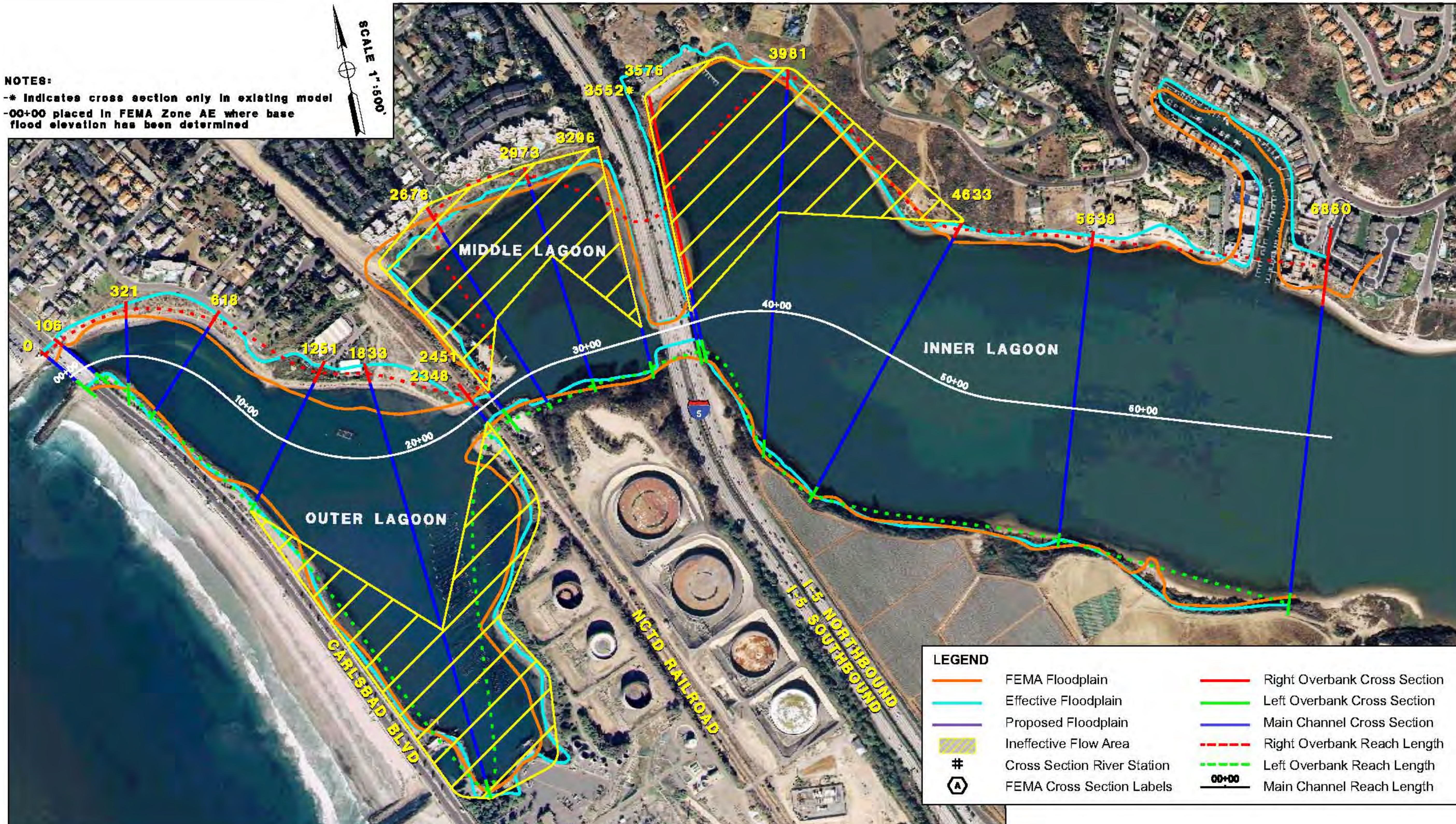
Source: Interstate 5 North Coast Floodplain Studies, Books 1, 2, and 3, February 2008 and February 2009

Figure 3-9.7: Batiquitos Lagoon Floodplain within the Project Area



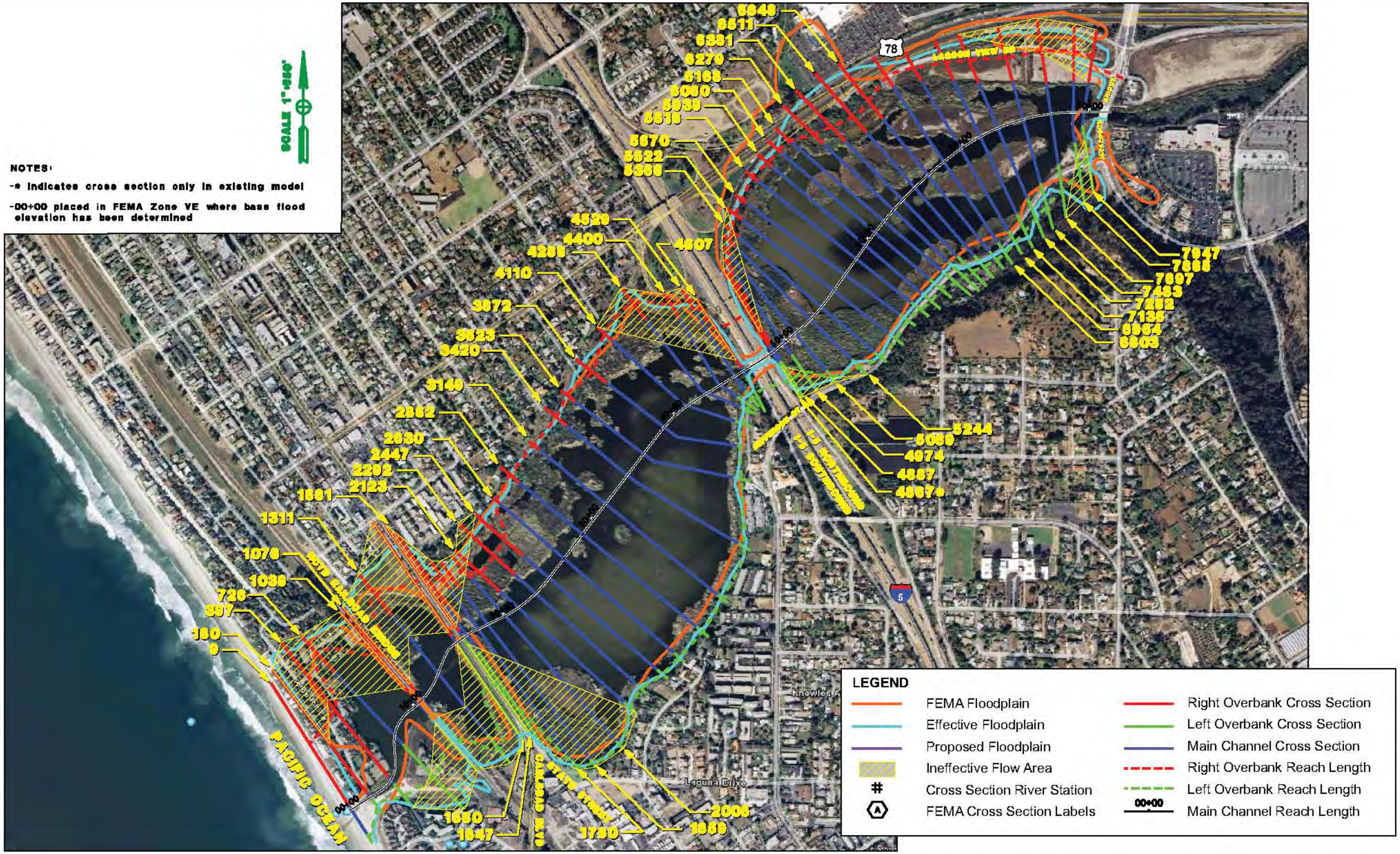
Source: Interstate 5 North Coast Floodplain Studies, Books 1, 2, and 3, February 2008 and February 2009

Figure 3-9.8: Encinas Creek Floodplain within the Project Area



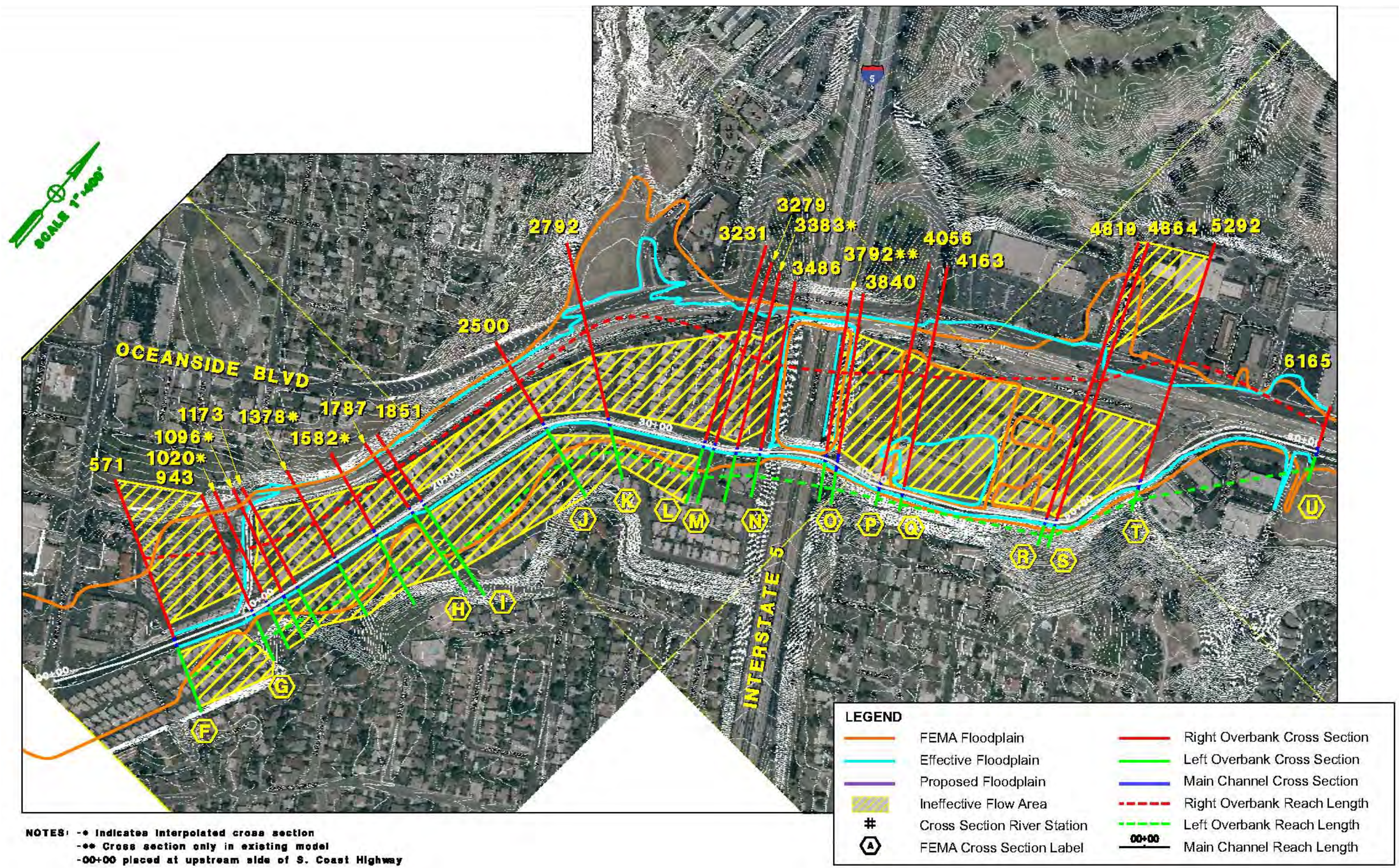
Source: Interstate 5 North Coast Floodplain Studies, Books 1, 2, and 3, February 2008 and February 2009

Figure 3-9.9: Agua Hedionda Lagoon Floodplain within the Project Area



Source: Interstate 5 North Coast Floodplain Studies, Books 1, 2, and 3, February 2008 and February 2009

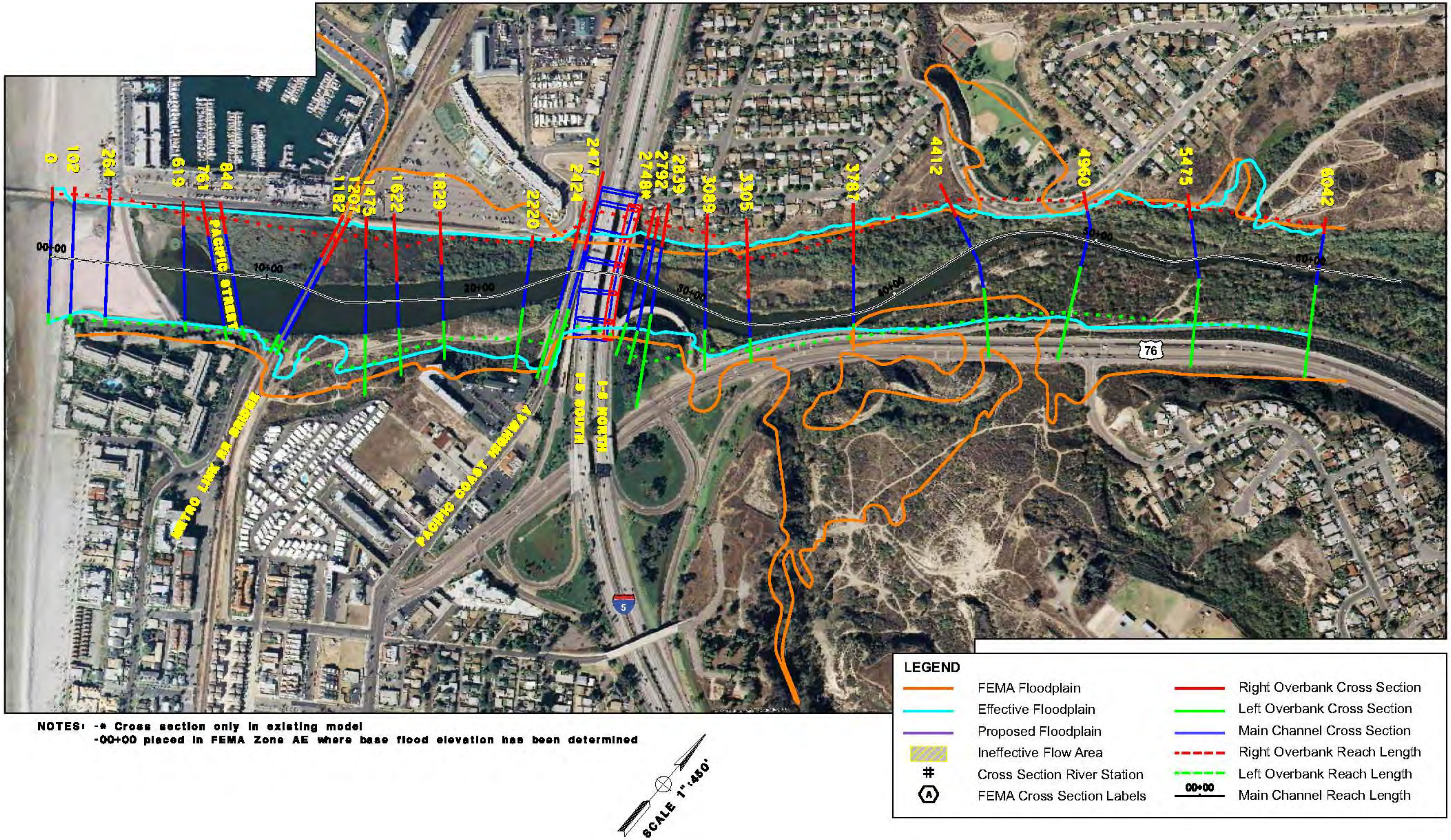
Figure 3-9.10: Buena Vista Lagoon Floodplain within the Project Area



NOTES: -* Indicates interpolated cross section
-** Cross section only in existing model
-00+00 placed at upstream side of S. Coast Highway

Source: Interstate 5 North Coast Floodplain Studies, Books 1, 2, and 3, February 2008 and February 2009

Figure 3-9.11: Loma Alta Creek Floodplain within the Project Area



Source: Interstate 5 North Coast Floodplain Studies, Books 1, 2, and 3, February 2008 and February 2009

Figure 3-9.12: San Luis Rey River Floodplain within the Project Area

3.10 Water Quality and Storm Water Runoff

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

The information presented in this section is based on the July 2009 Water Quality Report (WQR) prepared for the project. A Technical Memorandum (August 2013) was prepared to update regulatory permits and storm water information related to the LPA.

3.10.1 Regulatory Setting

Federal Requirements: Clean Water Act

In 1972 Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the United States (U.S.), from any point source unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. Known today as the Clean Water Act (CWA), Congress has amended it several times. In the 1987 amendments, Congress directed dischargers of storm water from municipal and industrial/construction point sources to comply with the NPDES permit scheme. Important CWA sections are:

- Sections 303 and 304 require states to promulgate water quality standards, criteria, and guidelines.

- Section 401 requires an applicant for a federal license or permit to conduct any activity, which may result in a discharge to waters of the U.S., to obtain certification from the State that the discharge will comply with other provisions of the act. This is most frequently required in tandem with a Section 404 permit request (see below).

- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. Regional Water Quality Control Boards (RWQCBs) administer this permitting program in California. Section 402(p) requires permits for discharges of storm water from industrial/construction and municipal separate storm sewer systems (MS4s).

- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers (USACE).

The objective of the CWA is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”

USACE issues two types of 404 permits: Standard and General permits. There are two types of General permits: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to authorize a variety of minor project activities with no more than minimal effects.

There are two types of Standard permits: Individual permits and Letters of Permission. Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of USACE's Standard permits. For Standard permits, the USACE decision to approve is based on compliance with U.S. Environmental Protection Agency (USEPA) Section 404 (b)(1) Guidelines (USEPA CFR 40 Part 230), and whether permit approval is in the public interest. The Section 404(b)(1) Guidelines (Guidelines) were developed by the USEPA in conjunction with USACE, and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative which would have less adverse effects. The Guidelines state that USACE may not issue a permit if there is a Least Environmentally Damaging Practicable Alternative (LEDPA), to the proposed discharge that would have lesser effects on Waters of the U.S., and not have any other significant adverse environmental consequences. According to the Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures has been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the U.S. In addition, every permit from the USACE, even if not subject to the Section 404(b)(1) Guidelines, must meet general requirements. See 33 CFR 320.4. A discussion of the LEDPA determination is included in Section *3.18, Wetlands and Other Waters*.

State Requirements: Porter-Cologne Water Quality Control Act

California's Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This Act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the State. It predates the CWA and regulates discharges to waters of the State. Waters of the State include more than just waters of the U.S., like groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of "waste" as defined and this definition is broader than the CWA definition of "pollutant". Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA, and for regulating discharges to ensure compliance with the water quality standards. Details regarding water quality standards in a project area are contained in the applicable RWQCB Basin Plan (Basin Plan). In California, Regional Boards designate beneficial uses for all water body segments in their jurisdictions, and then set criteria necessary to protect these uses. Consequently, the water quality standards developed for particular water segments are based on the designated uses and vary depending on such uses. In addition, the SWRCB identifies waters failing to meet standards for specific pollutants, which are then State-listed in accordance with CWA Section 303(d). If a State determines that waters are impaired for one or more constituents and the standards cannot be met through point source or non-point source controls (NPDES permits or WDRs), the CWA requires the establishment of Total Maximum Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

State Water Resources Control Board and Regional Water Quality Control Boards

The SWRCB administers water rights, sets water pollution control policy, issues water board orders on matters of Statewide application, and oversees water quality functions throughout the State by approving Basin Plans, TMDLs, and NPDES permits. RWCQBs are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

National Pollutant Discharge Elimination System (NPDES) Program

Municipal Separate Storm Sewer Systems (MS4)

Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of storm water discharges, including Municipal Separate Storm Sewer Systems (MS4s). The USEPA defines an MS4 as "any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, country, or other public body having jurisdiction over storm water, that are designed or used for collecting or conveying storm water." The SWRCB has identified Caltrans as an owner/operator of an MS4 pursuant to federal regulations.

Caltrans MS4 Program

The SWRCB adopted the Caltrans Statewide NPDES Permit (Order No. 99-06-DWQ) on July 15, 1999. This permit covers all Caltrans rights-of-way, properties, facilities, and activities in the State. NPDES permits establish a five-year permitting time frame. NPDES permit requirements remain active until a new permit has been adopted.

On September 19, 2012, the State Water Board adopted a Statewide permit (Order No. 2012-0011-DWQ) which regulates all storm water and certain non-storm water discharges from Caltrans' MS4. This includes all State highways, rights-of-way, facilities, and construction activities. This Order supersedes Order No. 99-06-DWQ upon its effective date of July 1, 2013.

In compliance with the permit, Caltrans developed the Statewide Storm Water Management Plan (SWMP) to address storm water pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP describes the minimum procedures and practices Caltrans uses to reduce pollutants in storm water and non-storm water discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs. The proposed project would be programmed to follow the guidelines and procedures outlined in the 2003 SWMP to address storm water runoff or any subsequently approved version of the SWMP. The SWMP is under revision to comply with the new requirements of the latest NPDES Permit.

Construction General Permit

Construction General Permit (Order No. 2009-009-DWQ), adopted on September 2, 2009, became effective on July 1, 2010. The permit regulates storm water discharges from construction sites that result in a disturbed soil area (DSA) of 1 ac or greater and/or are part of a common plan of development. By law, all storm water discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance of at least 1 ac must comply with the provisions of the Construction General Permit. Construction activity that results in soil disturbances of less than 1 ac is subject to this Construction General Permit if there is potential for significant water quality impairment resulting from the activity as determined by the

RWQCB. Operators of regulated construction sites are required to develop storm water pollution prevention plans; to implement sediment, erosion, and pollution prevention control measures; and to obtain coverage under the Construction General Permit.

The 2009 Construction General Permit separates projects into Risk Levels 1 – 3. Risk levels are determined during the planning and design phases, and are based on potential erosion and transport to receiving waters. Requirements apply according to the Risk Level determined. For example, a Risk Level 3 (highest risk) project would require compulsory storm water runoff pH and turbidity monitoring, as well as pre- and post-construction aquatic biological assessments during specified seasonal windows. For all projects subject to the permit, applicants are required to develop and implement an effective Storm Water Pollution Prevention Plan (SWPPP).

<u>Section 401 Permitting</u>

Under Section 401 of the CWA, any project requiring a federal license or permit that may result in a discharge to a water of the U.S. must obtain a 401 Certification, which certifies that the project will be in compliance with State water quality standards. The most common federal permits triggering 401 Certification are CWA Section 404 permits issued by USACE. The 401 permit certifications are obtained from the appropriate RWQCB, dependent on the project location, and are required before USACE issues a 404 permit.

In some cases the RWQCB may have specific concerns with discharges associated with a project. As a result, the RWQCB may issue a set of requirements known as WDRs under the State Water Code (Porter-Cologne Act) that define activities, such as the inclusion of specific features, effluent limitations, monitoring, and plan submittals, that are to be implemented for protecting or benefiting water quality. WDRs can be issued to address both permanent and temporary discharges of a project.

3.10.2 Affected Environment

The water quality analysis is based on the July 2009 WQR, a separate technical study prepared for this project. A Technical Memorandum was prepared in August 2013 to supplement the 2009 WQR.

The project area parallels the coastline throughout much of San Diego County, and is entirely within the coastal region of the San Diego Basin. The project corridor traverses surface streams and floodplains, along with lagoons, mesas, small canyons, and arroyos in a series of through-cuts and fill embankments (*Figure 3-10.1*). The climate in this coastal plain is characterized as generally mild and typically has warm, dry summers, and cool, wet winters. The average mean temperature in the coastal region ranges from a high of 71 degrees Fahrenheit (ºF) to a low of 56ºF (SANDAG Geographic Information Systems [GIS] 2005). The annual precipitation along the project corridor averages from 12 to 13 in. The vast majority of rainfall occurs between November and March, with most of the annual precipitation falling during a relatively small number of storms. Rainfall patterns are subject to extreme variations from year to year with periodic long-term wet and dry cycles.

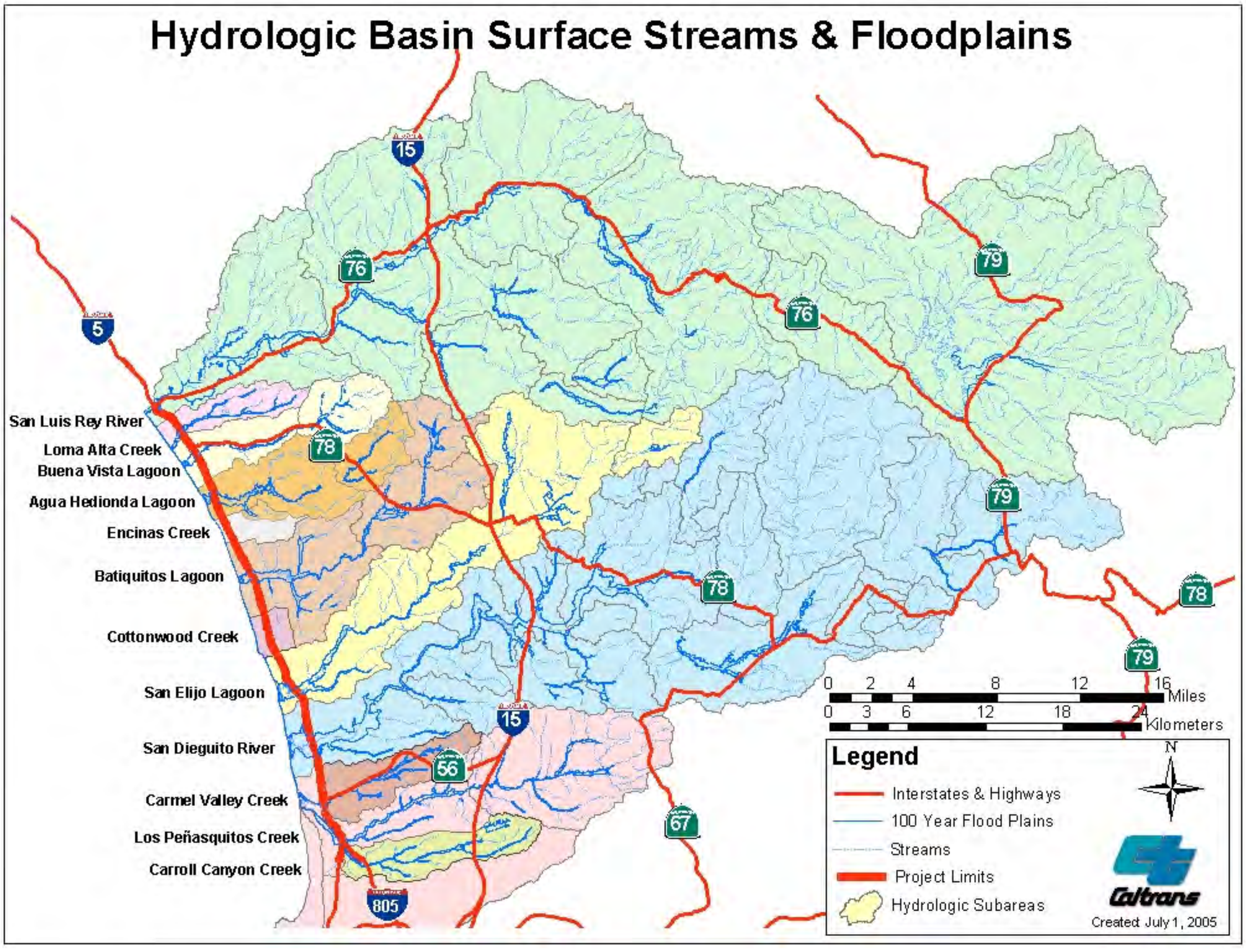


Figure 3-10.1: Surface Streams and Floodplains within the Project Limits

3.10.2.1 Hydrologic Units

The project limits cross 5 of the 11 hydrologic units (HUs) within the San Diego RWQCB Basin, including the Santa Margarita, San Luis Rey, Carlsbad, San Dieguito, and Los Peñasquitos HUs (*Figure 3-10.2*). The San Diego RWQCB Region encompasses most of San Diego County, as well as portions of southwestern Riverside County and southwestern Orange County. The region is divided into 11 major HUs, 54 hydrologic areas (HAs), and 147 hydrologic subareas (HSAs). HUs typically encompass the entire watershed of one or more streams; HAs are major tributaries and/or major groundwater basins within the HU; and HSAs are major subdivisions of the HAs and include both water bearing and non-water bearing formations (San Diego Basin Plan 1994).

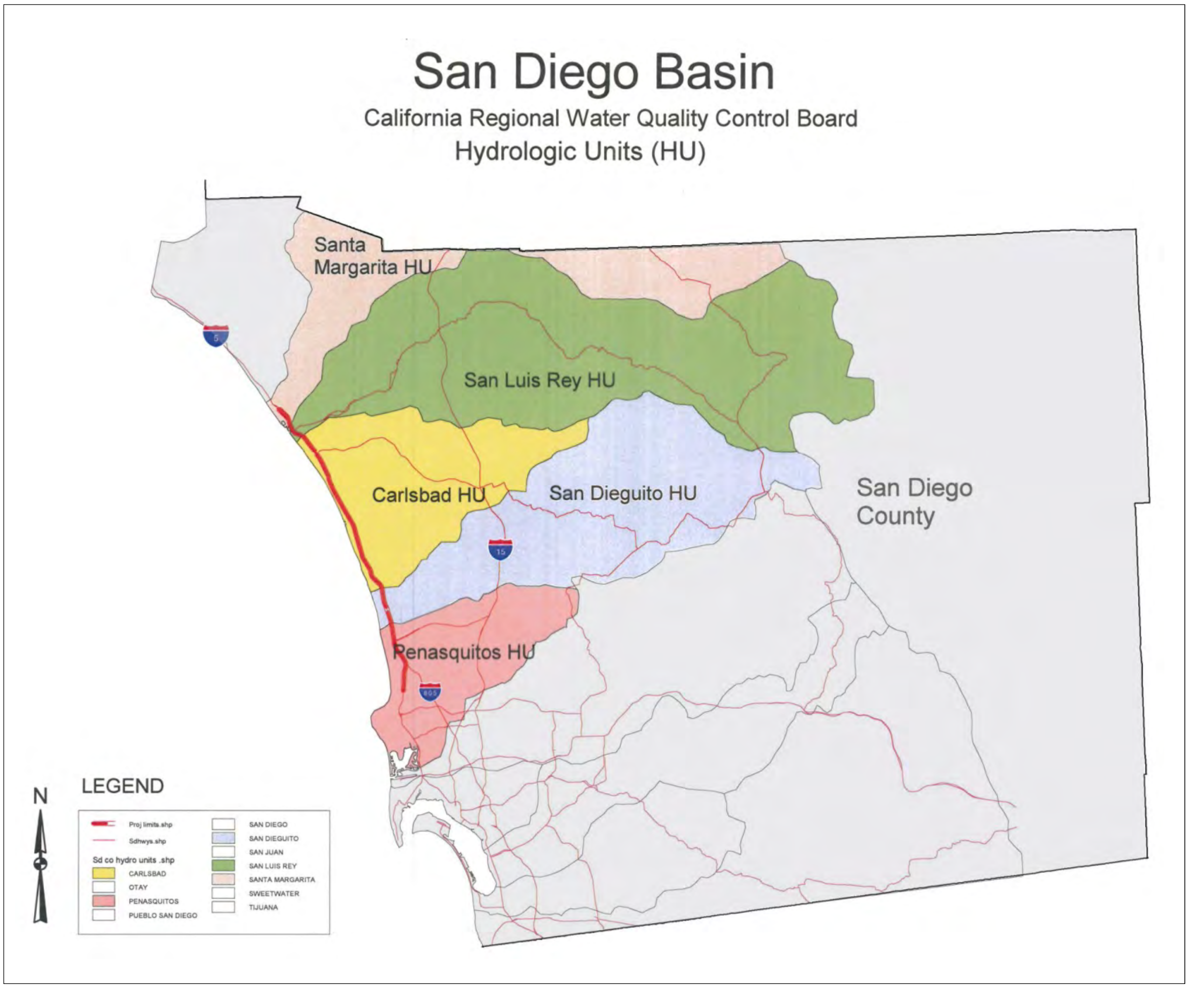


Figure 3-10.2: Hydrologic Units within the I-5 NCC Project

Santa Margarita (902.00)

The Santa Margarita River watershed encompasses approximately 750 square mi in northern San Diego and southwestern Riverside counties. The watershed contains a variety of nearly intact habitats; including chaparral-covered hillsides, riparian woodlands, and coastal marshes. Of the total watershed area, approximately 27 percent is within San Diego County. The Santa Margarita River is formed near the City of Temecula in Riverside County at the confluence of the Temecula and Murrieta Creek systems. Once formed, the majority of the Santa Margarita River main stem flows within San Diego County through unincorporated areas, the community of Fallbrook, and the Marine Corps Base Camp Pendleton.

San Luis Rey Hydrologic Unit (903.00)

The San Luis Rey is the second largest of the HUs within the project limits at approximately 562 square mi, and is one of the least developed. It is expected to increase in the amount of developed land from approximately 16 percent of the total basin currently to 23 percent by 2015. The entire basin is drained by the San Luis Rey River and crosses under I-5 north of the SR-76 Interchange. The Lake Henshaw Reservoir intercepts approximately 37 percent of the uppermost basin watershed and has a storage capacity of over 51,000 ac-ft.

Carlsbad Hydrologic Unit (904.00)

The Carlsbad HU includes approximately 212 square mi and is expected to continue developing from the current level of 56 percent of the watershed to an estimated 70 percent by the year 2015. This HU is comprised of seven sub-basins that cross under I-5. These sub-basins include San Elijo Lagoon (Escondido Creek), Cottonwood Creek, Batiquitos Lagoon (San Marcos Creek), Encinas Creek, Agua Hedionda Lagoon (Agua Hedionda Creek), Buena Vista Lagoon (Buena Vista Creek), and Loma Alta Creek. The freeway bisects four lagoons in this HU; San Elijo Lagoon south of Manchester Avenue, Batiquitos Lagoon north of La Costa Avenue, Agua Hedionda south of Tamarack Avenue, and Buena Vista Lagoon south of the I-5 / SR-78 Interchange. All four of the lagoon crossings, as well as Loma Alta Creek, are bridge structures. Cottonwood Creek crosses under the freeway in a 10-ft concrete arch culvert south of Encinitas Boulevard, and Encinas Creek crosses the corridor in a 10-ft x 5-ft concrete triple box culvert south of Palomar Airport Road.

San Dieguito Hydrologic Unit (905.00)

The entire 346 square mi that comprise the San Dieguito HU drain into the San Dieguito River, which crosses under the I-5 bridge south of Via de la Valle. This HU is expected to increase in developed area from the current level of approximately 26 percent to 38 percent by 2015.

Los Peñasquitos Hydrologic Unit (906.00)

The *I-5 NCC Project* begins near the middle of the Los Peñasquitos HU and crosses Carroll Canyon Creek just south of the I-5 / I-805 Interchange, Los Peñasquitos Creek at the I-5 / I-805 Interchange, and Carmel Valley Creek near the I-5 / SR-56 Interchange. All of these I-5 crossings are bridge structures, although Carmel Valley Creek currently drains through a 12-ft x 10-ft concrete triple box culvert under Sorrento Valley Road immediately downstream of the bridge. Approximately 89 of the 162 square mi that make up the Los Peñasquitos HU drain through the project limits. The developed area in this HU is expected to increase from the current estimate of 58 percent to 66 percent of the total watershed by the year 2015.

3.10.2.2 Existing Water Quality

To evaluate existing water quality, Caltrans has conducted runoff monitoring and characterization studies from various transportation facilities throughout the State of California. This monitoring has various objectives, including ensuring compliance with NPDES permit requirements, producing scientifically credible runoff data from various Caltrans facilities, and providing information that can assist in developing effective storm water management strategies. The following Monitoring and Characterization Studies to analyze the pollutants coming off Caltrans facilities and operations are listed below:

- First Flush Phenomenon Characterization Report, August 2005
- Monitoring & Research Program Annual Data Summary Report, February 2008
- 2002-2003 Annual Data Summary Report, August 2003
- Discharge Characterization Study Report, November 2003
- A Review of Contaminants and Toxicity Associated with Particles in Stormwater Runoff, 2003
- Caltrans Construction Site Runoff Characterization Study, September 2002

These studies, which can be found at http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/index.htm#monitoring, indicate that water quality can be influenced by various factors such as:

- Traffic volume – The higher the traffic volume, the higher the pollutant concentration.
- Total event rainfall – As total event rainfall increases, pollutant concentration decreases.
- Seasonal cumulative rainfall – As cumulative rainfall increases, pollutant concentration decreases.
- Maximum rainfall intensity – The larger the drainage area, the lower the pollutant concentration.
- Antecedent dry periods – The longer the dry period, the higher the pollutant concentration.
- Drainage Areas – The larger the drainage area, pollutants for highways decrease.
- Impervious Fraction of Drainage Area – The weakest and most non-consistent effect showed that an increase in impervious areas tends to increase the concentration of some pollutants and decrease the concentration of others.

3.10.2.3 Beneficial Uses

As defined in the Basin Plan, "Beneficial Uses" are the uses of water necessary for the survival or well-being of man, plants, and wildlife. These uses promote the tangible and intangible economic, social, and environmental goals of mankind. There are three types of water bodies in the study area: inland surface waters, coastal waters, and ground waters.

According to the Basin Plan, to establish existing beneficial uses, one would have to demonstrate that fishing, swimming, or other uses have actually occurred since November 28, 1975, or that the water quality and quantity is suitable to allow the uses to be attained.

The "Potential" designation is established for a variety of reasons, including: (1) plans that are proposed to put the water to a future use; (2) potential exists to put the water to a future use; (3) the public desires to put the water to future use; (4) the water is potentially suitable for municipal or domestic water supply under the terms of the *Sources of Drinking Water* Policy (State Board Resolution No. 88-63); and (5) the Regional Board has designated a beneficial use as a regional water quality goal.

In addition, some water bodies have been exempted by the Regional Board from the municipal use designation under the terms and conditions of State Board Resolution No. 88-63, Sources of Drinking Water Policy.

Table 3.10.1 defines the existing and potential beneficial uses as outlined in the Basin Plan for water bodies within the project limits.

Table 3.10.1: Beneficial Use Definitions

Beneficial Use Definitions		
MUN	Municipal and Domestic Supply	Includes uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
AGR	Agricultural Supply	Includes uses of water for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
PROC	Industrial Process	Includes uses of water for industrial activities that depend primarily on water quality.
IND	Industrial Services Supply	Includes uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.
GWR	Ground Water Recharge	Includes uses of water for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
FRSH	Freshwater Replenishment	Includes uses of water for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).
NAV	Navigation	Includes uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.
POW	Hydropower Generation	Includes uses of water for hydropower generation.
REC1	Contact Recreation	Includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, white water activities, fishing, or use of natural hot springs.
REC2	Non-Contact Recreation	Includes the uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
COMM	Commercial and Sport Fishing	Includes the uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.
AQUA	Aquaculture	Includes the uses of water for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, or harvesting of aquatic plants and animals for human consumption or bait purposes.
WARM	Warm Freshwater Habitat	Includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.
COLD	Cold Freshwater Habitat	Includes uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.
SAL	Inland Saline Water Habitat	Includes uses of water that support inland saline water ecosystems including, but not limited to, preservation or enhancement of aquatic saline habitats, vegetation, fish, or wildlife, including invertebrates.
EST	Estuarine Habitat	Includes uses of water that support estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds).

Table 3.10.1 (cont.): Beneficial Use Definitions

Beneficial Use Definitions		
MAR	Marine Habitat	Includes uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).
WILD	Wildlife Habitat	Includes uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
BIOL	Preservation of Biological Habitats of Special Significance	Includes uses of water that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves, or Areas of Special Biological Significance (ASBS), where the preservation or enhancement of natural resources requires special protection.
RARE	Rare, Threatened and Endangered Species	Includes uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under State or federal law as rare, threatened, or endangered.
SPWN	Spawning, Reproduction, and/or Early Development	Includes uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish. This use is applicable only for the protection of anadromous fish.
SHELL	Shellfish Harvesting	Includes uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters and mussels) for human consumption, commercial, or sport purposes.

The existing and potential beneficial uses for the water bodies within the project limits are included in *Tables 3.10.2, 3.10.3,* and *3.10.4.* These tables list the beneficial uses for inland surface waters, coastal waters, and ground waters respectively.

Table 3.10.2: Beneficial Uses for Inland Surface Waters

Water Body Name	Hydrologic Subarea	MUN	AGR	IND	PROC	GWR	FRSH	POW	REC1	REC2	BIOL	WARM	COLD	WILD	RARE	SPWN
Carmel Valley	906.10	*	+	+					x	+		+		+		
Soledad Canyon Creek	906.10	*	+	+					x	+		+	+	+		
Carroll Canyon	906.10	*	+	+					x	+		+	+	+	+	
Los Peñasquitos Creek	906.10	*	+	+					x	+	+	+		+		
San Dieguito River	905.11	*	x	x					+	+		+	+	+		+
Canyon del Las Encinitas	904.40	*							x	+		+		+		
Loma Alta Creek	904.10	*							x	+		+		+		
San Luis Rey River	903.11	*	+	+				+	+			+		+	+	

* Excepted from Municipal
\+ Existing Beneficial Use
X Potential Beneficial Use

Table 3.10.3: Beneficial Uses for Coastal Surface Waters

Water Body Name	Hydrologic Subarea	IND	NAV	REC1	REC2	COMM	BIOL	EST	WILD	RARE	MAR	AQUA	MIGR	SPWN	WARM	SHELL
Los Peñasquitos Lagoon	906.10			+	+		+	+	+	+	+		+	+		+
San Dieguito Lagoon	905.11			+	+		+	+	+	+	+		+	+		
Batiquitos Lagoon	904.51			+	+		+	+	+	+	+		+	+		
San Elijo Lagoon	904.61			+	+		+	+	+	+	+		+	+		
Agua Hedionda Lagoon	904.31	+		+	+	+	+	+	+	+	+	+	+	+		+
Buena Vista Lagoon	904.21			+	+		+	x	+	+	+				+	
Loma Alta Slough	904.10			+	+			+	+	+	+					
Mouth of San Luis Rey River	903.11			+	+				+	+	+		+			
Oceanside Harbor	NA	+	+	+	+	+			+	+	+		+	+		+

* Excepted from Municipal
\+ Existing Beneficial Use
x Potential Beneficial Use
NA Not applicable

Table 3.10.4: Beneficial Uses for Ground Waters

Water Body Name	Hydrologic Unit	MUN	AGR	IND	PROC	GWR	FRSH	GWR
Encinas Creek	904.40	*						
Lower San Luis[1]	903.10	+	+	+				

* Excepted from Municipal
\+ Existing Beneficial Use
x Potential Beneficial Use
[1] These beneficial uses do not apply westerly of the right-of-way of I-5 and this area is excepted from the sources of drinking water policy.

3.10.2.4 Section 303(d) of the Clean Water Act and Caltrans Targeted Design Constituents

The CWA requires states to identify and make a list of surface water bodies that do not meet water quality standards, also referred to as "water quality limited segments," even after discharges of wastes from point sources have been treated by the minimum required levels of pollution control technology. States are required to compile these water bodies into a list, referred to as the "Clean Water Act Section 303(d) List of Water Quality Limited Segments."

The Caltrans runoff characterization studies identify pollutants that are discharging with a load or a concentration that commonly exceeds allowable standards, and which are considered treatable by Caltrans-approved "treatment" BMPs. These pollutants are referred to as Targeted Design Constituents (TDCs), and include sediment, metals (total and dissolved zinc, lead and copper), nitrogen, phosphorus, and general metals. *Table 3.10.5* identifies the 303(d) receiving water bodies within the project limits and the associated TDCs.

Table 3.10.5: Project Area CWA Section 303(d) List of Water Quality Limited Segments and TDCs

Hydrologic Area	Water Body Name	HA/ HSA	Size	Pollutant	Caltrans TDC
Peñasquitos	Soledad Canyon	906.10	2 mi	Selenium, Sediment Toxicity	NA
	Los Peñasquitos Creek	906.10	12 mi	Total Dissolved Solids, Selenium, Toxicity, Total Nitrogen as N, Fecal Coliform, Enterococcus	Sediment, Nitrogen
	Los Peñasquitos Lagoon	906.10	469 ac	Sedimentation/Siltation	Sediment
	Rose Creek	906.4	13 mi	Selenium, Toxicity	NA
San Dieguito	San Dieguito River	905.11	19 mi	Total Dissolved Solids, Toxicity, Nitrogen, Fecal Coliform, Enterococcus, Phosphorus	Sediment, Nitrogen Phosphorus
Carlsbad	Loma Alta Creek	904.10	8 mi	Selenium, Toxicity	NA
	Buena Vista Creek	904.210	11 mi	Selenium, Sediment Toxicity	NA
	Buena Vista Lagoon	904.21	202 ac	Indicator Bacteria, Nutrients, Sedimentation/Siltation	Sediment, Nutrients (N and P)
	Agua Hedionda Creek	904.31	7 mi	Total Dissolved Solids, Selenium, Toxicity, Total Nitrogen as N, Fecal Coliform, Enterococcus, Phosphorus, Manganese	Sediment, Nitrogen Phosphorus
	Cottonwood Creek	904.51	2 mi	Sediment Toxicity, Selenium, DDT	NA
	Encinitas Creek	904.51	3 mi	Toxicity, Selenium	NA
	San Marcos Creek	904.51	19 mi	Selenium, Sediment Toxicity, Phosphorus, DDE	Phosphorus
	San Elijo Lagoon	904.61	566 ac	Sedimentation/Siltation, Indicator Bacteria, Eutrophic	Sediment
	Escondido Creek	904.62	26 mi	Total Dissolved Solids, Selenium, Toxicity, Total Nitrogen as N, Fecal Coliform, Enterococcus, DDT Phosphate, Sulfates, Manganese	Sediment, Nitrogen Phosphorus
San Luis Rey	San Luis Rey River, Lower (west of I-15)	903.11	19 mi	Chloride, Fecal Coliform, Phosphorus, Total Dissolved Solids, Total Nitrogen as N, Toxicity, Enterococcus	Phosphorus, Nitrogen
	Pacific Ocean Shoreline, at San Luis Rey River mouth		0 mi	Enterococcus, Total Coliform	NA
Santa Margarita	Oceanside Harbor	902.11	52 ac	Copper	Copper

Source: http://www.waterboards.ca.gov/sandiego/water_issues/programs/303d_list/index.shtml

NA = Not Applicable (Not determined to be a constituent found within Caltrans' storm water runoff monitoring program)

3.10.2.5 Total Maximum Daily Loads

Section 303(d) of the Federal Clean Water Act requires states to develop TMDLs for 303(d) listed water bodies and establish the TMDL process to guide application of State standards to individual water bodies/watersheds. According to the San Diego RWQCB website "A TMDL is a quantitative assessment of water quality problems, contributing sources, and load reductions or control actions needed to restore and protect bodies of water. The TMDL approach does not replace existing water pollution control programs. It provides a framework for evaluating pollution control efforts and for coordination between federal, State, and local efforts to meet water quality standards."

Within the project limits, Caltrans is a stakeholder in the TMDLs for Impaired Lagoons, Adjacent Beaches, and Agua Hedionda Creek (Investigation Order R9-2006-0076). Caltrans partnered with the other stakeholders to conduct monitoring for the listed water bodies and currently Caltrans is working with the stakeholders, USEPA, and the San Diego RWQCB to develop TMDLs for Los Peñasquitos Lagoon. *Table 3.10.6* lists the water bodies addressed in this order and the responsible stakeholders. Only the water bodies within the project limits and listed in this TMDL are included.

Table 3.10.6: List of Water Bodies Addressed in TMDLs and Responsible Stakeholders

Water Body	HSA	Responsible Stakeholders	
		Municipalities and Military Facilities	**Counties, State Agencies, and other Facilities**
Santa Margarita Lagoon	902.11	Camp Pendleton	San Diego County
		Fallbrook Naval Weapons Station	Riverside County Flood Control and Water Conservation District
		Murrieta	Caltrans
		Temecula	
Loma Alta Slough and Ocean shoreline	904.10	Oceanside	San Diego County
		Vista	Caltrans
Buena Vista Lagoon and Ocean Shoreline	904.20	Carlsbad	San Diego County
		Oceanside	Caltrans
		Vista	
Agua Hedionda Lagoon and lower Agua Hedionda Creek	904.31	Carlsbad	San Diego County
		Oceanside	Caltrans
		San Marcos	
		Vista	
San Elijo Lagoon and Ocean Shoreline	904.61	Encinitas	San Diego County
		Escondido	Caltrans
		Solana Beach	City of Escondido Hale Avenue Resource Recovery Facility
		San Marcos	
Los Peñasquitos Lagoon	906.10	Del Mar	
		Poway	San Diego County
		San Diego	Caltrans

http://www.waterboards.ca.gov/sandiego/water_issues/programs/tmdls/lagoons_aguahediondacreek.shtml

3.10.2.6 Navigable Waterways

There are six waterways in the project area designated as "navigable" by the United States Coast Guard and the USACE under the Rivers and Harbors Appropriation Act of 1899. No individual Coast Guard permits would be needed for San Diego River, Los Peñasquitos Lagoon and River, San Dieguito Lagoon, San Elijo Lagoon, Batiquitos Lagoon, and Agua Hedionda Lagoon because these waterways are not navigated by anything larger than small motorboats; however, San Elijo Lagoon, San Dieguito Lagoon, Buena Vista Lagoon, and Batiquitos Lagoon are under consideration for permitting by the USACE. Permits may be required for work conducted at crossings of these waterways, although current conditions restrict vessel use in these waterways. These restrictions range from none to small vessels, such as, canoes and kayaks. Following is a brief description of the existing conditions regarding current use and navigability.

San Luis Rey River

The San Luis Rey River is located on the northern border of the City of Oceanside in the northwestern region of San Diego County. The headwaters are to the east in the Cleveland National Forest, near Palomar Mountain. Unlike most major rivers in southern California, the San Luis Rey River has undergone relatively little channelization. The only channelized segment of the river is located within the City of Oceanside. The San Luis Rey River Park Master Plan does not include vessel use, and there is currently little or no use of the river by any type of vessel.

The San Luis Rey River has had a beach berm for over 60 years, and has been breached by wave action and flood flows. There is a railroad bridge crossing the river to the west of the existing I-5 bridge. A jetty was built along the northern edge of the San Luis Rey River, which extends out into the Pacific Ocean. It was built when Oceanside Harbor was constructed in the 1960s. Pacific Street was built on the sand berm in the 1980s, with a culvert for the river outlet across the river. Pacific Street Bridge realigned the road and placed it on a bridge to allow for less road maintenance and more water flow from the San Luis Rey River to the ocean. The I-5 Bridge over the San Luis Rey River is approximately 0.5 mi from the ocean. The Coast Highway Bridge is immediately west of the I-5 bridge. The San Luis Rey River has not had a stable mouth to the ocean during recorded history, and there is currently little or no use of the river by any type of vessel. Immediately upstream of the I-5 bridge, vegetation is overgrown and the river is not navigable, with the possible exception of small craft such as kayaks or canoes.

Agua Hedionda Lagoon

Agua Hedionda Lagoon is located in the City of Carlsbad, and is approximately 35 mi north of the City of San Diego. Agua Hedionda Lagoon is a healthy, tidal body, with large wetlands supporting several endangered species located in the Carlsbad Creek Watershed. Currently, there are three structures crossing the lagoon between the coast line and the project area: the Carlsbad Boulevard Bridge, a railroad bridge, and the existing I-5 bridge.

The majority of the lagoon is owned and maintained by Cabrillo Power I LLC, owners of a 900-megawatt power plant located on the outer segment of the lagoon (i.e., the Encina Power Plant). Approximately 60 years ago, three lagoon basins were built in between the structures to provide retention basins for the cooling water required for operation of the Encina Power Plant. The entire 400-ac lagoon, created in 1954, was completely re-dredged in 1998 to an average depth of 8 to 11 ft, which promoted increased tidal flushing. An extensive eelgrass planting program was initiated after the dredging, resulting in additional marine nursery areas.

The western basin, bound by Pacific Coast Highway to the west and the railroad bridge to the east, provides cooling water to the power plant and additional uses, including a commercial shellfish farm, aquaculture, and a marine fish hatchery. Small power boats are used by the shellfish farm, and the lagoon is dredged as needed to keep the mouth open. The middle basin is between the railroad bridge and the I-5 bridge. The YMCA runs a summer camp in this area and uses kayaks for recreational activities. The eastern basin extends east of I-5 for approximately 1 mi before the vegetation forms dense habitat along the narrow channel of Agua Hedionda Creek. There is a small boat marina in the eastern basin, and Agua Hedionda Lagoon accommodates active use such as boating, water skiing, wake boarding, personal watercraft use, sailing, windsurfing, and fishing.

Even though there are small recreational vessels allowed in the basins, boats, canoes, and kayaks do not travel upstream, or under the bridges, due to historic hydrologic siltation, lack of open water due to aquatic plant species, and other human activity in the area.

San Elijo Lagoon

San Elijo Lagoon is a large shallow body with a main channel that is confined to the northern side of the lagoon. The mouth of the lagoon frequently closes due to sand infiltration, and there is a hardpan sill that prevents deep dredging of the mouth. The Pacific Coast Highway Bridge over San Elijo Lagoon is less than 200 ft from the Pacific Ocean. This bridge over the narrow channel also has a low clearance. The main channel then winds to the southeast, until it turns east and flows under a railroad bridge approximately 300 ft from the Pacific Coast Highway Bridge. The main channel then meanders along the northern edge of the lagoon until it flows under I-5 approximately 0.85 mi from the Pacific Ocean. Only small watercraft such as kayaks and canoes could navigate this lagoon. The mouth frequently closes and the channel is narrow and shallow at low tide. In addition, there is no place to launch a motorized vessel within this lagoon. The majority of the lagoon is an ecological reserve. In general, the lagoon is not open to any human water use.

San Dieguito Lagoon

San Dieguito Lagoon has a main channel and a number of large open water areas. The mouth of the lagoon is subject to closure by sand accumulation, and dredging is often required to open the mouth. Camino Del Mar crosses San Dieguito Lagoon approximately 350 ft from the Pacific Ocean. There is a railroad trestle approximately 750 ft farther upstream from the Pacific Coast Highway crossing. A third crossing of the main channel is located approximately 0.5 mi from the mouth of the lagoon. The I-5 bridge is approximately 1.3 mi from the mouth of the lagoon. Only small watercraft, such as kayaks and canoes, could navigate on the lagoon channel, although the only vessels observed within the lagoon are platforms used for sampling fish and invertebrates related to the large restoration project that began in 2007. Upstream of I-5, the San Dieguito River passes under a fifth bridge, El Camino Real.

Buena Vista Lagoon

Buena Vista Lagoon has a tidal weir located at its mouth that has been in place since 1948. A new concrete weir and reinforced channel were built in 1972 at the mouth, which restrict access from the Pacific Ocean by watercraft. Buena Vista Lagoon is primarily a freshwater lagoon. Carlsbad Boulevard crosses the lagoon approximately 500 ft east of the tidal weir, and the railroad crosses the lagoon less than 500 ft from the Carlsbad Boulevard Bridge. The I-5 bridge is over 0.8 mi from the tidal weir. The lagoon is a reserve and no vessels are allowed, except those used for scientific monitoring. Only kayaks and canoes could navigate the lagoon due to thick vegetation, low bridges, and shallow water in some areas.

Batiquitos Lagoon

Batiquitos Lagoon is the outlet for San Marcos and Encinitas Creeks. Prior to the 1990s, the mouth of the lagoon was unstable and closed intermittently by wave and sand action. A large restoration project was undertaken in the 1990s to restore tidal flushing and marine resources in the lagoon, as part of the mitigation for a Port of Los Angeles project. The restoration project constructed a new tidal inlet and bridge over Carlsbad Boulevard that is approximately 400 ft from the Pacific Ocean. A second railroad bridge crosses the lagoon over 700 ft farther east of the Carlsbad Boulevard Bridge. Several nesting islands for endangered birds were also constructed during those efforts, and the lagoon is an Ecological Reserve. The only authorized motorized vessels within the lagoon are dredges that remove sediment from the lagoon and small craft for scientific monitoring. Only small personal watercraft or small motorized boats can navigate through the noted bridges.

3.10.3 Environmental Consequences

The project has the potential to impact water quality during the construction phase, as well as during its operation. BMPs would be evaluated and implemented to address these impacts during the planning and design, construction, and operational phases.

Potential sources of pollutants from construction activities could be generated from construction materials and activities. Examples of pollutants generated from construction materials include vehicle fluids, asphaltic emulsions from paving activities, joint and curing compounds, concrete curing compounds, solvents and thinners, paint, sandblasting material, landscaping materials, treated lumber, portland cement concrete rubble, and general litter. Examples of construction activities that have the potential to contribute pollutants include clearing and grubbing, grading operations, soil import operations, sandblasting, landscaping, and utility excavation.

During operation, potential sources of pollutants found in highway runoff include sediment from natural erosion; nutrients (nitrogen and phosphorus) from tree leaves or other vegetation debris, mineralized organic matter in soil, fertilizer runoff, nitrite from automobile exhausts, atmospheric deposition, emulsifiers, and surfactants; pesticides; and metals (dissolved and particulate) from combustion products of fossil fuels, wearing of brake pads, and corrosion.

Table 3.10.7 lists the HAs and HSAs that would be potentially impacted by the proposed *I-5 NCC Project*. Each of the HAs and HSAs is compared to the area of existing Caltrans right-of-way within the *I-5 NCC Project* limits. The maximum Caltrans waterway or tributary area to any of the noted hydrologic designations is less than two percent.

Table 3.10.7: Existing I-5 Contribution to the Watershed within the Project Limits

Watershed	Hydrologic Area/Sub Area Name	HA/HSA Number	HA/HSA (Acres)	Existing I-5 Tributary Area* (Acres)	Existing I-5 Contribution to HA/HSA (%)
Peñasquitos	Miramar HA	906.40	25924	288	1.10
	Miramar Reservoir HA	906.10	32,594.8	332	1.02
San Dieguito	Rancho Santa Fe HSA	905.11	22,610.5	221	0.98
Carlsbad	San Elijo HSA	904.61	20,721.5	181	0.88
	Batiquitos HSA	904.51	17,819.4	330	1.85
	Encinas HA	904.40	2,991.4	47	1.56
	Los Monos HSA	904.31	11,904.4	95	0.8
	El Salto HSA	904.21	7,476.4	134	1.79
	Loma Alta HA	904.10	5,199.6	40	0.78
San Luis Rey	Mission HSA	903.11	29,930	114	0.38
Santa Margarita	Lower Ysidora HSA	902.11	6710	38	0.57

* Source: sangis/landuse/right_of_way.shp

Build Alternatives

The build alternatives would retrofit I-5 with "treatment" BMPs to the Maximum Extent Practicable (MEP). This would require analyzing the entirety of the I-5 North Coast Corridor from a water quality perspective in relation to the impaired receiving water bodies. This process would provide for a more comprehensive approach to analyze the hydrology of the entire project area for "treatment" BMP implementation, consequently assisting Caltrans in meeting the TMDL requirements to be set by the San Diego RWQCB in the near future. *Table 3.10.8* shows the difference of additional pavement areas between each of the build alternatives. The 10+4 Barrier alternative has the highest percentage of additional impervious area, followed by the 8+4 Barrier alternative; whereas the 8+4 Buffer alternative has the lowest percentage of additional impervious area, followed by the 10+4 Buffer alternative. Implementation of the refined 8+4 Buffer alternative (Preferred Alternative) would result in a total of 112 percent of equivalent new impervious areas being treated. Currently seven percent of existing impervious areas is being treated. The Preferred Alternative would result in a total of 27 percent of total impervious areas (existing and new) being treated.

To address potential short-term impacts of each of the build alternatives, all DSAs would be stabilized before the completion of construction with permanent landscaping and/or permanent erosion control.

Table 3.10.8: Comparison of Existing and Proposed Pavement Areas between the Build Alternatives

Alternatives	Existing Impervious Area (Acres)	Proposed Additional Impervious Area (Acres)	Total Impervious Areas (Acres)	Percentage of Additional Impervious Areas (%)
8+4 Barrier	669	266	935	40
8+4 Buffer	669	214	884	32
10+4 Barrier	669	262	931	39
10+4 Buffer	669	307	976	46

No negative impacts to the six designated "navigable" waterways are predicted with construction of the proposed project, with existing planned uses to be maintained. At some locations, navigability may be improved due to project design raising the existing structures above current elevations. This could result in better access in the respective waterways for existing and planned uses to continue.

No Build Alternative

This alternative would not construct the proposed *I-5 NCC Project*, but it would construct multiple projects along the I-5 corridor to address traffic congestion issues at various locations. Similar to the build alternatives, implementation of individual projects under this alternative would require implementing BMPs to address potential pollutants during the construction and operation of those projects.

The amount of disturbed soil area during construction for each project under this alternative has not been determined for comparison to the build alternatives, since some of the proposed projects are in the early planning stages and such information is not available at this time. Nevertheless, "treatment" BMPs would only be incorporated within those projects' construction limits. "Treatment" BMPs, which are discussed in more detail in *Section 3.10.4, Avoidance, Minimization, and/or Mitigation Measures*, are permanent measures to improve storm water quality during the operation of the highway after the completion of construction.

There would be a water quality improvement with the build alternative(s) over the No Build alternative because of the opportunity to implement "treatment" BMPs throughout the *I-5 NCC Project* limits. These BMPs would "treat" water to remove targeted design constituents from existing impervious areas (including pollutants generated by future traffic volumes). This treatment would not occur under No Build conditions.

3.10.4 Avoidance, Minimization, and/or Mitigation Measures

Please see *Section 3.18, Wetlands and Other Waters*, for a discussion of Section 404 of the CWA. This establishes a regulatory program that provides that discharge of dredged or fill material cannot be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. The Section 404 permit program is run by the USACE with oversight by the USEPA.

BMPs would be implemented to address potential water quality impacts during the planning and design, construction, and operational (maintenance) stages. The Statewide SWMP describes how Caltrans would comply with the provisions of the NPDES Permit (Order 99-06-DWQ). The SWMP describes the program that Caltrans would implement to reduce the discharge of pollutants to the storm water drainage systems that serve the highway and highway-related properties, facilities, and activities. The SWMP divides the BMPs into separate categories from the planning and design phase to the operational (maintenance) phase.

Short-term potential impacts to water quality during the construction phase are prevented/minimized through the use of construction site BMPs, while the long-term potential impacts during the facility operation and maintenance are prevented/minimized through the use of design pollution prevention (DPP) BMPs, "treatment" BMPs, and maintenance BMPs (*Table 3.10.9*).

Every Caltrans project is required to complete a Storm Water Data Report (SWDR), which summarizes the storm water decisions made by the Project Development Team. These decisions take into consideration grading, environmental constraints, utility issues, and any other conflicts that might arise when designing a project. The SWDR documentation includes various checklists to help project engineers determine feasibility of BMPs and any potential conflicts related to their implementation. The SWDR is initiated at the beginning of the project and is updated as the project progresses through design. The final SWDR not only documents the decisions made throughout the phases of the project but also includes exhibits showing tributary drainage areas, percentages of "treatment," water quality impairments and types of design pollution prevention, construction, and maintenance BMPs that will be incorporated into the project.

Table 3.10.9: BMP Categories and Descriptions

BMP Category	Description	Responsible Division for BMP Implementation
Category IA	Maintenance BMPs: litter pickup, toxics control, street sweeping, etc.	Division of Maintenance
Category IB	Design pollution prevention BMPs: permanent soil stabilization systems, etc.	Division of Design
Category II	Construction site BMPs: temporary runoff control	Division of Construction
Category III	"Treatment" BMPs: permanent "treatment" devices and facilities	Divisions of Design, Construction, and Maintenance

Source: Statewide SWMP, Table 3-1, May 2003

Maintenance BMPs (Category IA)

Caltrans maintenance performs various activities on different facilities throughout the State to ensure safe and usable conditions for the public. Most of these activities are performed by small crews with minimal soil disturbance.

The objective of implementing maintenance BMPs is to provide preventative measures to ensure that maintenance activities are conducted in a manner that reduces the amount of pollutants discharged to surface waters via Caltrans storm water drainage systems. Maintenance BMPs would be ongoing for the life of the facility, and are required to be conducted in accordance with the Caltrans Storm Water Quality Handbook, Maintenance Staff Guide (Guide). The Guide provides detailed instructions on how to apply the approved storm water maintenance BMPs to maintain facility operations and highway activities.

Additionally, Appendix C of this Guide includes specific maintenance requirements for all approved treatment BMPs. Each BMP has approximately seven pages of general description, a schematic of the treatment BMPs, and tables with preventive and regular maintenance needed.

Design Pollution Prevention BMPs (Category IB)

DPP BMPs are standard technology-based, non-"treatment" controls selected to reduce pollutant discharges to the MEP. DPP BMPs have the following design objectives: prevent downstream erosion, stabilize disturbed soil areas, and maximize vegetated surfaces consistent with Caltrans policies.

Without the implementation of DPP BMPs, the project may have an effect on downstream channel stability through changes in the rate and volume of runoff, the sediment load due to changes in the land surface, and other hydraulic changes from stream encroachments, crossings, or realignment. The peak flow rate, runoff velocities, and erosive characteristics of the soils in the area would be assessed with regard to downstream watercourses to determine potential impacts.

Table 3.10.10 lists Caltrans-approved DPP BMPs for project-specific consideration Statewide. The selection of the specific BMPs is an iterative process that begins at the planning stages and is refined during the design phase. Since Caltrans is committed to prevent or minimize impacts to water quality, the project would preserve the existing vegetation outside the work areas, stabilize slopes with vegetative cover, and keep the total paved area to a practical minimum. Other DPP BMPs would be implemented as appropriate for the project.

Table 3.10.10: Design Pollution Prevention BMPs (MEP Based), Category IB

Consideration of Downstream Effects Related to Potentially Increased Flow
Preservation of Existing Vegetation
Concentrated Flow Conveyance Systems
Ditches, Berms, Dikes, and Swales
Overside Drains
Flared Culvert End Sections
Outlet Protection/Velocity Dissipation Devices
Slope/Surface Protection Systems
Vegetated Surfaces
Hard Surfaces

Source: Statewide SWMP, Table 4-1, May 2003

Low Impact Development (LID)

Caltrans encourages the use of LID features, which can mutually serve as both DPP BMPs and “treatment” BMPs. Due to limited right-of-way and the linear nature of the typical Caltrans project, the design must ensure that any design features do not create a safety hazard for the public or maintenance forces. LID uses site design and storm water management to maintain the site’s pre-project runoff rates and volumes by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source.

Features that function as LID measures include, but are not limited to:

- Surface vegetation, such as biofiltration swales and strips
- Soil amendments, such as compost and surface roughening
- Subsurface storage, such as dry-wells, infiltration trenches, or swales underlain with permeable soil layers
- Small detention areas, such as cisterns, traps, and check dams
- Pervious materials, such as paving stone and porous concrete, when used in lieu of impervious materials at locations outside the highway prism
- Disconnected drainage that relies upon overland flow rather than pipe networks to convey runoff to discharge locations
- Contour Grading, or grading that follows natural flow paths and terrain with an emphasis upon slope rounding and gradual elevation changes.

This project would review and propose LID features throughout the project footprint. Final selection would be made during final design once drainage, grading, and other design features are determined and used as a basis for feasibility and siting locations.

Hydromodification

Under its recently adopted statewide permit (Order 2012-0011-DWQ effective date of July 1, 2013), Caltrans is required to conduct a risk-based approach to ensure the project would not cause a decrease in lateral (bank) and vertical (channel bed) stability in receiving stream channels. Caltrans would assess pre-project channel stability and implement mitigation measures that are appropriate to protect structures and minimize stream channel bank and bed erosion.

A Project Approval/Environmental Document (PA/ED) level SWDR is being prepared for this project and is in the process of being finalized for the initial phase of design. The work done to date includes delineation of impervious surface tributary drainage areas and preliminary siting and selection of potential “treatment” BMPs. Discussion of LID, hydromodification and other BMPs would be included in this phase’s SWDR and would be finalized as the project design progresses.

The hydromodification requirements specified in the Caltrans Permit were subject to extensive discussion with SWRCB staff as a part of the development of the Statewide Caltrans NPDES Permit. Caltrans has unique right-of-way and safety constraints that differentiate their infrastructure from that of a traditional MS4. The Caltrans Hydromodification Management Plan (HMP) was developed specifically to accommodate the unique aspects of highway infrastructure without compromising environmental protection. The mitigation measures are also those that Caltrans maintenance forces are able to maintain, and are consistent with the design guidance, federal design requirements, and Caltrans *Maintenance Staff Guide*.

The SWRCB adopted hydromodification control standards in the Caltrans Permit based on the best available technical information and FHWA guidance specifically tailored to control runoff with highway facility projects. Although the SWRCB was aware of other hydromodification standards, including the standards set forth in the San Diego HMP, it did not adopt those identical standards in the Caltrans Permit because the San Diego HMP standards are tailored to control runoff from traditional development projects, rather than highway facilities.

Broadly, the objectives of the San Diego HMP and the objectives of the adopted Caltrans Permit are consistent: to ensure that post-project receiving water stream stability is not adversely impacted by impervious surface developed as a result of new projects. The technical approach taken to meet this objective differs because anticipated project characteristics differ, but overall each of the two hydromodification control standards represent a state-of-the-art analysis and program for stream stability for the targeted type of development.

The requirements in the new Caltrans Order are based on assessment methods developed by the FHWA. The analysis method and mitigation requirements specified in the Order for hydromodification were developed specifically considering the unique impacts and design requirements for highway projects. The SWRCB is aware of the role that bed material plays in channel stability in developing the Caltrans Permit. The hydromodification analysis and mitigation methods specified in the Caltrans Permit were specifically developed for highway infrastructure, which has specific design safety constraints and drainage design standards, in order to maintain natural flow patterns and stream hydraulic characteristics.

The design standards for Caltrans facilities must be consistent with Caltrans and FHWA standards to ensure safety, maintenance, and operation. The standards in the recently adopted Caltrans Permit represent the most current approach to hydromodification mitigation for highway infrastructure throughout the State, and will be equally as protective of receiving water streambed stability as the program specified in the San Diego HMP. Consistent with Section 2.d.3 of the Caltrans Permit, the design of highway facilities can include flow control at discharge points as well as engineered energy dissipation and cross culvert designs specifically to ensure the maintenance and transport of bed material in the local streams.

The Caltrans Permit requires a risk-based approach to assessment of lateral and vertical stability of the receiving water bodies using the Publications FHWA-HIF-12-004 and FHWA-HRT-05-072 for an initial (Level 1) assessment. The assessment includes a review of 13 channel stability indicators including: (1) watershed and flood plain activity and characteristics, (2) flow habit, (3) channel pattern, (4) entrenchment and channel confinement, (5) bed material, (6) bar development, (7) obstructions, (8) bank soil texture and coherence, (9) average bank slope angle, (10) vegetative or engineered bank protection, (11) bank cutting, (12) mass wasting or bank failure, and (13) upstream distance from meander impact point and alignment. The overall ratings from the Level 1 analysis determine if further numeric analysis is required or the channel is not at risk from the project improvements. However, all projects disturbing more than 5,000 square feet, regardless of the outcome of the Level 1 assessment, are required to implement Design Pollution Prevention Best Management Practices.

Projects that show a potential hydromodification impact following completion of a Level 1 analysis proceed progressively to Level 2 or Level 3 analysis, which include state-of-the-art hydraulic and sediment transport numerical modeling. The Caltrans Permit ultimately requires the project to be redesigned if potential hydromodification impacts cannot be mitigated by other means.

Regardless of the determination of HMP susceptibility in the receiving channel, Caltrans projects implement LID efforts to maintain or restore pre-project hydrology, as well as provide overall water quality improvement of discharges. The LID measures include: (1) minimizing impervious surface area and using pervious material for hardened surfaces outside of the roadway prism, (2) grading slopes to blend with the natural terrain and decreasing the need for dikes, promoting sheet flow to vegetated areas that can provide water quality benefits and promote infiltration, (3) maintaining existing vegetation areas, and (4) designing permanent drainage facilities that mimic the existing drainage pattern of the area. The Caltrans LID practices reduce, or in some cases can eliminate, hydromodification impacts from highway facilities.

Construction BMPs (Category II)

It would be necessary to use a combination of erosion and sediment control BMPs to address both storm water and non-storm water discharges during construction of any of the four build alternatives. Caltrans would implement various construction site BMPs, as appropriate, to reduce the potential for short-term impacts. These temporary control practices are consistent with the BMPs and control practices required under the Construction General Permit, and are intended to achieve compliance with the requirements of that permit. The selected BMPs are directed at reducing pollutants in storm water discharges and eliminating non-storm water discharges. The BMPs to be implemented would cover the following categories (*Table 3.10.11*). More information on the various types of BMPs covered under each one of these categories is found in Caltrans Construction Site BMPs Manual.

Table 3.10.11: Construction BMP Categories

Category
Temporary Soil Stabilization
Temporary Sediment Control
Wind Erosion Control
Tracking Control
Non-Storm Water Management
Waste Management and Materials Pollution Control

"Treatment" BMPs (Category III)

"Treatment" BMPs must be considered for the proposed project, as required under the SWMP, to prevent or minimize the long-term potential impacts from Caltrans facilities or activities. The approved "treatment" BMPs listed in *Table 3.10.12* are considered to be technically and fiscally feasible for all of the build alternatives. Caltrans research and monitoring has found these BMPs to be constructible, maintainable, and effective at removing pollutants to the MEP.

Table 3.10.12 Approved "Treatment" BMPs (Category III)

"Treatment" BMPs	
Biofiltration Systems	Multi-Chambered "Treatment" Train
Infiltration Devices	Wet Basin
Detention Devices	Traction Sand Traps
Dry Weather Flow Diversions	Media Filters
Gross Solid Removal Devices	

Source: Project Planning & Design Guide Manual, May 2007

A preliminary review of the project area has been completed and potential locations and types of "treatment" BMPs have been assessed for feasibility (based on such factors as climate, water volume, soil conditions, physical limitations, other environmental considerations, etc.). Preliminary locations of the "treatment" BMPs are shown on the Project Features Maps (*Figures 2-3.3, Sheets 1* through *67*). As previously noted, the Preferred Alternative would "treat" 112 percent of equivalent new impervious surfaces. When the proposed project proceeds to the design phase, the locations of these "treatment" BMPs would be further evaluated to determine feasibility in relation to right-of-way limitations, environmental constraints or hydraulic capacity. In areas where "treatment" BMPs have been identified, but cannot be incorporated due to above-mentioned reasons, the equivalent minimum would be identified and implemented. In addition, vegetation would be maximized and every effort would be made to ensure the successful establishment of landscaping and erosion control throughout the project limits. The project would also consider any future "treatment" BMPs that might be approved by Caltrans from the ongoing research and monitoring program.

The District Erosion Control Specialist, in coordination with the project Biologist and Landscape Architect, would determine the appropriate planting/seeding mix to ensure that proposed vegetation is consistent with existing vegetation within the corridor, as well as any specific requirements by local entities.

Existing "Treatment" BMPs within the I-5 NCC Project Area

Litigation between Caltrans and the Natural Resources Defense Council, Bay Keepers, and USEPA resulted in a requirement that Caltrans develop a BMP Retrofit Pilot Program in Districts 7 (Los Angeles County) and 11 (San Diego/Imperial Counties) (BMP Retrofit Pilot Program Final Report). Moreover, subsequent to the Statewide Permit adoption (Order 99-06-DWQ), and as described in SWMP Section 4.4.1 and the Caltrans Project Planning and Design Guide, Caltrans conducts an assessment whenever new construction or reconstruction is taking place, which is documented in the SWDR. *Table 3.10.13* provides a list of the "treatment" BMPs that have been constructed within District 11 on the I-5 corridor, as either part of the BMP Retrofit Pilot Program or ongoing construction projects.

Table 3.10.13: Existing "Treatment" BMPs within the *I-5 NCC Project* Area

Watershed	Location Description	BMP type	Total Tributary Area (Treated Acres)
Peñasquitos	N Roselle St, 5/805 I-5/SR-56	Biofiltration Swales Detention Basin	7.7
San Dieguito	N of Del Mar Heights Lomas Santa Fe	Biofiltration Swales and Detention Basin Biofiltration Swales	24
Carlsbad	Lomas Santa Fe I-5 at Manchester Avenue I-5/La Costa I-5 and Palomar Airport Road	Biofiltration Swales Detention Basin Wet Basin Biofiltration Swale	15

Source: BMP Retrofit Program Final Report (CTSW-RT-01-050) and project files (EAs 0301U4, 06510,2358U4)
*Park and Ride "treatment" numbers not included in table.

Minimization measures would be implemented during construction at crossings over six designated "navigable" waterways. Minimization measures at waterways can typically include, but are not limited, to: flagging the perimeter of the proposed impact area to restrict access; training all contractors and construction personnel on sensitive resources, such as navigable vessel use; scheduling construction outside of breeding season(s) or conducting pre-construction surveys for presence/absence of sensitive species; restricting equipment, material storage, and staging to disturbed areas; designing the project to avoid/reduce storm water impacts where feasible, or otherwise control sediment with silt fencing, gravel bags, hay bales, and fiber rolls; control fugitive dust; restrict changing oil and/or refueling to designated areas; construct velocity dissipation structures at drainage outlets; direct all lighting to the construction area during night time construction; and temporarily divert water around the work area by use of sandbags, gravel dams, or cofferdams.

3.11 Geology/Soils/Seismicity/Topography

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.11.1 Regulatory Setting

For geologic and topographic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects "outstanding examples of major geological features." Topographic and geologic features are also protected under CEQA.

This section also discusses geology, soils, and seismic concerns as they relate to public safety and project design. Earthquakes are prime considerations in the design and retrofit of structures. The Caltrans Office of Earthquake Engineering is responsible for assessing the seismic hazard for Caltrans projects. Structures are designed using Caltrans' Seismic Design Criteria (SDC). The SDC provide the minimum seismic requirements for highway bridges designed in California. A bridge's category and classification determine its seismic performance level and which methods are used for estimating the seismic demands and structural capabilities. For more information, please see Caltrans' Division of Engineering Services, Office of Earthquake Engineering, SDC.

3.11.2 Affected Environment

The Caltrans Office of Geotechnical Design South 2 prepared a Preliminary Geotechnical Report for the *I-5 NCC Project* (October 2005). This report presents the results of the preliminary geotechnical review, which consisted of archival research of pre-existing data, field reconnaissance, and preliminary analysis and recommendations.

Information contained in the following sections was derived from the Preliminary Geotechnical Report, and this report can be referenced for further details.

Existing Topography

In the project limits, I-5 runs roughly parallel to the coast within a few miles. The landforms traversed are comprised of a series of uplifted and incised wave cut terraces (mesas) that parallel the existing coastline. East-west trending river valleys and arroyos dissect these terraces and convey drainage via ephemeral streams and perennial rivers and streams west to the ocean. Terrace elevations are typically 328 ft or less while stream and lagoon elevations are at or slightly above sea level. The lagoons and rivers crossed by I-5 represent broad topographic lows that occur at semi regular intervals along the freeway corridor. These topographic lows are subject to tidal flow and episodic flooding arising from hinterland storm runoff.

I-5 traverses lagoons, mesas, small canyons, and arroyos in a series of through-cuts and fill embankments. Natural slopes along the corridor exhibit a maximum slope inclination of about 1:3 (vertical to horizontal). These slopes are typically vegetated by native scrub with some intrusion from exotic species. Steeper slopes in the area are sparsely vegetated or unvegetated, and display a "badlands" type weathering surface, indicating that they are experiencing excessive erosion. Seeps, springs, and streams occur at the toe of some slopes and within some cut slope faces.

Existing cut slopes are typically inclined at 1:2 and are up to 150ft high. The cut slopes primarily expose Torrey Sandstone of Eocene age and are stable. They are vegetated with indigenous and exotic plants. Cut slopes typically include a brow ditch around the upper perimeter and a wide drainage bench midway up the slope. The bench feeds numerous down-drains that collect runoff and pipe it to the paved roadway below. Some cut slopes along the corridor are relatively free of vegetation and display a "badlands" type surface indicating erosional instability. Other slopes in more indurated (consolidated) sandstone have a smooth appearance and remain relatively free of vegetation even after several decades.

Existing fill slopes vary in thickness along the travel way. Fill slope angles are typically 1:2 (vertical/horizontal) or flatter, although there are a few locations where fill slope angles are steeper. Several large embankments rest on relatively young, soft lagoonal deposits. Material used in the embankments was generated in cuts notched through the adjoining mesas. Embankment material, therefore, is similar in composition to material forming cut slopes. Archived logs of test borings reveal that the sandy embankment fills are generally medium dense and presumably compacted to Caltrans standards. Fill slopes are generally well vegetated with native scrub and exotic species.

Site Geology

Throughout the project limits, I-5 traverses terrain comprised of three predominate and repetitive geologic features: (1) through cuts in relatively young marine terrace, sandstone, and shale formations; (2) artificial fills; and (3) unconsolidated lagoonal alluvium.

Formational Units

The natural and cut slopes along the project alignment are primarily composed of Torrey Sandstone and the Delmar Formation. The Torrey Sandstone, part of the La Jolla Group, is light in color and is most often associated with massive and thick bedding of medium- to coarse-grained sandstone. Torrey Sandstone deposits are porous and permeable, and therefore, susceptible to erosion. The Delmar Formation, also part of the La Jolla Group, is considered to be poorly bedded and indurated. It consists of sandy clay stone interbedded with medium to coarse-grained gray sandstone, and steep unprotected slopes are susceptible to erosion. Both of the described units are generally capable of supporting large stable cut slopes at a 1:2 inclination and may support much steeper temporary excavations. The borrow soil derived from these units is generally well suited for use as engineered embankment fill.

Artificial Fill

Four major lagoons are spanned by freeway embankment fill ranging in height from 13 to 80 ft. Strut fills are incorporated at lagoons for additional stabilization. Numerous smaller fills exist elsewhere along the alignment. Exploratory borings show the embankment fills to have the general composition of medium dense silty sand, consistent with locally derived borrow. The roadway fills have slopes inclined at 1:2 that are performing well. Large areas of embankment settlement have been previously determined to be the result of settlement of the underlying alluvium.

Lagoonal Alluvium

The lagoon sediments are composed of weak, poorly consolidated, sand, silt, clay, and gravel, with more consolidated soil at depth. Within the project limits, lagoon alluvium exceeds 100 ft in depth. These relatively weak soils may be subject to consolidation settlement and bearing capacity failure upon the application of additional overburden that would result from freeway improvements. During early freeway construction, embankment fills were placed gradually to avoid failing the weak alluvium, and on the order of six to nine ft of settlement of the finished embankment were recorded. The overlying fills have acted to densify and strengthen the alluvial soils, although it remains necessary to analyze and mitigate the consequences of additional loads.

Subsurface Soil Conditions

Characterization of the subsurface conditions along the I-5 corridor is based on the results of site observations, local knowledge, and archived subsurface information derived from previous geotechnical investigations within the project limits.

The subsurface conditions along I-5 corridor consist of a succession of relatively competent near horizontal sedimentary strata at cut locations; weak, poorly consolidated alluvial deposits at the lagoons; and sandy engineered embankment fill, which is underlain by sedimentary formation or alluvial deposits.

Groundwater

Seeps, springs, ephemeral streams, and perched water have been identified within the project limits. These phenomena often occur at the toe of slopes and embankments, at the contact between permeable sandstone and impermeable shale, within cut slope faces, at grade, and within canyons crossed or traversed by I-5.

Seismicity

Ground shaking due to nearby and distant earthquakes should be anticipated during the life of the facilities. Major fault expressions near the I-5 corridor include the San Andreas, San Jacinto, Elsinore, and Rose Canyon fault zones. Additionally, a complex system of northwest trending faults situated offshore from San Diego, which include the Coronado Banks and San Diego Trough faults, are potential seismic sources that may cause minimal to moderate shaking within the site. The closest active major fault to the site is the Newport Inglewood-Rose Canyon East Fault, which runs offshore in a northwest trend at a distance of about four mi west of the I-5 corridor.

Existing Utilities

Numerous buried and overhead utilities are present in the project area. These include, but are not limited to, buried culverts, sewer lines, buried and overhead electric, buried gas, and buried and overhead telecommunications facilities. See *Section 3.5, Utilities and Emergency Services,* for more information.

Existing Human-Made, and Natural Features of Engineering and Construction Significance

The proposed I-5 project traverses many different human-made and natural features. The most significant are the four lagoon crossings, which contain deep compressible soils; a condition that can be adverse to the construction and behavior of structures and large embankment fills.

3.11.3 Environmental Consequences

Existing and Potential Hazards

Cuts and Excavation

Cuts and excavations, both temporary and permanent, would be utilized to gain the additional roadway width necessary to accommodate the *I-5 NCC Project*.

Caltrans standards require that the stability of permanent cut slopes be evaluated to determine the appropriate safety factor for the proposed slope angle. Slope stability is a function of slope geometry, soil or rock strength parameters, geologic structure, saturation and pore water pressure, and external loading. Additionally, slope faces are subject to surficial stability and erosion. Caltrans criteria for slope stability on newly designed, non-existing permanent slopes dictate that slopes meet minimum safety factors for both static and seismic cases. For more information on Caltrans criteria for slope stability, please refer to the Preliminary Geotechnical Report. Slopes inclined at 1:2 meet the slope stability requirements for permanent slopes, although slightly steeper slopes up to 1:1.75 may be appropriate where favorable soil conditions exist and relatively small slope heights of 16 ft or less are proposed. It should be noted that slopes steeper than 1:2 are difficult to landscape and maintain.

Embankment Stability

Most of the proposed improvements associated with the four build alternatives would be accomplished by gaining additional roadway width through the placement of embankment fill. These fills would be keyed into the existing embankment fill, with the majority of soil needed to construct fills anticipated to be derived from cuts in nearby formational strata. These strata yield soils well suited for roadway embankments.

Embankment stability, as with cut slopes, is a function of slope geometry, soil strength parameters, structure, saturation and pore water pressure, and external loading. Additionally, however, embankment stability also is a function of the stability of the underlying soil in response to additional fill. Adverse conditions, such as weak (e.g., lagoonal or alluvial) foundation soils may compromise embankment stability. Caltrans criteria for slope stability of newly designed permanent embankments dictate that slopes meet minimum safety and seismic factors. For more information on Caltrans criteria for slope stability, please refer to the Preliminary Geotechnical Report.

Construction of embankments would cause settlement where the foundation soils are compressible. Since the majority of the foundation soil in the project area is formational, little settlement would occur in conjunction with most fill placement. Placement of embankments over lagoon and alluvial soils would, however, result in substantial settlement. The amount of settlement depends on the height and width of the additional embankment, and on the depth and compressibility of the foundation soil. The existing embankment fills have acted to consolidate and strengthen the underlying soft soils, thereby reducing the anticipated settlement from additional loading. Embankment settlement from the proposed loads, however, may have a minor impact on existing freeway lanes.

Surface Water

Within the project limits, several small drainages and culverts convey minor year-round flows. These flows are attributable to urban runoff and/or perched groundwater seepage. Many of the existing drainage features would require rerouting, upgrading, and/or extending to accommodate a wider freeway facility.

Groundwater Seepage

The occurrence of groundwater in slopes can substantially influence slope stability. One such seepage location is on the east cut slope of northbound I-5 in Encinitas, between the Manchester Avenue on-ramp and the Birmingham Drive off-ramp. Rainwater infiltration and the irrigation of the residential complex at the top of the slope contribute to groundwater seepage at this location throughout the year.

Groundwater depths in areas adjacent to coastal lagoons are anticipated to be shallow, with groundwater having been encountered at or slightly above mean sea level. Excavations at and below lagoon surface elevations would be prone to inundation from groundwater infiltration. Saturated soils would predispose excavations in poorly consolidated deposits located at or below the water table to collapse.

Subsurface Soil Conditions

The geologic formations within the project limits, as well as the fill material derived from cuts in those formations, generally provide good subgrade for roadways and retaining walls. The soft lagoonal deposits, however, may be subject to settlement and bearing capacity failure due to the placement of additional surcharge.

Shrink-swell behavior may be associated with some of the clay beds within local sedimentary deposits. These materials shrink and swell in response to changing soil moisture. This type of behavior could adversely affect the structural section, predispose slope faces to erosion, and compromise slope stability.

Seismic Hazards

The proximity of the project area to the Newport Inglewood-Rose Canyon Fault Zone establishes the potential for the area to be impacted by a major seismic event. The Newport Inglewood-Rose Canyon Fault Zone displaces Holocene sediment and, therefore, is considered active. In general, seismic activity in the study area could include strong ground motion, liquefaction, seismically induced settlement, and embankment spreading.

Ground surface rupture due to active faulting is considered unlikely within the project limits due to absence of known active fault traces crossing the I-5 within the proposed project. The potential for cracking of the surface as a result of nearby or distant events is also considered unlikely.

A major seismic event could cause lateral spreading, cracking, and slumping of both existing and proposed embankments. Embankments and facilities build over loose, sandy, saturated foundation soil (i.e., river beds and lagoons) may also be subject to the effects of liquefaction.

Liquefaction involves a sudden loss in strength of a saturated, predominantly sandy soil caused by a cyclic loading such as an earthquake. This results in a temporary transformation of the soil into a fluid mass. Typically, liquefaction occurs in areas where groundwater is less than about 50 ft from the surface, and where the soils consist predominantly of poorly consolidated fine sands, silty sands, and non-plastic silts. Seismically induced liquefaction could cause embankment settlement and structural failure. Areas that would mostly be affected by seismically induced liquefaction are the embankment fills and structures at the lagoon and river crossings.

Embankment failures are a result of excessive settlement and damage to pavement structural sections. Currently, strut fills support existing fill embankments at the lagoons. These strut fills act to restrain the embankment from potential slumping or spreading. Additionally, the strut fills, up to 30-ft high, have helped to densify the native soils beneath, thereby lowering the liquefaction potential.

Impacts to Utilities

Numerous buried and overhead utilities are present in the project area. Existing utilities conflicting with proposed construction activities would require protection or relocation during construction. The location of all utilities would be verified prior to subsurface investigation or construction.

Construction-related impacts

- Wall construction features, such as temporary back cuts or soil nail lengths may impact existing facilities and right-of-way requirements.

- Large, near vertical earth retaining systems that may be located above soft lagoon and river alluvium would likely necessitate ground improvements for the foundation soil. Such improvements could generate a larger impact footprint, increase project costs, and result in excessive construction delays.

3.11.4 Avoidance, Minimization, and/or Mitigation Measures

Design Considerations

- For preliminary design purposes, soils at all the lagoons and river valleys would be assumed to be predisposed to liquefaction.

- The use of large retaining structures to accommodate embankment widening over the lagoons should be avoided.

Surface and Subsurface Drainage

- Drainage for proposed improvements would be constructed in accordance with the Caltrans Highway Design Manual.

- Impacts to water quality would be minimized by directing surface runoff away from the top of slopes, and also by not allowing runoff to discharge over the top of slopes.

- Surface water would be conveyed off site by appropriate erosion-reducing devices.

- Where groundwater is present, subsurface drainage devices would be installed, if applicable.

Minimization of Embankment Settlement

- Settlement waiting periods would be employed at all soft soil locations before establishment of the final grade.

Construction Monitoring and Instrumentation

- Caltrans personnel would be present during project construction to observe all cuts, foundation subgrade, and embankment subgrade to assure that all appropriate provisions are enforced. If unanticipated subsurface conditions are encountered, a geotechnical representative would be notified to make additional recommendations to the Resident Engineer, who in turn would direct the contractor. Instrumentation for measuring settlement or slope distress, and periodic surveying for ground movement, would be included during construction in areas where the potential for ground movement or failure exists.

- Grading and roadway work would be performed in accordance with Caltrans Standard Plans and Specifications.

- To avoid surface erosion, which may supply an unacceptable sediment load to the watershed, temporary slopes would be protected throughout the wet season.

- Concentrated flows would not be allowed on slopes.

- Appropriate construction scheduling, soil tackifiers, geosynthetic mats, and plastic sheeting are some of the techniques that may be used to avert excessive slope erosion.

3.12 Paleontology

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.12.1 Regulatory Setting

Paleontology is the study of life in past geologic time based on fossil plants and animals. A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized projects. 16 United States Code (USC) 431 and 433 prohibit appropriating, excavating, injuring, or destroying any object of antiquity situated on federal land without the permission of the Secretary of the Department of Government having jurisdiction over the land. 23 USC 305 authorizes funds to be appropriated and used for archaeological and paleontological salvage as necessary by the highway department of any state, in compliance with 16 USC 431 and 433 above. 16 USC Section 470aaa prohibits the excavation, removal, or damage of any paleontological resources located on federal land. 23 Code of Federal Regulations (CFR) 1.9(a) states that the use of federal funds must be in conformity with federal and State law.

Under California law, paleontological resources are protected by CEQA. The California Coastal Act Section 30244, Archaeological or Paleontological Resources, states: “Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.” Paleontological resources would be addressed in the coastal zone permit (see *Table 3.1.1* of this EIR/EIS).

3.12.2 Affected Environment

A paleontology study, entitled Paleontological Resource Assessment, I-5 NCC Project, Caltrans District 11, San Diego County, California, was conducted and identified the presence of geologic formations with the potential to contain important fossil remains within the project footprint. The oldest rocks date from the Eocene Epoch and include the Delmar Formation, Torrey Sandstone, Ardath Shale, Scripps Formation, and Santiago Formation, as well as a previously unmapped formation from the Oligocene Epoch. In the northern portion of the project area, the Eocene strata are overlain by Miocene-age strata of the San Onofre Breccia, and San Mateo Formation. Both the Miocene and Eocene strata are overlain by much younger Pleistocene-age deposits of the Bay Point Formation or Lindavista Formation. These formations are known to contain important land mammal and marine invertebrate fossil assemblages, and may produce important microfossil specimens.

The Delmar Formation is late-early to early-middle Eocene in age, approximately 49 to 50 million years old (Ma), has produced important remains of terrestrial vertebrate fossils, and is assigned a high paleontological resource sensitivity. Fossils from the Delmar Formation consist of well- to poorly preserved remains of estuarine invertebrates (e.g., clams, oysters, and snails) and vertebrates (e.g., sharks, rays, and fishes). An extremely important locality at Swami's Point in Encinitas has yielded well-preserved skull remains of aquatic reptiles (e.g., crocodiles) and terrestrial mammals (e.g., tillodonts and early rhinoceros). The Delmar Formation crops out from Sorrento Valley in the south to at least Batiquitos Lagoon in the north, and from the coast inland to La Costa and Rancho Santa Fe. The best exposures of the Delmar Formation occur in the sea cliffs from Torrey Pines State Reserve to Encinitas.

The Torrey Sandstone is considered to be early-middle Eocene in age, approximately 48 to 49 Ma, and is known to produce important remains of fossil plants and marine invertebrates. Invertebrate fossils known from the Torrey Sandstone primarily consist of nearshore marine taxa (e.g., clams, oysters, snails, and barnacles). Vertebrate fossil remains are rare and include teeth of crocodiles, sharks, and rays. The Torrey Sandstone occurs from Sorrento Valley in the south to Batiquitos Lagoon in the north, and from the coast inland to La Jolla Valley and Olivenhain.

The Ardath Shale was deposited at outer shelf depths on an ancient sea floor during the early-middle Eocene, about 47 to 48 Ma. This formation has yielded diverse and well-preserved assemblages of marine microfossils, macroinvertebrates, and vertebrates (e.g., sharks, rays, and bony fish). The Ardath Shale crops out from La Jolla, Pacific Beach, and Clairemont in the south, to Carmel Valley in the north.

The Scripps Formation is entirely of marine origin (continental shelf) and was deposited during the early-middle Eocene, approximately 46 to 47 Ma. It is considered to be potentially fossiliferous almost everywhere it occurs. Most of the fossils known from this formation consist of marine organisms including clams, snails, crabs, sharks, rays, and bony fishes. Fossil reptiles (e.g., crocodiles and turtles), land mammals (e.g., uintathere, brontothere, rhinoceros, and artiodactyl), and well-preserved specimens of fossil wood, however, have also been recovered from the Scripps Formation. The Scripps Formation crops out from Presidio Park in the south, north to Del Mar, and from Clairemont east to La Jolla Valley.

The Santiago Formation boundary occurs in the general area of Olivenhain and Cardiff-by-the-Sea, and broadly correlates with almost the entire middle Eocene stratigraphic sequence at San Diego (Pomerado Conglomerate to Ardath Shale), approximately 40 to 49 Ma. There are generally three recognized members of the Santiago Formation in the Encinitas-Carlsbad area, referred to as the “A,” “B,” and “C” members.

> Member “C” crops out from south of Batiquitos Lagoon north at least to the San Luis Rey River, and has produced abundant vertebrate fossils from several districts including Carlsbad, Oceanside, and Camp Pendleton Marine Corps Base. Fossils collected from this upper unit include well-preserved remains of turtles, snakes, lizards, crocodiles, birds, and mammals (e.g., opossums, insectivores, primates, rodents, brontotheres, tapirs, protoreodonts, and other early artiodactyls). The mammal assemblages are especially important because of their great faunal diversity and excellent specimen preservation. These fossils, together with contemporaneous mammal fossils from the Poway Group, make the Eocene deposits of San Diego County among the most important in North America. Also recovered from Member “C” deposits are remains of various types of marine organisms including calcareous nannoplankton and mollusks.

Member "B" crops out in Encinitas in the south, and extends north to at least the San Luis Rey River. Member "B" gradationally overlies the Torrey Sandstone near Encinitas, and is unconformably overlain by Member "C" wherever the contact between the two is observed. Member "B" has produced well-preserved vertebrate fossils from several localities in Carlsbad and Oceanside, including opossums, insectivores, primates, rodents, brontothere, rhinoceros, and uintathere. Also recovered from Member "B" deposits are various types of marine and estuarine mollusks.

Member "A" crops out sparingly south of SR-78 in the Cerro de la Calavera area, and is also present on the south side of the San Luis Rey River near Guajome Lake. Member "A" has yet to produce any fossils, but the discovery of any diagnostic fossils in this rock unit would be of great importance in resolving the age and stratigraphic significance of the Santiago Formation.

An unmapped formation of Oligocene age was discovered in the exposed sedimentary rocks of the Santiago Formation. A small number of terrestrial mammal fossils has been discovered within these sedimentary deposits. These fossils suggest that the associated strata are younger than previously believed, and were deposited during the Oligocene Epoch (approximately 23 to 34 Ma). The discovery of fossil bone at numerous localities within these strata suggests that this unit is much more fossiliferous than previously believed. This unit is assigned a high paleontological resource sensitivity because of its potential to produce well-preserved remains of fossil vertebrates, as well as the potential to yield previously unknown information about the natural history of this part of San Diego County.

The San Onofre Breccia is an alluvial fan and nearshore marine rock unit of middle Miocene age, approximately 14 to16 Ma. Poorly preserved remains of nearshore marine foraminifers and bivalve mollusks have been reported from the San Onofre Breccia. Remains of fossil mammals have also been recovered from this formation, although these fossils have not been adequately studied and remain unidentified. The San Onofre Breccia in San Diego County crops out from Oceanside, north through the coastal portion of the Camp Pendleton Marine Corps Base. The formation is well-exposed in the valleys of the San Luis Rey and Santa Margarita rivers.

The San Mateo Formation is of late Pliocene to late Miocene in age (approximately 4 to 7 Ma). This formation has produced very important and locally abundant remains of many kinds of fossil marine vertebrates, including rays, sharks, bony fishes, sea birds, dolphins, sperm whales, baleen whales, sea cows, fur seals, walrus, and sea otters. In addition, terrestrial mammal remains (e.g., horse, camel, llama, and peccary) have been recovered from these deposits. The most productive vertebrate fossil localities occur in the Lawrence Canyon area of north Oceanside. Exposures of the San Mateo Formation on Camp Pendleton have also produced diverse assemblages of marine invertebrates (e.g., clams, scallops, snails, and sea urchins). The San Mateo Formation crops out from the San Luis Rey River Valley in Oceanside, north through Camp Pendleton Marine Corps Base to San Mateo Point near San Clemente.

The Lindavista Formation represents a marine and/or non-marine terrace deposit of early Pleistocene age (approximately 0.5 to 1.5 Ma). Fossil localities are rare in the Lindavista Formation and have only been recorded from a few areas (e.g., Tierrasanta and Mira Mesa). Fossils collected from these sites consist of nearshore marine invertebrates including clams, scallops, snails, barnacles, and sand dollars, as well as sparse remains of sharks and baleen whales. The Lindavista Formation occurs over a large area from the International Border north to San Clemente.

The Bay Point Formation is actually an all-inclusive stratigraphic unit for all coastal Pleistocene sedimentary deposits younger than the Lindavista Formation. The marine deposits of the Bay Point Formation have produced large and diverse assemblages of marine invertebrate fossils such as mollusks, crustaceans, and echinoderms, as well as sparse remains of marine vertebrates including sharks, rays, and bony fish. The non-marine alluvial deposits of the Bay Point Formation have produced locally concentrated fossil remains of terrestrial mammals such as ground sloths, dire wolves, tapirs, horses, deer, camels, mastodons, and mammoths. The Bay Point Formation occurs along the coast from the International Border to San Clemente.

3.12.3 Environmental Consequences

Direct impacts to paleontological resources would occur when earthwork activities, such as mass grading operations or cuts, extend into geological deposits containing fossils. The four build alternatives would disturb similar areas along the I-5 corridor. Since, the types, depths, and locations of various construction activities are not known at this time and unearthing paleontological resources within the project study area would be anticipated, the four build alternatives are considered to have similar effects on paleontological resource sensitivity.

3.12.4 Avoidance, Minimization, and/or Mitigation Measures

Paleontological mitigation would be carried out primarily during the project construction phase. The mitigation program would consist of monitoring, fossil salvage, macrofossil and microfossil analysis, fossil preparation, report preparation, and curation.

Monitoring

- A qualified principal paleontologist (M.S. or Ph.D. in paleontology or geology familiar with paleontological procedures and techniques) would be retained to be present at pre-grading meetings to consult with grading and excavation contractors.

- A paleontological monitor, under the direction of the qualified principal paleontologist, would be on site to inspect cuts for fossils at all times during original grading involving sensitive geologic formations.

Macrofossil / Microfossil Analysis

- When fossils are discovered, the paleontologist (or paleontological monitor) would recover them. Construction work in these areas would be halted or diverted to allow recovery of fossil remains in a timely manner.

- Fossil remains collected during the monitoring and salvage portion of the mitigation program would be prepared, sorted, and cataloged.

Report Preparation

- Paleontological Mitigation Monitoring Plan (PMMP) – Once the grading plan is finalized, the types, depth, and locations of the construction activities would be analyzed to finalize the PMMP prepared by a qualified principal paleontologist.

- Paleontological Mitigation Monitoring Report (PMMR) – A PMMR would be prepared by a qualified principal paleontologist. The PMMR would document the results of the mitigation program, and include construction monitoring, fossil salvage, laboratory preparation of salvaged specimens, curation of prepared specimens, and storage of curated specimens.

Curation

- Although all fossils collected remain the property of the State, the collection must be properly curated at an approved facility (preferably local to the project location) and preserved for future researchers. A complete set of field notes, geologic maps, stratigraphic sections, and a copy of the final report should be curated with the fossils.

3.13 Hazardous Waste / Materials

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.13.1 Regulatory Setting

Hazardous materials including hazardous substances and wastes are regulated by many State and federal laws. Statutes govern the generation, treatment, storage, and disposal of hazardous materials, substances, and waste, and also the investigation and mitigation of waste releases, air and water quality, human health and land use.

The primary federal laws regulating hazardous wastes/materials are the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The purpose of CERCLA, often referred to as Superfund, is to identify and clean up abandoned contaminated sites so that public health and welfare are not compromised. RCRA provides for "cradle to grave" regulation of hazardous waste generated by operating entities. Other federal laws include:

- Community Environmental Response Facilitation Act (CERFA) of 1992
- Clean Water Act
- Clean Air Act
- Safe Drinking Water Act
- Occupational Safety and Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act (TSCA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

In addition to the acts listed above, EO 12088, Federal Compliance with Pollution Control, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

California regulates hazardous materials, waste, and substances under the authority of the California Health and Safety Code and is also authorized by the federal government to implement RCRA in the state. California law also addresses specific handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning of hazardous waste. The Porter-Cologne Water Quality Control Act also restricts disposal of wastes and requires clean up of wastes that are below hazardous waste concentrations but could impact ground and surface water quality. California regulations that address waste management and prevention and clean up of contamination include Title 22 Division 4.5 Environmental Health Standards for the Management of Hazardous Waste, Title 23 Waters, and Title 27 Environmental Protection.

Worker and public health and safety are key issues when addressing hazardous materials that may affect human health and the environment. Proper management and disposal of hazardous material is vital if it is encountered, disturbed during, or generated during project construction.

3.13.2 Affected Environment

The following reports were prepared for the proposed *I-5 NCC Project* and incorporated by reference:

- Site Investigation Report, Lead Investigation on the Route 5, from Via de la Valle to Leucadia Boulevard, San Diego, Solana Beach, and Encinitas, California, KP: R57.9/R68.7; PM: R36.0/R42.7, June 22, 2001
- Aerial Deposited Lead Investigation, Contract No. 43A0012, Task Order No. 11-07830K-VW, Route 5 Between Leucadia Boulevard and Brooks Street, San Diego County California. PM 42.7/R51.2. KP R68.7/82.4. PSI, June 28, 2001
- Limited Phase II Environmental Site Assessment Interstate 5 Expansion, Del Mar Heights Road to Birmingham Drive, San Diego California, November 15, 2005
- Phase II Environmental Site Assessment Interstate 5 Expansion, Birmingham Drive to Vandegrift Boulevard, San Diego County, California, October 31, 2006
- Aerially-Deposited Lead Survey – Interstate 5 and Genesee Avenue, San Diego, California, January 9, 2009

These reports provide an evaluation of the potential hazardous waste/material concerns within the project study area. Specific methodology used for these analyses includes:

- An evaluation of study area history through review of available reports and historic maps/aerial photographs
- Field reconnaissance to document the potential occurrence of, and contamination by, hazardous waste/materials within the study area
- Review of regulatory agency files and databases regarding the use, storage, unauthorized release, and remediation of hazardous materials within the study area and vicinity
- Subsurface evaluation, where needed
- The portion of Interstate 5 from Del Mar Heights Road to Genesee Avenue has been widened and ADL has been previously mitigated under other projects

The study area for the noted analyses was determined by reviewing databases for potential hazardous material site locations within a 0.5-mi radius of the project corridor. This study area, as with most of San Diego County, was historically rural with an agricultural base. Transportation uses began in the North Coast Corridor in the early 1900s, although several agricultural and nursery uses still exist. Urban uses have also developed, including service stations located at intersections, landfills, and facilities with potential to contain asbestos and lead, such as I-5 bridges.

In particular, there is a gasoline station on the east side and agricultural uses northeast of Manchester Avenue, with associated petroleum hydrocarbon impacts to soil and groundwater. The agricultural areas also have non-hazardous concentrations of pesticides in the soil. Gasoline stations are present at Birmingham Drive, on the east and west sides of the freeway. Between Birmingham Drive and Palomar Airport Road there are nurseries with non-hazardous concentrations of pesticides in the soil. On the east side of I-5 near Piraeus Street there is a burn ash landfill location with non-hazardous material. At Palomar Airport Road, there are gasoline stations just outside the project area with petroleum hydrocarbon impacts to soil and groundwater. North of Cannon Road on the east side of I-5, there is a strawberry field; testing indicated the soil overall is not hazardous with regard to pesticides, but pesticides are present. At Tamarack Avenue, there are gas stations with petroleum hydrocarbon impacts to soil and groundwater. Near the southbound on-ramp at Carlsbad Village Drive, there is a gas station with petroleum hydrocarbon impacts to soil and groundwater. A former landfill is located on the east side of I-5 at Maxson Street in Oceanside. See *Figures 3-13.1* and *3-13.2.*

3.13.3 Environmental Consequences

The impacts are very similar for all of the build alternatives and the following discussion is presented on a project basis. All alternatives would potentially result in the discovery of contaminated materials.

The hazardous waste investigations determined that the following contaminants occur, or have the potential to occur, within the project area:

- Aerially Deposited Lead (ADL)
- Petroleum Hydrocarbons
- Landfills
- Pesticides and Herbicides
- Chemical Spills
- Asbestos
- Lead
- Treated Wood

Aerially Deposited Lead

Construction activities associated with the four build alternatives would invoke the Department of Toxic Substances Control (DTSC) lead variance. The soil in the median of I-5 is hazardous, while the soil along and adjacent to the shoulders of I-5 is non-hazardous with respect to ADL. If excess soil from the shoulders is exported, then further characterization would be necessary to evaluate proper disposal criteria (i.e., since the shoulder soil may contain ADL).

Petroleum Hydrocarbons

Hazardous waste with respect to petroleum hydrocarbons concerns include a number of service stations located at intersections. Petroleum hydrocarbons may be encountered in soil and groundwater during associated trenching to move utilities and during bridge reconstruction/widening at abutments and bents. Caltrans would comply with the Dewatering permit for the San Diego Region for handling and disposal of groundwater (Order No. R9-2008-02 and any reissuance thereof). If soil from abutment excavations at Via de la Valle, Birmingham Drive, Brooks Street, Palomar Airport Road, Carlsbad Village Drive, and Mission Avenue would be exported, the soil may require further characterization for petroleum hydrocarbons, volatile organic compounds (VOCs), or semi-volatile organic compounds to evaluate the proper disposal method. *Table 3.13.1* shows the potential for encountering hazardous waste issues/materials at each bridge/intersection. The potential for encountering hazardous waste at these locations is characterized as Low, Medium, or High.

Table 3.13.1: Bridge/Intersection with Potential for Hazardous Waste

Undercrossing / Overcrossing / Intersection	Potential
La Jolla Village Drive OC	Low
Voigt Drive OC	Low
Genesee Avenue OC	Low
Del Mar Heights Road OC	Low
San Dieguito River	Low
Via de la Valle UC	**Medium**
Lomas Santa Fe Drive UC	Low
Manchester Avenue UC	Low
Birmingham Drive OC	**Medium**
MacKinnon Avenue OC	Low
Santa Fe Drive UC	Low
Encinitas Boulevard UC	Low
Leucadia Boulevard OC	Low
La Costa Avenue OC	Low
Batiquitos Lagoon	Low
Poinsettia Lane OC	Low
Palomar Airport Road OC	**High**
Cannon Road UC	Low
Agua Hedionda Lagoon	Low
Chinquapin Avenue OC	Low
Tamarack Avenue OC	Low
Chestnut Avenue UC	Low
Carlsbad Village Drive UC	**Medium**
Las Flores Drive OC	Low
Jefferson Street OC	Low
Buena Vista Lagoon	Low
SR-78 / I-5 Sep Br # 57-270	Low
Cassidy Street OC	Low
California Street OC	Low
Loma Alta Creek	Low
Oceanside Boulevard OH	**Medium**
Brooks Street OC	**Medium**
Mission Avenue OC	**Medium**
Fourth Street / Bush Street OC	Low
Neptune Way / 8th Street OC	Low
I-5 / SR-76 UC	Low
San Luis Rey River	Low
Harbor Drive / Vandegrift Boulevard / Camp Pendleton UC	Low
Camp Del Mar OC	Low

Service stations with a partial or full take at Manchester Avenue (east of I-5), Birmingham Drive (west of I-5), Tamarack Avenue (west of I-5), and Carlsbad Village Drive (west of I-5) have petroleum hydrocarbons in soil and/or groundwater as a result of leaking underground storage tanks.

Landfills

Two landfills were identified within the project footprint, including the Olympus Street Landfill at the intersection of Piraeus and Olympus streets in Leucadia, and the Maxson Street Landfill at Maxson Street in Oceanside. The Olympus Street Landfill is a burn ash site, and is presently occupied mostly with residential housing. Soil sampling at the Olympus Street Landfill identified non-hazardous concentrations of lead within Caltrans' right-of-way and adjacent properties. The Maxson Street Landfill included municipal solid wastes now covered by a park, baseball fields, residential housing, a golf course, and retail businesses. Investigations within the existing Caltrans' right-of-way along the Maxson Street Landfill did not encounter wastes associated with the landfill.

Pesticides and Herbicides

Nurseries and farmland were observed at various locations along both sides of I-5 from the Manchester Avenue Interchange to the Palomar Airport Road Interchange. Nurseries are known to use pesticides and herbicides. The use of pesticides such as DDE (Dichloro Diphenyl Ethane), DDT (Dichloro Diphenyl Trichlorethane), and DDD (Dichloro Diphenyl Dichloroethane) have been banned since the late 1970s, although concentrations of these pesticides and herbicides can remain in the soil for long periods of time. Pesticides and herbicides were encountered in shallow soils on and around nurseries. Overall, testing of soil for pesticides and herbicides indicates that soil containing these pesticides is not a hazardous waste.

Chemical Spills

Chemical spills from truck and auto accidents have historically occurred along I-5. These spills mainly consist of petroleum hydrocarbons, but other chemicals may be present. These spills are difficult to locate in advance.

Asbestos

Asbestos may be found in bridge joint and piping material. These materials may pose a health hazard if workers are exposed to them during construction activities.

Lead

Lead-based paint may have been used on metal guardrails, piping, or in structures to be demolished. If yellow paint or yellow thermal plastic paint would be removed during construction activities, these materials may pose a health hazard if workers are exposed to them during construction activities.

Treated Wood

The wood guardrail posts and signposts on site have been treated with creosote. If these posts were removed, a safety and health work practices plan must be submitted to the Resident Engineer prior to removal. The wood must then be handled and disposed in accordance with Caltrans' treated wood non-standard special provision.

3.13.4 Avoidance, Minimization, and/or Mitigation Measures

Designs of the alternatives for the proposed project are a result of extensive research, technical analysis, and community input. The amount of right-of-way required for each alternative is the minimum amount of land required to fulfill the purpose and need of the project, while meeting the associated operational requirements of the roadway. Wherever possible, the project alternatives follow the existing I-5 alignment to avoid and/or minimize impacts from hazards and hazardous materials. In particular, avoidance of the gasoline stations and soil excavation at Manchester Avenue, Birmingham Drive, Palomar Airport Road, Tamarack Avenue, and Carlsbad Village Drive would be considered. Soil excavated from agricultural land and nurseries may require reuse or proper off-site disposal, with further testing necessary at Manchester Avenue, between Birmingham Drive and Palomar Airport Road, and at Cannon Road. Soils from landfills near Piraeus Street may be reused or disposed as non-hazardous material at the appropriate landfill location; however, the Maxson Street site would be avoided. Further hazardous waste investigation may be necessary on individual parcels to be acquired. Therefore, Environmental Engineering staff shall be kept informed of parcel acquisitions and changes in scope or design. Since there are chemical constituents present in soil and groundwater within the I-5 corridor, soil excavation activities shall be performed under the guidelines of a site-specific Soil Management Plan and a Health and Safety Plan.

In addition, the DTSC lead variance would be followed for ADL soil excavated in the median. Soil in the median along I-5 to a depth of two ft is hazardous with regard to soluble ADL concentrations. This soil may be reused on site in accordance with a DTSC lead variance issued to Caltrans. If this criterion cannot be met, then disposal of ADL soil would be a necessary at a Class I landfill. Soil excavated as a whole along the shoulders may be reused as clean material with regard to ADL, unless soil adjacent to the shoulder is segregated from the whole. The DTSC lead variance will apply for segregated soil from the shoulder. Measures for groundwater impacts at service stations would be contained in the Dewatering permit for the San Diego Region (Order No. R9-2008-02 and any reissuance thereof). If soil from abutment excavations at Via de la Valle, Birmingham Drive, Brooks Street, Palomar Airport Road, Carlsbad Village Drive, or Mission Avenue would be exported, however, the soil may require further characterization for petroleum hydrocarbons, VOCs, or semi-volatile organic compounds to evaluate the proper disposal method. Investigation near the Olympus and Maxson Street landfills did not encounter wastes associated with the landfills. It is recommended that widening activities in the vicinity of these landfills be moved to the west to avoid the landfill sites. If parcels were acquired at these landfill locations, excavated soil would require further characterization to evaluate the proper disposal method. If soil from locations containing farmland or nurseries is exported, further characterization for pesticide/herbicides would be warranted to evaluate the proper disposal method. Because historical chemical spill locations along I-5 are unknown, a contingency would be written into the construction contract to address this potential hazardous waste issue. Proper handling and disposal measures would be carried out for asbestos, lead paint, and treated wood wastes, which may be in structures demolished during construction.

Figure 3-13.1: Hazardous Materials for High and Medium Risk – North

Figure 3-13.2: Hazardous Materials for High and Medium Risk – South

3.14 Air Quality

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.14.1 Regulatory Setting

The federal Clean Air Act (FCAA), as amended in 1990, is the federal law that governs air quality while the California Clean Air Act of 1988 is its companion State law. These laws, and related regulations by the U.S. Environmental Protection Agency (USEPA) and California Air Resources Board (CARB), set standards for the quantity of pollutants that can be in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). NAAQS and State ambient air quality standards have been established for six transportation-related criteria pollutants that have been linked to potential health concerns. The criteria pollutants are: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM) broken down for regulatory purposes into particles of 10 micrometers or smaller(PM_{10}) and particles of 2.5 micrometers and smaller ($PM_{2.5}$), lead (Pb), and sulfur dioxide (SO_2). In addition, State standards exist for visibility reducing particles, sulfates, hydrogen sulfide (H_2S), and vinyl chloride. The NAAQS and State standards are set at a level that protects public health with a margin of safety, and are subject to periodic review and revision. Both State and federal regulatory schemes also cover toxic air contaminants (air toxics). Some criteria pollutants are also air toxics or may include certain air toxics within their general definition.

Federal and State air quality standards and regulations provide the basic scheme for project-level air quality analysis under NEPA and CEQA. In addition to this type of environmental analysis, a parallel "Conformity" requirement under the FCAA also applies.

The FCAA Section 176(c) prohibits the USDOT and other federal agencies from funding, authorizing, or approving plans, programs, or projects that are not first found to conform to the State Implementation Plan (SIP) for achieving the FCAA requirements related to the NAAQS. "Transportation Conformity" Act takes place on two levels: the regional—or planning and programming—level and the project level. The proposed project must conform at both levels to be approved. Conformity requirements apply only in nonattainment and "maintenance" (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. USEPA regulations at 40 CFR 93 govern the conformity process.

Regional level conformity is concerned with how well the regional transportation system supports plans for attaining the standards set for CO, NO_2, O_3, $PM_{10,}$ and $PM_{2.5}$, and in some areas, SO_2. California has nonattainment or maintenance areas for all of these transportation-related "criteria pollutants" except $SO_{2;}$ the State also has a nonattainment area for Pb. However, lead is not currently required by the FCAA to be covered in transportation conformity analysis. Regional conformity is based on Regional Transportation Plans (RTPs) and federal Transportation Improvement Programs (TIPs) that include all of the transportation projects planned for a region over a period of at least 20 years for the RTP, and 4 years for the TIP. RTP and TIP conformity is based on use of travel demand and air quality models to determine whether or not the implementation of those projects would conform to emission budgets or other tests showing that requirements of the Clean Air Act and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization (MPO), Federal Highway Administration (FHWA), and Federal Transit Administration (FTA), make determinations that the RTP and TIP are in conformity with the SIP for achieving the goals of the Clean Air Act. Otherwise, projects in the RTP and/or TIP must be modified until conformity is attained. If the design, scope, and open to traffic schedule of a proposed transportation project are the same as described in the RTP, then the proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

As noted in Chapter 1 of this Final EIR/EIS, SANDAG has approved the 2050 RTP, although on December 20, 2012, the San Diego Superior Court entered a judgment finding that the EIR for the 2050 RTP is legally inadequate in certain limited respects. The EIR for the 2050 RTP was invalidated mainly because it allegedly: (1) failed to adequately analyze greenhouse gas (GHG) emissions against Executive Order S-03-05 requirements to reduce GHG emissions 80 percent below 1990 levels by 2050; and (2) failed to identify sufficient legally enforceable mitigation measures for GHG emissions. SANDAG has appealed the judgment to the Court of Appeal. This Final EIR/EIS has been drafted to avoid the narrow alleged deficiencies the Court found in the EIR for the 2050 RTP.

FHWA and Caltrans' environmental analysis for the *I-5 NCC Project* EIR/EIS may draw on facts from the EIR for the 2050 RTP; but it does not tier from the 2050 RTP EIR or rely on the EIR's certification. The project would be constructed by 2035 and includes specific, enforceable mitigation measures for GHG emissions.

Conformity at the project-level also requires "hot spot" analysis if an area is designated as "nonattainment" or "maintenance" for CO and/or PM_{10} or $PM_{2.5}$. A region is "nonattainment" if one or more monitoring stations in the region fail to attain the relevant standard, and USEPA officially designates the area nonattainment. Areas that were previously designated as nonattainment areas but subsequently meet the standard may be officially redesignated to attainment by the USEPA, and are then called "maintenance" areas. "Hot spot" analysis is essentially the same, for technical purposes, as a CO or PM analysis performed for NEPA purposes. Conformity does include some specific procedural and documentation standards for projects that require a "hot spot" analysis. In general, projects must not cause the "hot spot"-related standard to be violated, and must not cause any increase in the number and severity of violations. If a known CO or PM violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well.

It should also be noted that new federal standards include a one-hour NAAQS for NO_2 of 100 parts per billion (ppb), while retaining the existing annual standard of 53 ppb. The new one-hour standard was based on observations by USEPA that roadway-associated exposures account for a majority of ambient exposures to peak NO_2 concentrations. Associated monitoring is required to be implemented and operational by January 1, 2013. After three years of monitoring are completed, the USEPA will evaluate the associated data and redesignate individual areas as appropriate for NAAQS attainment or non-attainment status.

3.14.2 Affected Environment

This section is based on the Air Quality Analysis for the I-5 North Coast Project, prepared in August 2007.

The proposed project is located in the San Diego Air Basin (SDAB), which is within San Diego County. The climate of San Diego County is characterized by warm, dry summers and mild, wet winters. One of the main determinants of the climatology is a semi permanent high-pressure area (the Pacific High) in the eastern Pacific Ocean. In the summer, this pressure center is located well to the north, causing storm tracks to be directed north of California. This high-pressure cell maintains clear skies for much of the year. When the Pacific High moves southward during the winter, this pattern changes, and low-pressure storms are brought into the region, causing widespread precipitation. In San Diego County, the months of heaviest precipitation are November through April, averaging about 9 to 14 in annually. The mean temperature is 62.2°F, and the mean maximum and mean minimum temperatures are 75.7°F and 48.5°F, respectively.

The Pacific High also influences the wind patterns of California. The predominant wind directions are westerly and west-southwesterly during all four seasons, and the average annual wind speed is 5.6 mph.

A common atmospheric condition known as a temperature inversion affects air quality in San Diego. During an inversion, air temperatures get warmer rather than cooler with increasing height. Subsidence inversions occur during the warmer months (May through October) as descending air associated with the Pacific High comes into contact with cooler marine air. The boundary between the layers of air represents a temperature inversion that traps pollutants below it. The inversion layer is approximately 2000 ft AMSL during the months of May through October. However, during the remaining months (November through April), the temperature inversion is approximately 3000 ft AMSL. Inversion layers are important elements of local air quality because they inhibit the dispersion of pollutants, thus resulting in a temporary degradation of air quality.

3.14.3 Environmental Consequences

Regional Air Quality Conformity

The proposed project is fully funded in the 2030 RTP. The proposed project is also listed in the 2050 financially constrained RTP, which was found to conform by SANDAG on October 28, 2011. The FHWA and FTA made a regional conformity determination on December 2, 2011. The project is included in SANDAG's financially constrained 2012 RTIP, page 33. The SANDAG 2012 RTIP was adopted by the SANDAG Board on September 28, 2012, and was determined to conform by FHWA and FTA on December 14, 2012. The design concept and scope of the proposed project is also generally consistent with the project description in the 2030 RTP, and the 2010 RTIP, and the "open to traffic" assumptions of the SANDAG's regional emissions analysis. Therefore, the project is assumed to conform to the SIP and no adverse regional air quality impact would occur as a result of the project.

Project Level Conformity

The FCAA requires the adoption of NAAQS to protect public health and welfare from the effects of air pollution. Current standards are set for SO_2, CO, NO_2, O_3, PM_{10}, fine $PM_{2.5}$, and Pb. State standards have been established by the CARB, and these are generally more stringent than the NAAQS counterparts. Federal and State standards are depicted in *Table 3.14.1.*

Areas are classified by the FCAA as either "attainment" or "nonattainment" for each of the criteria pollutants, based on whether the NAAQS have been met.

The proposed project site is located in the SDAB, which currently meets the federal air quality standards for all of the criteria air pollutants except O_3, as shown in the *Table 3.14.2*. The SDAB was designated as a marginal nonattainment area for the eight-hour O_3 standard in July 2012. The SDAB is designated as a federal maintenance area for CO following its redesignation from the non-attainment to a CO attainment area. *Table 3.14.3* shows the pollutants for which the area has been classified as a federal nonattainment or maintenance area and the number of associated violations within the past three years. State standards currently classify the SDAB area as a "serious-nonattainment" for O_3, and a nonattainment area for $PM_{2.5}$ and PM_{10}.

Ambient air pollutant concentrations in the SDAB are measured at 10 air quality monitoring stations operated by the Air Pollution Control District (APCD). The APCD air quality monitoring station that represents the project area, climate, and topography in the SDAB is the Del Mar-Mira Costa College Monitoring Station. However, the Del Mar-Mira Costa College Monitoring Station only monitors O_3. The next nearest monitoring station is San Diego Beardsley, 1110A Beardsley Street, San Diego, CA 92112. This station monitors CO, NO_X, O_3, PM_{10}, and $PM_{2.5}$. *Table 3.14.4* summarizes the excess of standards and the highest pollutant levels recorded at these stations for the years 2010 and 2012.

Table 3.14.1: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]	Federal Standards[2]	
		Concentration[3]	Primary[3,4]	Secondary[3,5]
Ozone (O_3)	1-Hour	0.09 ppm (180 µg/m^3)	–	Same as Primary Standard
	8-Hour	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	
Respirable Particulate Matter (PM_{10})[6]	24-Hour	50 µg/m^3	150 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	20 µg/m^3	–	
Fine Particulate Matter ($PM_{2.5}$)[6]	24-Hour	–	35 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	12 µg/m^3	12.0 µg/m^3	15.0 µg/m^3
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	None
	1-Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
Nitrogen Dioxide (NO_2)[7]	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary Standard
	1-Hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	None

Table 3.14.1 (cont.): Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1] Concentration[3]	Federal Standards[2] Primary[3,4]	Federal Standards[2] Secondary[3,5]
Sulfur Dioxide (SO_2)[8]	Annual Arithmetic Mean	–	0.030 ppm (80 µg/m[3]) (for certain areas)[8]	–
	24-Hour	0.04 ppm (105 µg/m[3])	0.14 ppm (365 µg/m[3]) (for certain areas)[8]	–
	3-Hour	–	–	0.5 ppm (1300 µg/m[3])
	1-Hour	0.25 ppm (655 µg/m[3])	75 ppb (196 µg/m[3])	–
Lead (Pb)[9,10]	30-Day Average	1.5 µg/m[3]	–	–
	Calendar Quarter	–	1.5 µg/m[3]	Same as Primary Standard
	Rolling 3-Month Average	–	0.15 µg/m[3]	
Hydrogen Sulfide (H_2S)	1-Hour	0.03 ppm (42 µg/m[3])	No Federal Standards	
Sulfates (SO_4)	24-Hour	25 µg/m[3]		
Visibility Reducing Particles[11]	8-Hour	See footnote 11		
Vinyl Chloride[9]	24-Hour	0.01 ppm (26 µg/m[3])		

1. California standards for O_3, CO (except Lake Tahoe), SO_2 (1 and 24 hour), NO_2, PM_{10}, $PM_{2.5}$, and visibility reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than O_3, PM, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest eight-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m[3] is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact USEPA for further clarification and current federal policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 77°F and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 77°F and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
5. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
6. On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m[3] to 12.0 µg/m[3]. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m[3], as was the annual secondary standard of 15 µg/m[3]. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m[3] also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
7. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of ppb. California standards are in units of ppm. To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
8. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. Note that the 1-hour national standard is in units of ppb. California standards are in units of ppm. To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
9. The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
10. National lead standard, rolling 3-month average: final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m[3] as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
11. In 1989, the CARB converted the general Statewide 10-mile visibility standard to an instrumental equivalent, which is "extinction of 0.23 per kilometer" when the relative humidity is less than 70 percent.

Source: CARB (June 4, 2013)

Table 3.14.2: Federal and State Criteria Pollutant Attainment Status for the San Diego Air Basin

Pollutant	SDAB Attainment Status	
	Federal	State
O_3 – 1 hour	--	Nonattainment
O_3 – 8 hour	Nonattainment - Marginal	Nonattainment
CO	Maintenance	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Attainment	Nonattainment
NO_2 – 1 hour	Under Evaluation	--

Table 3.14.3: Federal Nonattainment and Attainment/Maintenance Pollutants in the San Diego Air Basin

Pollutant	Federal Attainment Status	Exceedances in the Last 3 Years
O_3 – 8-hour	Nonattainment, Marginal*	none in 2010, none in 2011, and 2 in 2012
CO	Maintenance	None

* In March 2013, the EPA approved CARB's request to redesignate the SDAB to an attainment/maintenance area for the 1997 8-hour ozone federal standard. Under the new 2008 8-hour federal standard, however, EPA designated the SDAB as a marginal non-attainment area (effective July 2012).

Source: CARB 2013a, USEPA 2013d

Note: CARB indicates that exceedances are not necessarily violations

Table 3.14.4: Ambient Air Quality Summary – San Diego-Beardsley

Pollutant Standards	2010	2011	2012
Carbon Monoxide (CO)			
Maximum National 8-hour concentration (ppm)	2.17	2.44	1.81
Maximum California 8-hour concentration (ppm)	2.17	2.44	1.81
Number of Days Standard Exceeded			
NAAQS 1-hour (>35 ppm)	0	0	0
CAAQS 8-hour (>20 ppm)	0	0	0
NAAQS 8-hour (>9 ppm)	0	0	0
CAAQS 8-hour (>9 ppm)	0	0	0
Nitrogen Dioxide (NO_2)			
Maximum 1-hour concentration (ppm)	0.077	0.067	0.065
Annual Average (ppm)	0.015	0.014	0.013
Number of Days Standard Exceeded			
CAAQS 1-hour	0	0	0
Sulfur Dioxide (SO_X)[a]			
Maximum National 1-hour concentration (ppm)	0.008	0.001	0.002
Maximum California 24-hour concentration (ppm)	0.0025	0.0005	0.0005
Number of Days Standard Exceeded			
NAAQS 1-hour (>0.075 ppm)	0	0	0
CAAQS 24-hour (>0.04 ppm)	0	0	0

Table 3.14.4 (cont.): Ambient Air Quality Summary – San Diego-Beardsley

Pollutant Standards	2010	2011	2012
Ozone (O_3)[b]			
Maximum 1-hour concentration (ppm)	0.085	0.091	0.088
Maximum 8-hour concentration (ppm)	0.072	0.075	0.079
Number of Days Standard Exceeded			
CAAQS 8-hour (>0.070 ppm)	2	1	2
CAAQS 1-hour (>0.09 ppm)	2	1	3
NAAQS 8-hour (>0.075 ppm)	0	0	2
Particulate Matter (PM_{10})			
National maximum 24-hour concentration (µg/m^3)	40.0	48.0	45.0
National second highest 24-hour concentration (µg/m^3)	38.0	47.0	43.0
State maximum 24-hour concentration (µg/m^3)	40.0	49.0	47.0
State second highest 24-hour concentration (µg/m^3)	39.0	48.0	45.0
National[c] annual average concentration (µg/m^3)	22.8	23.3	21.8
State[d] annual average concentration (µg/m^3)	23.4	24.0	22.2
Number of Days Standard Exceeded			
NAAQS 24-hour (>150 µg/m^3)	0	0	0
CAAQS 24-hour (>50 µg/m^3)	0	0	0
Particulate Matter ($PM_{2.5}$)			
Maximum 24-hour concentration (µg/m^3)	29.7	34.7	39.8
Second highest 24-hour concentration (µg/m^3)	26.2	33.9	34.7
Third highest 24-hour concentration (µg/m^3)	25.3	33.2	32.4
Fourth highest 24-hour concentration (µg/m^3)	24.3	25.4	31.8
National[c] annual average concentration (µg/m^3)	10.4	10.8	11.3
State[d] annual average concentration (µg/m^3)	*	10.9	*
Number of Days Standard Exceeded			
NAAQS 24-hour (>65 µg/m^3)	0	0	1

Notes

* Data Unavailable

[a] Sulfur dioxide readings for 2011 and 2012 taken from the El Cajon-Redwood Avenue Monitoring Station. National 24-hour and Annual Arithmetic Mean revoked in June 2010.

[b] Ozone readings taken at Del Mar-Mira Costa Monitoring Station.

[c] National annual average based on arithmetic mean.

[d] State annual average based on geometric mean.

Source: CARB 2013b,c

Some locations are considered more sensitive to adverse effects from air pollution than others. These locations are commonly termed sensitive receptors and they include hospitals, schools, day care centers, nursing homes, and parks/playgrounds. Sensitive receptors in proximity to localized CO sources, toxic air contaminants, or odors are of particular concern. Sensitive receptors closest to I-5 are presented in *Table 3.14.5*.

Table 3.14.5: Sensitive Receptors

School	District	Street Address	City	Distance (ft)
Preuss School UCSD	San Diego Unified	9500 Gilman Drive, Dept. 0536	La Jolla	1708
Laurel Elementary	Oceanside Unified	1410 Laurel Street	Oceanside	2131
Oceanside High	Oceanside Unified	1 Pirates Cove	Oceanside	1151
Palmquist Elementary	Oceanside Unified	1999 California Street	Oceanside	2280
South Oceanside Elementary	Oceanside Unified	1806 South Horne Street	Oceanside	1512
Buena Vista Elementary	Carlsbad Unified	1330 Buena Vista Way	Carlsbad	800
Jefferson Elementary	Carlsbad Unified	3743 Jefferson Street	Carlsbad	743
Pacific Rim Elementary	Carlsbad Unified	1100 Camino De Las Ondas	Carlsbad	2558
Capri Elementary	Encinitas Union Elementary	941 Capri Road	Encinitas	2025
Paul Ecke-Central Elementary	Encinitas Union Elementary	185 Union Street	Encinitas	1992
North Coast Alternative High	San Dieguito Union High	684 Requeza Street	Encinitas	2445
Sunset High (Continuation)	San Dieguito Union High	684 Requeza Street	Encinitas	2483
San Dieguito High Academy	San Dieguito Union High	800 Santa Fe Drive	Encinitas	1830
Solana Vista Elementary	Solana Beach Elementary	780 Santa Victoria Avenue	Solana Beach	2203
Skyline Elementary	Solana Beach Elementary	606 Lomas Santa Fe Drive	Solana Beach	1388
Earl Warren Middle	San Dieguito Union High	155 Stevens Street	Solana Beach	1931
Solana Highlands Elementary	Solana Beach Elementary	3520 Long Run Drive	San Diego	1462
Del Mar Hills Elementary	Del Mar Union Elementary	14085 Mango Drive	Del Mar	431
Del Mar Heights Elementary	Del Mar Union Elementary	13555 Boquita Drive	Del Mar	1826
Torrey Hills	Del Mar Union Elementary	10830 Calle Mar De Mariposa	San Diego	1481
Ada W. Harris Elementary	Cardiff Elementary	1508 Windsor Road	Cardiff-by-the-Sea	1066
Cardiff School District	Cardiff Elementary	1888 Montgomery Avenue	Cardiff-by-the-Sea	2435
Cardiff Elementary	Cardiff Elementary	1888 Montgomery Avenue	Cardiff-by-the-Sea	2592
Montessori Arts And Sciences Elementary	Carlsbad Unified	3016 Highland Drive	Carlsbad	1764
St. Patrick	Carlsbad Unified	3820 Pio Pico Drive	Carlsbad	187
Discovery Isle Child Development	Carlsbad Unified	6130 Paseo Del Norte	Carlsbad	556

Table 3.14.5 (cont.): Sensitive Receptors

School (cont.)	District	Street Address	City	Distance (ft)
Santa Fe Christian Schools	San Dieguito Union High	838 Academy Drive	Solana Beach	777
Santa Fe Montessori School	Solana Beach Elementary	1010 Solana Drive	Solana Beach	352
St. Mary Star Of The Sea Elementary	Oceanside Unified	515 Wisconsin Avenue	Oceanside	2613
Sanderling School	Cardiff Elementary	1401 Windsor Road	Cardiff-by-the-Sea	1673
Casa Montessori De Carlsbad	Carlsbad Unified	3470 Madison Street	Carlsbad	982
Cal Coast Academy	San Dieguito Union High	983 Lomas Santa Fe Drive, Suite F/G	Solana Beach	1173
Preschool	**Capacity**	**Street Address**	**City**	**Distance (ft)**
A Brighter Future Preschool & Child Development Center	136	3422 Tripp Court	San Diego	577
A Children's Garden – Leucadia	30	1421 Burgundy Road	Encinitas	1618
Back To The Basics Preschool	48	1759 Oceanside Boulevard	Oceanside	887
Balderrama Child Development Center	84	709 San Diego Street	Oceanside	1491
Bright Horizons Family Solutions	151	3720 Arroyo Sorrento Road	San Diego	947
Carlsbad Children's Garden	38	2518 Jefferson Street	Carlsbad	848
Carlsbad Children's House	24	2606 Jefferson Street	Carlsbad	1130
Carlsbad Montessori School	71	740 Pine Avenue	Carlsbad	1197
Casa De Niños Child Development Center	119	1718 Mission Avenue	Oceanside	1577
Casa Montessori De Carlsbad	49	3470 Madison Street	Carlsbad	1104
Childrens Learning Center	73	139 Canyon Drive	Oceanside	2633
Encinitas Migrant Child Development Center	52	1508 Windsor Road	Cardiff-by-the-Sea	1179
Family Recovery Center - Child Development Center	15	1100 Sportfisher Drive	Oceanside	332
Friendly Daycare & Preschool Center	30	1836 Dixie Street	Oceanside	1720
Great Beginnings Preschool	87	511 Encinitas Boulevard #110	Encinitas	1415
Immanuel Lutheran Children's Learning Center	35	1900 South Nevada Street	Oceanside	1937

Table 3.14.5 (cont.): Sensitive Receptors

Preschool (cont.)	Capacity	Street Address	City	Distance (ft)
International Cooperative Nursery School	24	9500 Gilman Drive, Dept. 18	La Jolla	2189
Little Bears Tender Care	75	1828 Oceanside Boulevard	Oceanside	1462
Maac Project Head Start North Coast	60	1501 Kelly Street	Oceanside	150
Maac Project Head Start Oceanside 3	18	509 Sports Fisher	Oceanside	1672
Magdalena Ecke YMCA	128	200 Saxony Road	Encinitas	635
Megastar Children's Christian Academy	27	3780 Pio Pico Drive	Carlsbad	98
Neighborhood House Association (NHA) - Carlsbad Head Start	82	3368 Eureka Place	Carlsbad	216
NHA - Head Start By The Sea	80	777 Santa Fe Drive	Encinitas	1528
NHA - Leucadia Head Start Center	60	616 Old Highway 101	Leucadia	2214
NHA - St. Leo's Head Start Center	74	936 Genevieve Street	Solana Beach	226
Oceanside Child Development Center	136	Corner of Horne Street & Center Avenue	Oceanside	1610
Oceanside Unified School District (OUSD) - Ditmar Elementary	26	1125 South Ditmar	Oceanside	2276
OUSD - Laurel Elementary	30	1410 Laurel Street	Oceanside	2050
San Dieguito United Methodist Pre-School	67	170 Calle Magdalena	Encinitas	759
Sanderling School	18	1401 Windsor Road	Cardiff-by-the-Sea	1518
Sandy Hill Nursery School	34	1036 Solana Drive	Solana Beach	835
Santa Fe Christian Preschool	64	845 Santa Fe Drive	Encinitas	1912
Santa Fe Montessori School	144	1010 Solana Drive	Solana Beach	420
Smart Start Preschool	75	240 Birmingham Drive	Cardiff-by-the-Sea	2269
Solana Beach Community Preschool	28	524 Stevens Avenue	Solana Beach	1600
Solana Beach Presbyterian Preschool	135	120 Stevens Avenue	Solana Beach	1778
Sorrento Valley Children's Center	84	4050-A Sorrento Valley Boulevard	San Diego	1424
Torrey Pines Montessori Center	12	2596 Carmel Valley Road	Del Mar	1919
Trump's Del Mar Hills Nursery School, Inc.	60	13692 Mango Drive	Del Mar	1259

Table 3.14.5 (cont.): Sensitive Receptors

Hospital	Street Address	City	Distance (ft)
Thornton-Perlman Hospital	9300 Campus Point Drive	La Jolla	1105
Veterans Administration Hospital	3350 La Jolla Village Drive	San Diego	859
Scripps Memorial Hospital - La Jolla	9888 Genesee Avenue	La Jolla	858
Scripps Memorial Hospital - Encinitas	354 Santa Fe Drive	Encinitas	203
College/University	**Street Address**	**City**	**Distance (ft)**
University Of California San Diego	La Jolla Village Drive & Gilman Drive	San Diego	895
National University-Carlsbad	705 Palomar Airport Road	Carlsbad	759
Park	**Park Type**	**City**	**Distance (ft)**
Los Peñasquitos Canyon Preserve	Preserve	San Diego	949
Quail Botanical Gardens	Botanical Garden	Encinitas	1489
San Elijo Lagoon Ecological Reserve	Ecological Reserve	Solana Beach/ Encinitas	79
UCSD Park	Passive Open Space	San Diego	160
Los Peñasquitos Canyon Reserve Trail	Trail	San Diego	50
Torrey Hills Neighborhood Park	Community Park	San Diego	2110
Torrey Pines State Reserve	Open Space	San Diego	0-50
Solana Highlands Elementary School & Park	Community Park	San Diego	1160
San Dieguito River Park	Open Space Preserve	San Diego	0
Surf and Turf Recreation Park (a.k.a. Del Mar Golf Center)	Golf and Tennis	San Diego	50
La Colonia Park	Community Park	Solana Beach	960
Glen Park	Community Park	Encinitas	1890
George Berkich Park	Community Park	Encinitas	2490
Cardiff Sports Park	Sports Fields	Encinitas	2320
Hall Property Community Park	Community Park	Encinitas	0
Ada Harris Elementary School & Park	Community Park	Encinitas	740
Mildred MacPherson Park	Community Park	Encinitas	2020
Encinitas Viewpoint Park	Community Park	Encinitas	930
Cottonwood Creek Park	Community Park	Encinitas	20
Paul Ecke Sports Park	Sports Fields	Encinitas	0
Magdalena Ecke Family YMCA	Gym, Pool, Skate Park, and Indoor Soccer Fields	Encinitas	140
Orpheus Park	Community Park	Encinitas	1210
James MacPherson Park	Park	Encinitas	15
Batiquitos Lagoon	Open Space	Carlsbad	0
Aviara Trails	Trail	Carlsbad	720

Table 3.14.5 (cont.): Sensitive Receptors

Park (cont.)	Park Type		City	Distance (ft)
South Carlsbad State Beach	Beach, Open Space		Carlsbad	1740
Poinsettia Park	Community Park		Carlsbad	1850
Car Country Park	Community Park		Carlsbad	50
Cannon Park	Community Park		Carlsbad	1690
Agua Hedionda Lagoon and CDFW Reserve	Open Space and Reserve		Carlsbad	0
Carlsbad State Beach	Beach and Open Space		Carlsbad	2110
Coastal Rail Trail - Carlsbad	Trail		Carlsbad	110
Chase Field and Pine Avenue Park	Sports Fields and Community Park		Carlsbad	360
Oak Park	Picnic Area		Carlsbad	50
Pio Pico Park	Picnic Area		Carlsbad	50
Holiday Park	Community Park		Carlsbad	0
Rotary Park	Community Park		Carlsbad	2530
Maxton Brown Park	Passive Recreation		Carlsbad	2320
Hosp Grove Park	Community Park		Carlsbad	1930
Buena Vista Lagoon	Open Space		Carlsbad & Oceanside	0
South Oceanside Elementary School and Park	Community Park		Oceanside	840
Marshall Street Swim Center and Park	Community Park		Oceanside	1320
Center City Golf Course	Golf Course		Oceanside	0
Ron Ortega Recreation Park	Sports Fields		Oceanside	100
Joe Balderrama Park & Center	Community Park		Oceanside	790
San Luis Rey River Trail	Trail / Bike Path		Oceanside	0
Capistrano Park	Community Park		Oceanside	1110
Nursing Homes	**Capacity**	**Street Address**	**City**	**Distance (ft)**
George G. Glenner Family Center - Encinitas	30	335 Saxony Road	Encinitas	961
Aviara Healthcare Center	119	944 Regal Road	Encinitas	130

Carbon Monoxide (CO)

For the CO hot spot analysis, the procedure outlined in the Transportation Project-Level Carbon Monoxide Protocol, 1997 (CO Protocol) (Institute of Transportation Studies UC Davis 1997) was used to perform a microscale air quality modeling using EMFAC2002 and CALINE4 (Caltrans 1989). EMFAC2002 (CARB 2007) was used to calculate the CO emission factors required for modeling. CALINE4 included in the CL4 software package was used to predict the maximum one-hour average CO concentrations at selected intersections in the proposed project limits (*Table 3.14.6*).

The composite CO emission factors were calculated for the years 2015 and 2030 for the SDAB. The EMFAC2002 SDAB default data were used for most variables including: model years; vehicle classes; inspection and maintenance program schedule; control technology; vehicle population and odometer accrual rates; vehicle miles traveled (VMT) and vehicle trips; and profiles of Reid Vapor Pressure, temperature, humidity, speed fractions, and idle times.

The ambient temperature used in EMFAC modeling was the lowest mean minimum temperature over a representative period of at least three years, adjusted by +5°F for both the morning and evening peak hours as recommended by the CO protocol. The temperature was determined to be 44.0°F (NWS 2009).

The average free flow speeds for the selected links were obtained from the project traffic study. These speeds were then used to determine the average cruise speed based on the arterial classifications. The links' average approach and departure speeds were also determined based on traffic volume, average cruise speed, and percentage of red time.

The eight-hour maximum CO concentration was calculated by applying a persistence factor of 0.7 to the predicted maximum one-hour average CO concentrations obtained from each modeling run. The background concentrations were then added to the predicted concentrations to calculate the modeled maximum concentrations, which were then compared to the CAAQS and NAAQS to determine if the proposed project results in exceedances.

Table 3.14.6: Estimated CO Concentration Hot Spot Modeling Results

Intersection	Existing		2030 No Build		2015 10+4 Scenarios		2030 10+4 Scenarios	
	AM	PM	AM	PM	AM	PM	AM	PM
One-Hour CO Concentrations								
Palomar Airport Road and I-5 access ramps	11.1	10.8	6.6	7.0	7.7	8.2	6.6	7.1
Genesee Avenue and I-5 access ramps	12.1	13.2	6.5	6.7	7.3	7.0	6.5	6.7
Del Mar Heights Road and I-5 access ramps	10.2	11.3	6.7	6.8	7.5	7.9	6.4	6.8
Federal standard	35							
State standard	20							
Eight-Hour CO Concentrations								
Palomar Airport Road and I-5 access ramps	7.8	7.6	4.6	4.9	5.4	5.7	4.6	5.0
Genesee Avenue and I-5 access ramps	7.8	8.7	4.6	4.7	5.1	4.9	4.6	4.7
Del Mar Heights Road and I-5 access ramps	7.1	7.9	4.7	4.8	5.3	5.5	4.5	4.8
Federal standard	9.0							
State standard	9.0							

Ambient one-hour concentrations are based on maximum CO levels for the Beardsley Street (Downtown San Diego) Monitoring Station.
Eight-hour concentrations are estimated from one-hour concentrations using an urban location persistence factor of 0.7.

Based on the results obtained from a detailed analysis, it has been concluded that the proposed project's future traffic conditions would not exceed federal and State one-hour or eight-hour standards during the a.m. or p.m. peak periods at any of the analyzed intersections. All other intersections in the project area are predicted to experience less delay time and improved operating conditions. The results of the quantitative CO hot spot analysis show that the proposed project would not adversely impact the local air quality.

The Carbon Monoxide (CO) "Hot Spot" analysis that was performed in the August 2007 Air Quality Analysis, was performed using the most current protocol (Transportation Project-Level Carbon Monoxide Protocol [CO Protocol], University of California Davis, December 1997, Caline 4, dispersion modeling software, in conjunction with CT-EMFAC 2002). While there have been recent updates to the CT-EMFAC version, the CO Protocol is still the same as is the traffic information used for modeling input. Any new analysis would result in similar or additionally improved findings due to improvements in vehicle emissions technology and vehicle fleet turnover.

PM_{10} and $PM_{2.5}$

On March 10, 2006, the USEPA published a final rule that establishes the transportation conformity criteria and procedures for determining which transportation projects must be analyzed from local air quality impacts in PM_{10} and $PM_{2.5}$ nonattainment and maintenance areas. Based on that rule, the USEPA and FHWA published the Transportation Conformity Guidance for Qualitative Hot-Spot Analysis in PM_{10} and $PM_{2.5}$ Nonattainment and Maintenance Areas (PM guidance) (FHWA 2006b). While the SDAB is not a federally designated PM_{10} and $PM_{2.5}$ nonattainment or maintenance area, it is designated as a State nonattainment area for both pollutants. Thus, to meet State requirements, the proposed project is assessed using the procedure outlined in the PM Guidance.

A hot spot analysis is defined in 40 CFR 93.101 as an estimation of likely future localized $PM_{2.5}$ or PM_{10} pollutant concentrations and a comparison of those concentrations to the relevant air quality standards. A hot spot analysis assesses the air quality impacts on a scale smaller than an entire nonattainment or maintenance area, including, for example, congested roadway intersections and highways or transit terminals. Such an analysis is a means of demonstrating that a transportation project meets CAA conformity requirements to support state and local air quality goals with respect to potential localized air quality impacts. When a hot spot analysis is required, it is included within the project-level conformity determination that is made by the FHWA or FTA.

The PM Guidance describes qualitative hot spot analyses. Qualitative hot spot analyses methods involve more streamlined reviews of local factors such as local monitoring data near a proposed project location.

Projects of Air Quality Concern

To meet statutory requirements, the March 10, 2006, final rule requires $PM_{2.5}$ and PM_{10} hot spot analyses to be performed for "projects of air quality concern." Qualitative hot spot analyses would be done for these projects. Projects not identified as projects of air quality concern (POAQC) are considered to meet statutory requirements without any further hot spot analyses.

The PM Guidance defines POAQC as projects within a federally designated $PM_{2.5}$ or PM_{10} nonattainment or maintenance area, funded or approved by the FHWA or FTA, and one of the following types of projects:

- New or expanded highway projects that have a significant number of or significant increase in diesel vehicles
- Projects affecting intersections that are LOS D, E, or F with a significant number of diesel vehicles, or those that would change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project

- New bus and rail terminals, and transfer points, that have a significant number of diesel vehicles congregating at a single location
- Expanded bus and rail terminals, and transfer points, that significantly increase the number of diesel vehicles congregating at a single location
- Projects in, or affecting locations, areas, or categories of sites that are identified in the $PM_{2.5}$ applicable implementation plan, or implementation plan submittal, as appropriate, as sites of violation or possible violation

Appendix A of the PM Guidance contains examples of POAQC and examples of projects that are not an air quality concern. Under the example of POAQC, a significant volume for a new highway or expressway is defined as facilities with an annual average daily traffic (AADT) volume of 125,000 or more, and a significant number of diesel vehicles is defined as diesel truck traffic representing eight percent or more of the total AADT.

The proposed project is not located in a federally designated $PM_{2.5}$ or PM_{10} nonattainment or maintenance area. Therefore, the proposed project does not meet the criteria of a POAQC as defined in the PM Guidance. PM_{10} and $PM_{2.5}$ hot spot analyses are required by the USEPA Transportation Conformity Rule (40 CFR § 93.116 and 40 CFR § 93.123) to determine project-level conformity in PM_{10} and $PM_{2.5}$ nonattainment or maintenance areas (FHWA 2006a).

The SDAB is not a federally designated PM_{10} or $PM_{2.5}$ nonattainment or maintenance area; thus, the project does not require PM_{10} or $PM_{2.5}$ hot spot analyses. However, the SDAB is in nonattainment for PM_{10} and $PM_{2.5}$ State standards as stated above.

Following the PM Guidance, the project does not meet the requirement set forth as a POAQC. As defined above, the project would expand the I-5 corridor but would not have a significant increase in diesel truck traffic, only six percent diesel trucks. The project would not affect intersections that are LOS D, E, or F with a significant number of diesel vehicles, or change those to LOS D, E, or F, because of increased traffic volumes from a significant number of diesel vehicles related to the project. The project would not create new bus and rail terminals, and transfer points, that have a significant number of diesel vehicles congregating at a single location. The project would not expand bus and rail terminals, and transfer points, that significantly increase the number of diesel vehicles congregating at a single location. The project would not significantly increase the number of diesel vehicles congregating at a single location affecting locations, areas, or categories of sites that are identified in the $PM_{2.5}$ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation. The project does not meet the criteria of a POAQC as defined in the PM Guidance and therefore does not require PM_{10} or $PM_{2.5}$ hot spot analyses.

There has also been practical advice established, based on the California conformity working group practices, to help identify a POAQC. This advice lists three types of projects:

1. Likely a POAQC
   a. Project services 10,000+ AADT of diesel trucks
   b. Project substantially affects truck traffic by means of congestion reduction, capacity expansion or realignment
2. Could be a POAQC
   a. Project moves diesel emissions closer to sensitive receptors, somewhat independent of volume

   b. Project increases truck volume 5 to 10 percent, even if volume falls short of USEPA criteria
3. Not likely a POAQC
   a. Project has essentially the same build and no build truck volume

Using this advisory analysis and the PM "Hot Spot" methodology of localized analysis, the project was broken up into 22 segments to determine the worst-case scenario of diesel truck AADT. According to *Table 3.14.7*, the worst-case AADT of diesel trucks, for the 2030 8+4 Buffer alternative (Preferred Alternative), is located at Segment 5, southbound. This segment has an AADT of 7,434 trucks, which is well below the 10,000+ advisory limit and it is during off-peak hours. The highest peak hour AADT truck traffic is only 1,790 at Segment 2 in the southbound direction.

Table 3.14.7: 2030 Worst-case Diesel Trucks AADT for the Preferred Alternative

Segment	2030 Preferred Alternative							
	AADT by Segment							
	SB General Purpose				NB General Purpose			
	Peak	Trucks (6%)	OP	Trucks (6%)	Peak	Trucks (6%)	OP	Trucks (6%)
1	14,994	**900**	85,072	**5,104**	25,101	**1,506**	83,571	**5,014**
2	15,570	**934**	71,706	**4,302**	18,611	**1,117**	67,516	**4,051**
3	17,494	**1,050**	71,044	**4,263**	17,900	**1,074**	89,371	**5,362**
4	29,832	**1,790**	115,943	**6,957**	28,372	**1,702**	112,486	**6,749**
5	27,417	**1,645**	123,893	**7,434**	26,304	**1,578**	110,616	**6,637**
6	24,501	**1,470**	112,262	**6,736**	23,776	**1,427**	104,788	**6,287**
7	22,618	**1,357**	111,630	**6,698**	23,768	**1,426**	107,615	**6,457**
8	20,051	**1,203**	101,623	**6,097**	20,563	**1,234**	97,923	**5,875**
9	19,303	**1,158**	97,345	**5,841**	19,460	**1,168**	94,890	**5,693**
10	18,608	**1,116**	95,765	**5,746**	19,731	**1,184**	93,338	**5,600**
11	18,234	**1,094**	94,648	**5,679**	18,803	**1,128**	91,168	**5,470**
12	17,494	**1,050**	94,224	**5,653**	19,623	**1,177**	91,887	**5,513**
13	16,970	**1,018**	92,111	**5,527**	19,389	**1,163**	89,671	**5,380**
14	17,430	**1,046**	89,804	**5,388**	18,146	**1,089**	85,906	**5,154**
15	20,442	**1,227**	87,813	**5,269**	19,036	**1,142**	80,967	**4,858**
16	22,264	**1,336**	91,709	**5,503**	20,720	**1,243**	82,189	**4,931**
17	22,615	**1,357**	92,816	**5,569**	20,257	**1,215**	81,876	**4,913**
18	19,040	**1,142**	85,541	**5,132**	19,640	**1,178**	80,209	**4,813**
19	13,935	**836**	88,601	**5,316**	21,114	**1,267**	86,567	**5,194**
20	14,454	**867**	86,762	**5,206**	21,006	**1,260**	82,998	**4,980**
21	13,687	**821**	82,277	**4,937**	21,158	**1,269**	79,727	**4,784**
22	13,692	**822**	86,688	**5,201**	19,274	**1,156**	77,175	**4,631**

Note: Peak hours are 6 a.m. to 9 a.m. and 3 p.m. to 6 p.m., total of six hours. Off peak hours are all others, total of 18 hours. This is why off peak AADT is greater than peak AADT.

Table 3.14.8 depicts the AADT truck traffic for the 2030 No Build alternative and shows the same segment with an increased AADT for trucks at 8,398. This project actually reduces the amount of AADT truck traffic, for this worst-case scenario, by 964. Therefore, the proposed project would not affect truck traffic by means of congestion reduction, capacity expansion or realignment and does not fall under category 1 of this advisory analysis.

Table 3.14.8: 2030 Worst-case Diesel Trucks AADT for the No Build Alternative

Segment	2030 No Build							
	AADT by Segment							
	SB General Purpose				NB General Purpose			
	Peak	Trucks (6%)	OP	Trucks (6%)	Peak	Trucks (6%)	OP	Trucks (6%)
1	8,016	**481**	91,605	**5,496**	17,373	**1,042**	90,671	**5,440**
2	7,937	**476**	80,002	**4,800**	11,078	**665**	70,375	**4,223**
3	7,864	**472**	74,161	**4,450**	12,853	**771**	69,676	**4,181**
4	11,258	**675**	131,291	**7,877**	17,497	**1,050**	117,112	**7,027**
5	11,509	**691**	139,969	**8,398**	17,038	**1,022**	119,890	**7,193**
6	9,462	**568**	122,045	**7,323**	16,118	**967**	111,906	**6,714**
7	9,299	**558**	127,372	**7,642**	16,644	**999**	115,077	**6,905**
8	8,385	**503**	124,849	**7,491**	15,888	**953**	119,633	**7,178**
9	8,066	**484**	121,113	**7,267**	15,500	**930**	112,189	**6,731**
10	7,899	**474**	118,107	**7,086**	15,113	**907**	110,148	**6,609**
11	7,829	**470**	116,478	**6,989**	14,868	**892**	108,843	**6,531**
12	7,571	**454**	115,547	**6,933**	14,904	**894**	106,842	**6,411**
13	7,675	**461**	113,796	**6,828**	14,763	**886**	105,048	**6,303**
14	7,501	**450**	113,235	**6,794**	14,399	**864**	100,265	**6,016**
15	8,432	**506**	114,634	**6,878**	13,196	**792**	103,319	**6,199**
16	9,058	**543**	120,565	**7,234**	13,024	**781**	107,515	**6,451**
17	9,171	**550**	121,165	**7,270**	12,945	**777**	105,246	**6,315**
18	8,701	**522**	114,861	**6,892**	12,610	**757**	101,140	**6,068**
19	6,871	**412**	113,456	**6,807**	16,264	**976**	107,313	**6,439**
20	7,313	**439**	114,974	**6,898**	15,980	**959**	99,229	**5,954**
21	6,878	**413**	104,160	**6,250**	16,042	**963**	88,730	**5,324**
22	6,986	**419**	105,012	**6,301**	15,577	**935**	83,426	**5,006**

Note: Peak hours are 6 a.m. to 9 a.m. and 3 p.m. to 6 p.m., total of six hours. Off peak hours are all others, total of 18 hours. This is why off peak AADT is greater than peak AADT.

The Preferred Alternative would only construct HOV lanes in the center of the alignment and would not add additional general purpose lanes. However, there would be some areas throughout the corridor that require additional right-of-way to accommodate the HOV lanes, which would translate into some minor shifting of the number four lane ranging from 3 to 25 ft. As stated above, the project would not increase truck volumes 5 to 10 percent. In the worst case, the project would actually reduce truck AADT by 13 percent.

The third criterion in the advisory analysis is a project that is not likely a POAQC. This describes a project as one that has essentially the same build and no build truck volume. The combined northbound and southbound truck volume for the Preferred Alternative is 294,848 ADT. However, the combined northbound and southbound truck volume for the No Build alternative is 315,921. Not only does the project meet the third criterion, but it exceeds it because there would be a seven percent reduction in diesel truck traffic.

As stated above, the SDAB is not a federally designated PM_{10} or $PM_{2.5}$ nonattainment or maintenance area; thus, the project does not require PM_{10} or $PM_{2.5}$ hot spot analyses. Emissions burdens for these pollutants have been calculated in *Table 3.14.9* for CEQA purposes, which requires that the future build project be compared with the existing conditions. While PM_{10} would experience a slight increase due to increased volumes, diesel truck emissions, which are directly related to the pollutant, $PM_{2.5}$ would experience a five percent decrease for the 2030 Preferred Alternative when compared with existing conditions.

Table 3.14.9: 2030 Changes (Δ) in Total Project PM Emission Rates

Toxic Air Contaminant	Emissions		Δ % from Existing
	Existing (g/day)	8+4 Alternative (g/day)	
PM_{10} (fugitive dust)	329,920	368,236	12
$PM_{2.5}$ (diesel)	164,147	156,741	-5
Average Percent Change			4

The proposed project does not meet the criteria of a POAQC as defined in the PM Guidance and falls under category 3 of the advisory analysis, not likely a POAQC, and emissions show a reduction of five percent in the diesel-related pollutant $PM_{2.5}$, therefore it does not require a quantitative PM_{10} or $PM_{2.5}$ hot spot analyses.

The proposed improvements to the I-5 North Coast Corridor would increase capacity. The existing diesel fuel truck percentage within the project limits is six percent of AADT, however, which is below the threshold of eight percent. Accordingly, the proposed project would not result in an increase in the ratio of trucks to the overall traffic volumes. Estimated horizon year (2030, equivalent to 2035) truck AADT would remain at six percent. In addition, the proposed project would relieve congestion, improve operations, and provide better circulation.

The nearest air quality monitoring site located in a downwind direction from the project site that provides PM_{10} and $PM_{2.5}$ background information is the Beardsley Monitoring Station. Data from the Beardsley Monitoring Station indicate that the project area meets the current federal PM_{10} and $PM_{2.5}$ standards of 150 ug/m3 (PM_{10}, 24 hours), 35 ug/m^3 ($PM_{2.5}$, 24 hours), and 15 ug/m^3 ($PM_{2.5}$, annual).

Over the past 20 years the SDAB has experienced a decline in the number of days with unhealthy levels of pollutants including PM_{10} and $PM_{2.5}$, despite the region's growth in population and VMT (which both contribute to air pollution problems). Based on the APCD 2009 Annual Report, there has been a general downward trend in the concentration of particulates over that time. *Table 3.14.4* shows the PM_{10} and $PM_{2.5}$ concentrations observed at the Beardsley Monitoring Station from 2010 to 2012, in comparison with federal and State standards.

The proposed project is located in an attainment area for federal PM_{10} and $PM_{2.5}$ standards, and in a nonattainment area for State PM_{10} and $PM_{2.5}$ standards. Based on screening using USEPA PM Guidance, the proposed project is not a Project of Air Quality Concern because it does not meet the criteria due to relatively low truck AADT, truck percentage, and increase in truck volumes comparing the build alternatives and No Build alternative. The proposed project would improve traffic operations by smoothing traffic flow and would contribute to lower PM emissions as compared to the No Build alternative. The proposed project, therefore, is in conformance for federal PM_{10} and $PM_{2.5}$ standards and is unlikely to increase the frequency or severity of any existing exceedances regarding the nonattainment of State PM_{10} and $PM_{2.5}$ standards.

Naturally Occurring Asbestos (NOA)

The FCAA requires the USEPA to develop and enforce regulations to protect the general public from exposure to airborne contaminants that are known to be hazardous to human health. In accordance with FCAA Section 112, the USEPA established National Emissions Standards for Hazardous Air Pollutants (NESHAP) to protect the public. Asbestos was one of the first hazardous air pollutants regulated under this section. On March 31, 1971, the USEPA identified asbestos as a hazardous pollutant, and on April 6, 1973, first published the asbestos NESHAP in 40 CFR 61. In 1990, a revised NESHAP regulation was published by the USEPA.

The asbestos NESHAP regulations protect the public by minimizing the release of asbestos fibers during activities involving the processing, handling, and disposal of asbestos-containing material. Accordingly, the asbestos NESHAP specifies work practices to be followed during demolitions and renovations of all structures, installations, and buildings (excluding residential buildings that have four or fewer dwelling units). In addition, the regulations require the project applicant to notify applicable State and local agencies and/or USEPA regional offices before all demolitions or before construction that contains a certain threshold amount of asbestos.

Naturally Occurring Asbestos (NOA)-bearing Serpentine

Serpentine is a mineral commonly found in seismically active regions of California, usually in association with ultramafic rocks and along associated faults. Certain types of serpentine occur naturally in a fibrous form known generically as asbestos. Asbestos is a known carcinogen and inhalation of asbestos may result in the development of lung cancer or mesothelioma. The CARB has regulated the amount of asbestos in crushed serpentinite used in surfacing applications, such as for gravel on unpaved roads, since 1990. In 1998, new concerns were raised about health hazards from activities that disturb asbestos-bearing rocks and soil. In response, the CARB revised its asbestos limit for crushed serpentines and ultramafic rock in surfacing applications from 5 percent to less than 0.25 percent and adopted a new rule requiring best practices dust control measures for activities that disturb rock and soil containing NOA (CDC 2000a).

According to the report A General Location Guide for Ultramafic Rocks in California-Area Likely to Contain Naturally Occurring Asbestos (CDC 2000b), the coastal portion of San Diego County NOA is not typically found in the geological formations present on the proposed project site (CDC 2000a, b). Thus, hazardous exposure to asbestos-containing serpentine materials would not be a concern with the proposed project.

Mobile Source Air Toxics (MSAT)

For the Mobile Source Air Toxics (MSAT) analysis, the FHWA's Interim Guidance on Air Toxic Analysis for NEPA Documents (MSAT Guidance), December 6, 2012, was used, updated from the previous 2006 and 2009 guidance. The proposed project would add or create new significant capacity to the I-5 North Coast Corridor, which has an AADT level of greater than 150,000. Furthermore, the proposed project is located in proximity to populated areas and sensitive receptors. Consequently, as outlined in the MSAT guidance, a quantitative MSAT analysis is required.

There are no established regulatory concentration targets for the priority MSATs, which include acrolein, benzene, 1,3 butadiene, diesel particulate matter (DPM), diesel exhaust organic gases (DEOG), formaldehyde, naphthalene, and polycyclic organic matter (POM). Therefore, the impacts of these MSATs were assessed through a quantitative alternative analysis in which MSAT emissions are compared among proposed project scenarios for build alternatives in 2015 and 2030, No Build 2015 and 2030, and the existing conditions (2006) to determine if meaningful differences in the levels of MSAT emissions exist. Appropriate mitigation measures should be identified and considered if meaningful differences exist.

Twenty-two segments of the corridor were determined and selected for the analyses. The segment boundaries do not change with the different scenarios. Each segment runs from the middle of each existing interchange to the next interchange and consists of all main lanes, connectors, and HOV lanes, included within the segment for each scenario. Northbound and southbound lanes are included together in each segment. The discrete traffic data for each link contained within a segment are summed up to obtain daily peak and off-peak totals for that segment.

In order to perform the quantitative emissions analysis, CT-EMFAC, which is a California specific transportation project-level analysis tool, was used. This modeling software was designed to model criteria pollutants, MSATs, and carbon dioxide using the latest version of the California Mobile Source Emission Inventory and Emission Factors.

The Caltrans CT-EMFAC tool has been available for several years, with the existing version of CT-EMFAC (version 4.1) being based on data derived from EMFAC 2007. In 2011, CARB released a new version of EMFAC (EMFAC 2011) that includes updated emissions information and travel activity data for car and truck fleets (CARB 2011). Until an updated CT-EMFAC tool is available that incorporates EMFAC 2011 data, the Project-Level Emissions Estimation – Interim Template (Interim Tool) is being used. This Interim Tool combines the existing CT-EMFAC and CARB's EMFAC 2011 online databases to analyze the priority MSATs listed above.

MSAT Analysis

Traffic activity data have been utilized in performing the MSAT analysis, with these data supplemented by available Caltrans data inventory systems for the base year values, as well as by Caltrans forecast modeling of the corridor for future year values (*Table 3.14.10*). Emission factors for the priority MSATs have been obtained for the SDAB portion of San Diego County using the Interim Tool.

The Draft EIR/EIS analyzed the build alternatives. The emissions analysis corresponded with traffic volumes that identified that the MSAT analysis for the 10+4 alternatives would be slightly greater than the 8+4 alternatives. This was not, however, found to be substantive. FHWA-issued Interim Guidance on December 6, 2012 added three pollutants (napthalene, POM and DEOG) and removed one pollutant (acetaldehyde). Because there would be no substantial differences, an updated MSA analysis was only performed for the refined 8+4 Buffer alternative (Preferred Alternative). The results of the MSAT analysis are tabulated in *Tables 3.14.11* and *3.14.12*.

Table 3.14.10: Traffic Activity Data for *I-5 NCC Project*

Year	Scenario	Peak Period (VMT)			Daily Total (VMT)			Average Speed (mph)
		LDV	Trucks	Total	LDV	Trucks	Total	Peak
Existing (2006)	Existing	1,069,290	68,253	1,137,543	5,228,788	333,752	5,562,540	50.5
Operational	No Build	889,325	56,765	946,091	5,926,505	378,288	6,304,793	32.7
Year (2015)	10+4 Scenarios	1,268,670	80,979	1,349,649	6,203,569	395,972	6,599,541	66.5
	8+4 Scenarios	1,241,187	79,225	1,320,411	6,064,769	387,113	6,451,882	60.5
Horizon	No Build	709,360	45,278	754,638	6,624,221	422,823	7,047,044	19.5
Year (2030)	10+4 Scenarios	1,468,049	93,705	1,561,754	7,178,348	458,192	7,636,540	54.7
	8+4 Scenarios	1,313,047	83,812	1,396,859	6,890,497	439,819	7,330,316	39.3

Source: Caltrans Traffic Data, LDV – light duty vehicle, VMT – vehicle miles traveled, mph – miles per hour

Table 3.14.11: 2015 Changes (Δ) in Total Project MSAT Emission Rates

Toxic Air Contaminant	Existing Emissions	No Build Alternative	8+4 Scenarios (8 MF + 2 HOV/ML)			10+4 Scenarios (10 MF + 2 HOV/ML)		
	(g/day)	(g/day)	(g/day)	Δ% from Existing	Δ % from No Build	(g/day)	Δ% from Existing	Δ% from No Build
Diesel PM	59,722	39,411	37,481	-37	-5	32,925	-26	+14
Benzene	28,530	12,974	12,886	-55	-1	24,340	-42	+10
1,3-Butadiene	6,444	2,875	2,865	-56	0	4,234	-46	+17
DEOG	55,035	29,204	26,001	-53	-11	These constituents did not require documentation when the 10+4 MSAT analysis was performed.		
Naphthalene	29,050	31,481	30,199	+4	-4			
Polycyclic organic matter	4,050	4,429	4,314	+7	-3			
Acrolein	1,500	684	688	-54	+1	960	-46	+17
Formaldehyde	24,695	10,781	10,548	-57	-2	19,767		+14
Average Percent Change				**-38**	**-3**	**--**	**-40.5**	**+14**

MF – mixed-flow lane, ML – Managed Lane, g/day – grams per day (based on vehicle miles traveled)

Table 3.14.12: 2030 Changes (Δ) in Total Project MSAT Emission Rates

Toxic Air Contaminant	Existing Emissions	No Build Alternative	8+4 Scenarios (8 MF + 2 HOV)			10+4 Scenarios (10 MF + 2 HOV)		
	(g/day)	(g/day)	(g/day)	Δ% from Existing	Δ% from No Build	(g/day)	Δ% from Existing	Δ% from No Build
Diesel PM	59,722	34,013	34,343	-42	+1	24,898	-44	+18
Benzene	28,530	6,626	7,286	-74	+10	17,105	-59	+17
1,3-Butadiene	6,444	1,450	1,603	-75	+11	3,001	-62	+25
DEOG	55,035	20,424	17,927	-67	-12	These constituents were not required documentation when the 10+4 MSAT analysis was performed.		
Naphthalene	29,050	30,907	32,109	+11	+4			
Polycyclic organic matter	4,050	4,362	4,523	+12	+4			

Table 3.14.12 (cont.): 2030 Changes (Δ) in Total Project MSAT Emission Rates

Toxic Air Contaminant	Existing Emissions	No Build Alternative	8+4 Scenarios (8 MF + 2 HOV)			10+4 Scenarios (10 MF + 2 HOV)		
	(g/day)	(g/day)	(g/day)	Δ% from Existing	Δ% from No Build	(g/day)	Δ% from Existing	Δ% from No Build
Acrolein	1,500	348	379	-75	+9	680	-62	+26
Formaldehyde	24,695	5,056	5,466	-78	+8	4,255	-61	+19
Average Percent Change				**-49**	**+4**	**--**	**--**	**--**

Caltrans began air quality technical studies for the proposed project in 2006, basing those studies on the most current traffic projections then available, which were SANDAG's Series 10 projected traffic volumes for year 2030 for the 10+4 build alternatives. During the course of the project development process, SANDAG released both the Series 11 forecasts and model that were based upon the 8+4 build alternatives and are within one percent of the Series 10 forecasts. More recently, the Series 12 forecasts and model was released that included forecasts for years 2035 and 2050. Review of these different data sets indicated that the initial Series 10 2030 daily traffic volumes, which were used for the basis of the original traffic studies, were equivalent to the Series 12 2035 daily traffic demand volumes to within an average of 3.5 percent. These demand volumes differences are minimal and a revision at this time would not alter the results of the associated studies. Because the difference between Series 10 and Series 12 decreases to almost zero over time, it does not represent a substantial change and would not impact the alternatives studied or the impacts of those alternatives. Therefore, forecasts presented in this Final EIR/EIS and the associated technical studies are based on the Region's Series 10 model and that analysis is indicative of what is expected to occur in year 2035.

The analysis was refined to determine MSAT emission rates by segments of the I-5 corridor. *Table 3.14.13* shows the approximate segments for the northbound and southbound sides of the freeway. The segments are not of equal length, varying from 0.37 mi to 2.35 mi. *Table 3.14.13* also lists the segment extents and principal land uses near the freeway along each segment.

Table 3.14.13: Land Uses within I-5 Segments

Segment No.	I-5 Segment	Principal Land Use Along Segment
1	La Jolla Village Drive to Genesee Avenue	Residential, Retail & Commercial
2	Genesee Avenue to Carmel Mountain Road	Residential, Retail & Commercial
3	Carmel Mountain Road to Carmel Valley Road	Residential, Retail & Commercial
4	Carmel Valley Road to Del Mar Heights Road	Residential, Retail & Commercial
5	Del Mar Heights Road to Via de la Valle	Residential, Retail & Commercial
6	Vía de la Valle to Lomas Santa Fe Drive	Residential, Commercial, & Industrial
7	Lomas Santa Fe Drive to Manchester Avenue	Residential, Commercial, & Industrial
8	Manchester Avenue to Birmingham Drive	Residential & Retail
9	Birmingham Drive to Santa Fe Drive	Residential & Retail
10	Santa Fe Drive to Encinitas Boulevard	Residential & Retail

Table 3.14.13 (cont.): Land Uses within I-5 Segments

Segment No.	I-5 Segment	Principal Land Use Along Segment
11	Encinitas Boulevard to Leucadia Boulevard	Residential & Retail
12	Leucadia Boulevard to La Costa Avenue	Residential & Retail
13	La Costa Avenue to Poinsettia Lane	Residential & Retail
14	Poinsettia Lane to Palomar Airport Road	Residential & Commercial
15	Palomar Airport Road to Cannon Road	Residential & Commercial
16	Cannon Road to Tamarack Avenue	Residential & Commercial
17	Tamarack Avenue to Carlsbad Village Drive	Residential & Commercial
18	Carlsbad Village Drive to Vista Way	Residential & Commercial
19	Vista Way to Oceanside Boulevard	Residential & Commercial
20	Oceanside Boulevard to Mission Avenue	Residential & Commercial
21	Mission Avenue to SR-76	Residential & Commercial
22	SR-76 to Wire Mountain Road	Residential & Commercial

MSAT Discussion of Results

As discussed in the Draft EIR/EIS, the prior MSAT analysis indicated that a substantial decrease in MSAT emissions would be expected for the build alternatives from the base year (2006) levels through future year levels. This decrease was shown to be prevalent throughout the highest-priority MSATs and the analyzed alternatives, regardless of the difference in mainline configurations. This decrease was also consistent with the aforementioned USEPA study that projects a substantial reduction in on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde between 2000 and 2020. Based on the analysis in the Draft EIR/EIS *Table 3.14.12,* reductions in existing MSAT levels expected by 2030 were: between 44 and 48 percent of DPM, 59 and 62 percent of benzene, 62 and 65 percent of 1,3-butadiene, 62 and 64 percent of acetaldehyde, 62 and 65 percent of acrolein, and 61 and 64 percent of formaldehyde, depending on the alternative. These reductions were projected to be achieved while the total VMT for the alternatives would increase by approximately 32 to 37 percent in 2030 from the base year value depending on the alternative (refer to *Table 3.14.10*).

Prior to preparation of this Final EIR/EIS, Caltrans recalculated MSAT analyses for the refined 8+4 Buffer (Preferred Alternative). This analysis indicates that a substantial decrease in most of the MSAT emissions can be expected for the Preferred Alternative from the base year through future year levels. *Figures 3-14.1* through *3-14.8* illustrate these decreases. This decrease is consistent with the aforementioned USEPA study projections of a substantial reduction in on-highway emissions of benzene, formaldehyde, and 1,3-butadiene prior to 2020. Based on the analysis for this project as shown in *Table 3.14.12,* reductions in existing MSAT levels expected by 2030 are: 42 percent of DPM, 74 percent of benzene, 75 percent of 1,3-butadiene, 67 percent of DEOG, 75 percent of acrolein, and 78 percent of formaldehyde. Comparing the 2030 Preferred Alternative with the No Build alternative shows that MSAT levels would increase by 11 percent, in the worst case, for 1,3 Butadiene, and by 1 percent for Diesel Particulate Matter (DPM), while the emissions for Diesel Exhaust Organic Gases (DEOG) would decrease by 12 percent. MSAT levels would increase slightly for naphthalene and POM by 11 percent and 12 percent, respectively. MSAT priority pollutant levels for the Preferred Alternative would also decrease by an average of three percent (2015) and increase by an average of four percent (2030) compared to the No Build alternative, with the 2030 increase due to the higher projected traffic volumes shown on *Table 3.14.11*. It should be noted that the pollutants directly

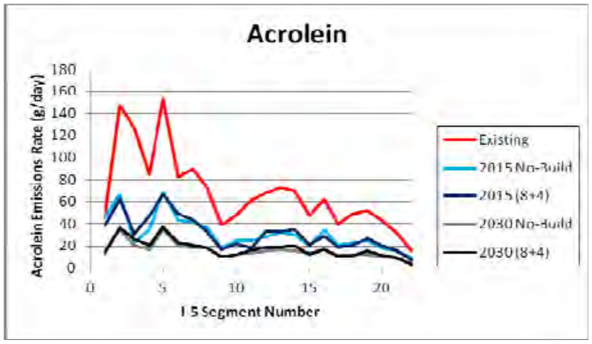


Figure 3-14.1: Changes in Acrolein Emission

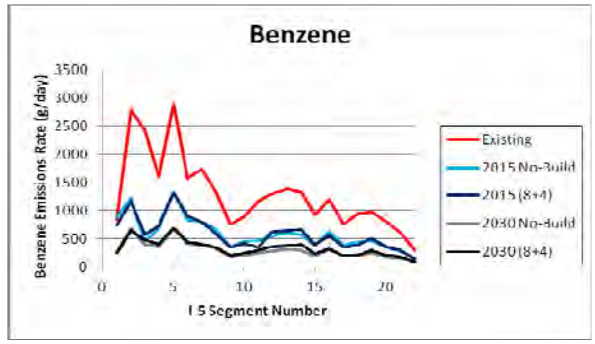


Figure 3-14.2: Changes in Benzene Emission

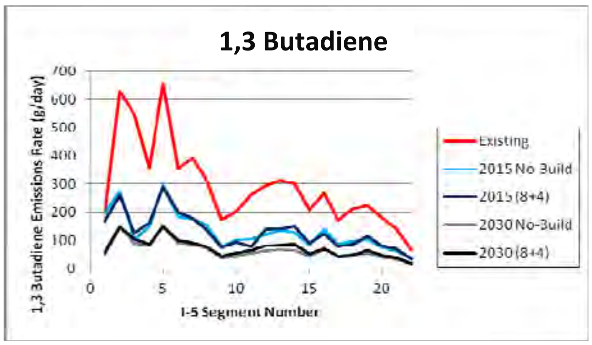


Figure 3-14.3: Changes in Butadiene Emission

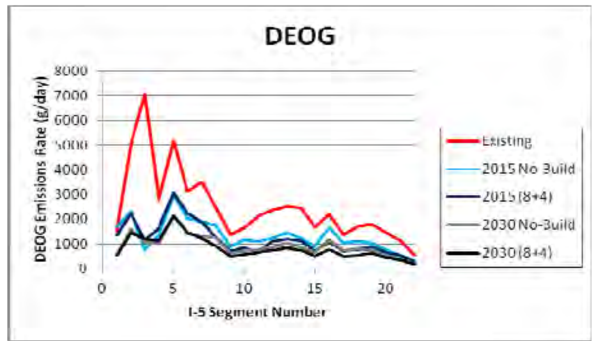


Figure 3-14.4: Changes in DEOG Emission

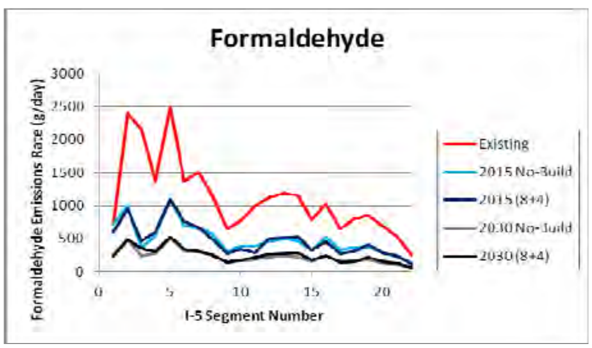


Figure 3-14.5: Changes in Formaldehyde Emission

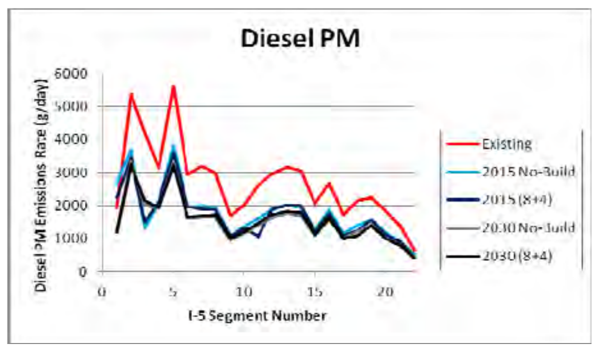


Figure 3-14.6: Changes in Diesel PM Emission

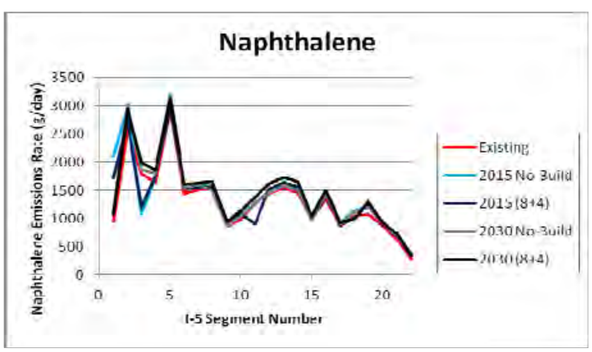


Figure 3-14.7: Changes in Naphthalene Emission

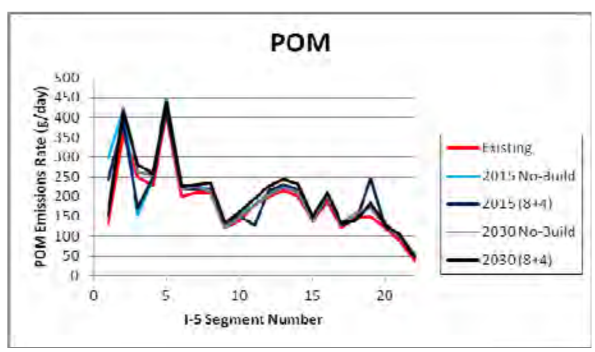


Figure 3-14.8: Changes in POM Emission

related to diesel trucks, DPM and DEOG, would experience almost no change and even a decrease in MSAT emissions, +1 percent and -12 percent respectively, when comparing the 2030 Preferred Alternative to the No Build alternative. In addition, the 2030 Preferred Alternative would experience reduced MSAT emissions levels when compared to the 2030 10+4 Alternative, with DPM being the largest at a 17 percent reduction.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating Impacts of MSATs

Controlling air toxic emissions became a national priority with the passage of the FCAA Amendments (CAAA) of 1990, whereby Congress mandated that the USEPA regulate 188 air toxics, also known as hazardous air pollutants. The USEPA has assessed this expansive list in its latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are listed in its Integrated Risk Information System (IRIS) (http://www.epa.gov/iris/). In addition, the USEPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from its 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butadiene, DPM plus DEOG (diesel PM), formaldehyde, naphthalene, and POM. While the FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future USEPA rules. The 2007 USEPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using USEPA's MOBILE6.2 model, even if vehicle activity (VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in *Figure 3.14.9*.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision making within the context of NEPA.

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, Caltrans is duly expected by the public and other agencies to address MSAT impacts in environmental documents. The FHWA, USEPA, the Health Effects Institute (HEI), and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this field.

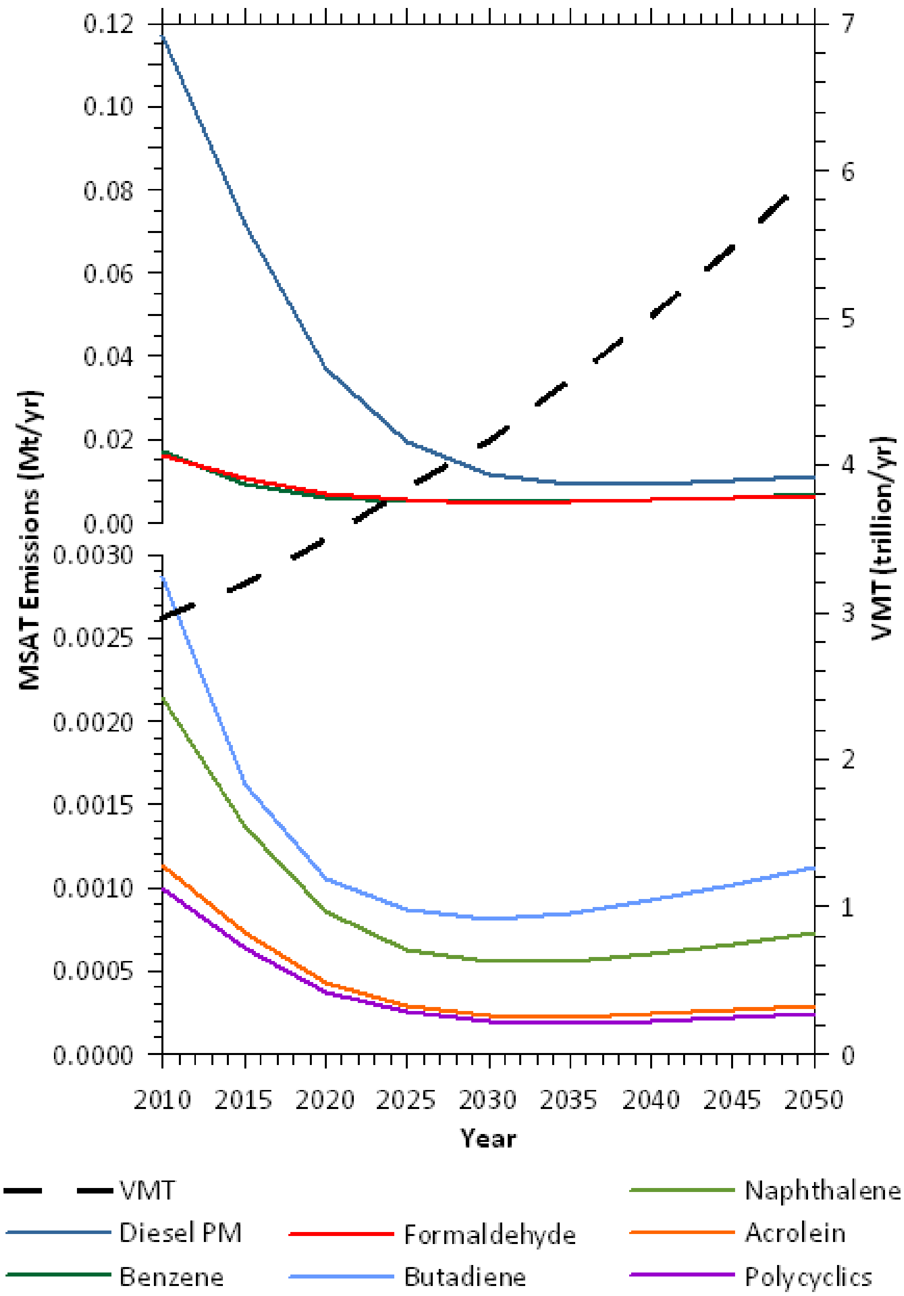


Figure 3-14.9: National MSAT Emission Trends 1999 – 2050 for Vehicles Operating on Roadways Using USEPA's MOVES2010b Model

Note: Trends for specific locations may be different, depending on locally derived information representing VMT, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: USEPA MOVES2010b model runs conducted during May to June 2012 by FHWA

Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The USEPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. The agency is the lead authority for administering the FCAA and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The USEPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. The agency maintains the IRIS, which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (USEPA, http://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations also are active in the research and analyses of the human health effects of MSAT, including the HEI. Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents. Adverse health effects linked to MSAT compounds at high exposures include: cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling, dispersion modeling, exposure modeling, and then final determination of health impacts, with each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) MSAT assessments, particularly because assumptions have to be made regarding changes in travel patterns and vehicle technology (both of which affect emissions rates) over that timeframe, and such information is generally unavailable. It is also particularly difficult to reliably forecast 70-year lifetime concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, with such information being similarly unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The USEPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the USEPA as provided by the FCAA to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries.

The decision framework is a two-step process. The first step requires the USEPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than one in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld the USEPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits. These benefits include reducing traffic congestion, accident rates, and fatalities, as well as improved access for emergency response, each of which is better suited for quantitative analysis.

In conclusion, Caltrans has provided a quantitative analysis of MSAT emissions relative to the various alternatives, and has acknowledged that some alternatives may result in increased MSAT emissions in certain locations. However, no meaningful differences in MSAT emissions were observed amongst alternatives and thus no mitigation measures are required. In addition, due to the described uncertainties regarding concentrations and the duration of exposures, the health effects from these emissions have not been estimated.

Construction Impacts

I-5 construction would result in a temporary addition of pollutants to the local airshed caused by soil disturbance, dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials. Specifically, construction activities associated with segment widening, mainline bridge construction, and overcrossing/undercrossing construction would generate air pollutants. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and, for dust, the prevailing weather conditions.

The principal criteria pollutants emitted during construction would be PM_{10} and $PM_{2.5}$. The source of these pollutants would be fugitive dust, created during clearing, grubbing, excavation, and grading; demolition of structures and pavement; vehicle travel on paved and unpaved roads; and material blown from unprotected graded areas, stockpiles, and haul trucks.

A secondary source of pollutants during construction would be the engine exhaust from construction equipment. The principal pollutants of concern would be nitrogen oxides (NO_X) reactive organic gases (ROGs), and volatile organic compounds (VOCs) emissions that would contribute to the formation of O_3, a regional nonattainment pollutant.

Site preparation and roadway construction typically involve clearing, cut-and-fill activities, grading, removal of or improvement to existing roadways, and paving of roadway surfaces. Construction-related effects on air quality from proposed highway improvements would be greatest during the site preparation and demolition phases, which involve excavation, handling, and transport of soils to and from the site. These activities could temporarily generate PM_{10} and $PM_{2.5}$. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site could deposit mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions also would depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Construction activities for large development projects are estimated by the USEPA to add 1.2 tons of fugitive dust per acre of soil disturbed per month of activity. If water or other soil stabilizers are used to control dust, the emissions can be reduced by up to 50 percent. Caltrans' Standard Specifications (Section 14-9.02) pertaining to dust minimization requirements require use of water or dust palliative compounds and would reduce potential fugitive dust emissions during construction.

In addition to dust-related PM_{10} emissions, heavy-duty trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO_2, NO_X, VOCs, and some soot particulate (PM_{10} and $PM_{2.5}$) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Federal conformity regulations require analysis of construction impacts for projects when construction activities will last for more than five years. The proposed project would be broken into separate contracts of construction each lasting less than five years; therefore, no quantitative estimates of regional construction emissions are required. However, the Air Quality Analysis, dated August 2007, did perform a construction emissions analysis and found that activities limited to 6.6 miles of roadway and bridge construction working simultaneously in the region would not have a significant impact on air quality. For further analysis related to this topic, please review the noted Air Quality Analysis. In addition, it is recommended that specific measures to control dust and particulates be incorporated into project specifications. These measures are identified in *Section 3.14.4*.

Minimal air quality impacts could also occur from construction of the proposed community enhancement projects. Construction of the majority of the community enhancements would occur within the project's construction footprint and these were accounted for within the construction emissions budget. Grading, paving, and landscaping for these features would be accomplished in conjunction with the freeway project, as described in *Section 2.3* and demonstrated on *Tables ES.12* and *ES.13* of this Final EIR/EIS.

Emissions from the construction phase of the project were estimated through the use of emission factors from the Sacramento Metropolitan Air Quality Management District's

(SMAQMD) Road Construction Model Version 6.3.2,[1] which was released in July 2009 and was the most recent version when the analysis was performed.[2] Assumptions from the 2007 Air Quality Report were used when running the current Road Construction Model Version 6.3.2, with the exception of start date. The modeled bridge construction scenario assumed a project length of 0.036 mi and an area of 4.3 ac, constructed during a 12-month period. Daily maximum area disturbed was assumed to be 0.9 ac per day, and no soil import or export haul trucks trips would be made. The modeled roadway widening scenario assumed a project length of 1.3 mi and an area of 28 ac, also constructed within a 12-month period. For this scenario, daily maximum area disturbed was assumed to be 4.6 ac per day and 4,000 cubic yards (cy) of soil import was assumed per day, resulting in 200 round-trip haul truck trips per day. For the purposes of estimating emissions, construction phasing for both the bridge construction and roadway widening model scenarios included the following assumptions:

- Grading/land clearing (1.2 months)
- Grading/excavation (5.4 months)
- Drainage/utilities/sub-grade (3.6 months)
- Paving (1.8 months)

Estimated maximum annual construction emissions of VOC, NO_X, CO, and PM_{10} generated during construction of the bridge construction scenario and the roadway widening scenario are presented in *Table 3.14.14*.

Table 3.14.14: Estimated Construction Emissions (tons/year)

Construction Phase	VOC	NO_X	CO	PM_{10}
Grubbing/Land Clearing	0.2	1.1	1.3	0.4
Grading/Excavation	1.7	12.1	14.2	2.2
Drainage/Utilities/Sub-Grade	0.7	3.8	4.3	1.3
Paving	0.1	0.7	1.1	0.1
Total of Construction Phases	2.7	17.7	20.9	4.0
De Minimis Limit	100	100	100	100

Source: Road Construction Model Version 5.1
Note: PM_{10} estimates assume 50 percent control of fugitive dust from watering and associated dust control measures.

Construction emissions are assessed against the federal general conformity *de minimis* thresholds, which are used to determine conformity of a federal action with existing air quality plans. The *de minimis* threshold for CO in an area under a maintenance plan is 100 tons per year. The *de minimis* thresholds for O_3 (eight-hour) moderate nonattainment are 100 tons per year for both NO_X and VOC. The *de minimis* threshold for PM_{10} nonattainment is 100 tons per

[1] The 2007 Air Quality Report for the *I-5 NCC Project* estimated potential construction air quality impacts resulting from construction activities. The report did not calculate CO_2 emissions as it was based on the SMAQMD Road Construction Emissions Model Version 5.1, which did not calculate CO_2. The SMAQMD Road Construction Emissions Model Version 6.3.2 estimates CO_2 emissions and provides more recent emission factors than Version 5.1; therefore, current criteria air pollutant emissions presented in this section are also estimated using Version 6.3.2 (i.e., EMFAC 2007 and OFFROAD 2007 emission factors).

[2] The SMAQMD released a more recent version in September 2012; however, it would tend to estimate lower air pollutant emissions because it reflects some Statewide measures that are intended to reduce off-road vehicle and heavy-duty truck emissions.

year. Although the SDAB is not a federal nonattainment or maintenance area for PM_{10}, it is a State nonattainment area; therefore, use of this limit would represent a conservative threshold. $PM_{2.5}$ is not a required pollutant to quantify according to the federal general conformity *de minimis* thresholds, and as a result, $PM_{2.5}$ is not included in this analysis.

Climate Change

Climate change is analyzed in *Chapter 4*, *California Environmental Quality Act Evaluation*. Neither the USEPA nor FHWA has published explicit guidance or methodology to conduct project-level GHG analysis. As stated on the FHWA's climate change website (http://www.fhwa.dot.gov/hep/climate/index.htm), climate change considerations should be integrated throughout the transportation decision-making process—from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process would facilitate decision making and improve efficiency at the program level, and would inform the analysis and stewardship needs of project-level decision making. Climate change considerations can easily be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

Because there have been more requirements set forth in California legislation and executive orders regarding climate change, this issue is addressed in the CEQA chapter of this environmental document and may be used to inform the NEPA decision. The four strategies set forth by the FHWA to lessen climate change impacts correlate well with related efforts that the State has undertaken, and the FHWA is striving to deal with transportation and associated climate change issues. Specific strategies in these efforts include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and reduction in the growth of vehicle hours traveled.

3.14.4 Avoidance, Minimization, and/or Mitigation Measures

Most of the construction impacts to air quality are short-term in duration and, therefore, would not result in long-term adverse conditions. Implementation of the following measures, some of which may also be required for other purposes (such as storm water pollution control) would reduce any air quality impacts resulting from construction activities:

- The construction contractor shall comply with Caltrans' Standard Specifications in Section 14 (2010).

- Section 14-9.01 specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances.

- Section 14-9.02 is directed at controlling dust. If dust palliative materials other than water are to be used, material specifications are contained in Section 18.

- Apply water or dust palliative to the site and equipment as frequently as necessary to control fugitive dust emissions. Fugitive emissions generally must meet a "no visible dust" criterion either at the point of emission or at the right-of-way line, depending on local regulations.

- Spread soil binder on any unpaved roads used for construction purposes, and all project construction parking areas.
- Wash off trucks as they leave the right-of-way as necessary to control fugitive dust emissions.
- Properly tune and maintain construction equipment and vehicles. Use low-sulfur fuel in all construction equipment as provided in California Code of Regulations Title 17, Section 93114.
- Develop a dust control plan documenting sprinkling, temporary paving, speed limits, and expedited revegetation of disturbed slopes as needed to minimize construction impacts to existing communities.
- Locate equipment and materials storage sites as far away from residential and park uses as practical. Keep construction areas clean and orderly.
- Near sensitive air receptors, establish Environmentally Sensitive Areas (ESAs) or their equivalent within which construction activities involving the extended idling of diesel equipment would be prohibited, to the extent feasible.
- Use track-out reduction measures such as gravel pads at project access points to minimize dust and mud deposits on roads affected by construction traffic.
- Cover all transported loads of soils and wet materials prior to transport, or provide adequate freeboard (space from the top of the material to the top of the truck) to minimize emission of dust (particulate matter) during transportation.
- Promptly and regularly remove dust and mud that are deposited on paved, public roads due to construction activity and traffic to decrease particulate matter.
- Route and schedule construction traffic to avoid peak travel times as much as possible, to reduce congestion and related air quality impacts caused by idling vehicles along local roads.
- Install mulch or plant vegetation as soon as practical after grading to reduce windblown particulate in the area. Be aware that certain methods of mulch placement, such as straw blowing, may themselves cause dust and visible emission issues, and may need to use controls such as dampened straw.
- Locate construction equipment and truck staging and maintenance areas as far as feasible and nominally downwind of schools, active recreation areas, and other areas of high population density.

3.15 Noise

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.15.1 Regulatory Setting

NEPA and CEQA provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement and/or mitigation, however, differ between NEPA and CEQA.

California Environmental Quality Act

CEQA requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. The rest of this section will focus on the NEPA-23 CFR 772 noise analysis; please see *Chapter 4* for further information on noise analysis under CEQA.

National Environmental Policy Act and 23 CFR 772

For highway transportation projects with FHWA involvement, the Federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations contain noise abatement criteria (NAC) that are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis (*Table 3.15.1*). For example, the NAC for residences (67 A-weighted decibels [dBA]) is lower than the NAC for commercial areas (72 dBA). The following table lists the noise abatement criteria for use in the NEPA-23 CFR 772 analysis at the time the noise study was prepared, and would be updated with an additional noise study performed during final design for the approved project alternative. This follows the FHWA protocol that states: "Projects that do not have a completed noise study signed and approved by Caltrans (or FHWA for non-delegated projects) by July 13, 2011, will be required to comply with this updated Protocol and the updated regulation. If a project is modified such that a NEPA reevaluation and new noise study are required, the Protocol and regulation in place at that time must be used" (http://www.dot.ca.gov/hg/env.noise/pub/ca_tnap_may2011.pdf).

Table 3.15.1: Noise Abatement Criteria

Activity Category	NAC, Hourly A- Weighted Noise Level, dBA L_{eq}(h)	Description of Activities
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose

Table 3.15.1 (cont.): Noise Abatement Criteria

Activity Category	NAC, Hourly A- Weighted Noise Level, dBA L_{eq}(h)	Description of Activities
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	72 Exterior	Developed lands, properties, or activities not included in Categories A or B above
D	--	Undeveloped lands
E	52 Interior	Residence, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

dBA L_{eq}(h) is defined as A-weighted decibels, peak noise hour equivalent sound level
Source: 23 CFR Part 772, 2006

Figure 3-15.1 lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise-levels discussed in this section with common activities.

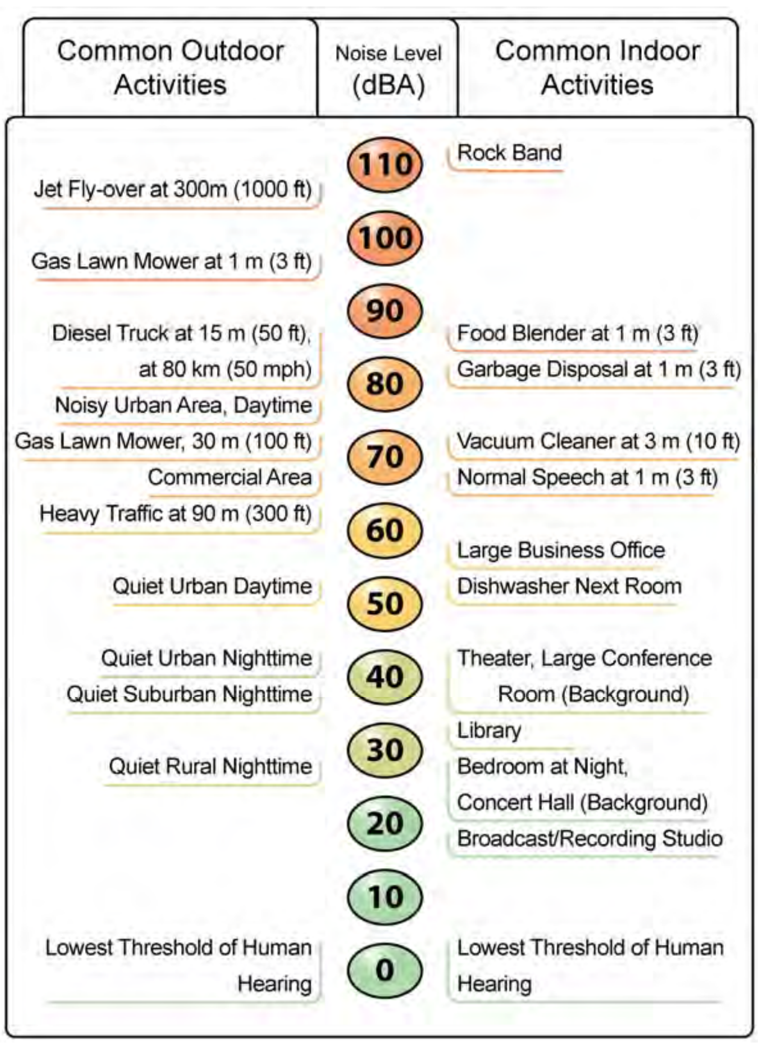


Figure 3-15.1: Noise Levels of Common Activities

In accordance with Caltrans' Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, August 2006, a noise impact occurs when the future noise level with the project results in a substantial increase in noise level (defined as a 12 dBA or more increase) or when the future noise level with the project approaches or exceeds the NAC. Approaching the NAC is defined as coming within 1 dBA of the NAC.

During final design, Caltrans and FHWA would assess the noise impacts for the approved project alternative. If it is determined that the project would have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications. This document discusses noise abatement measures that would likely be incorporated into the project, which were evaluated on the alternative with the largest footprint and the anticipated largest impacts for noise; the 10+4 Barrier alternative.

Caltrans' Traffic Noise Analysis Protocol sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. A minimum 5 dBA reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other considerations include topography, access requirements, other noise sources, and safety considerations. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include: residents' acceptance, the absolute noise level, build versus existing noise, environmental impacts of abatement, public and local agencies' input, newly constructed development versus development pre-dating 1978, and the cost per benefited residence.

3.15.2 Affected Environment

The *I-5 NCC Project* is a Type 1 project, described as a project that would physically alter the existing highway or increase the number of through traffic lanes, which could result in increased noise. Therefore, a Noise Study Report (April 2007) was prepared to assess the potential noise impacts associated with the proposed *I-5 NCC Project*. It is incorporated into this document by reference. The report identified noise sensitive locations, and predicted future traffic noise levels for the No Build and a generic 10+4 alternative. A generic 10+4 alternative was modeled because it would represent the worst-case conditions, irrespective of a buffer or barrier, in terms of traffic noise. Although the 10+4 Barrier alternative represents a worst-case impact scenario, the difference in noise levels between it and the other alternatives would be imperceptible. Therefore, in terms of impact analysis, all four build alternatives would be equal. Future noise levels for the No Build and build alternatives were modeled using the LOS C traffic volumes to obtain the worst-case noise scenario.

The cost per benefited residence is determined by calculating an allowance that is considered to be a reasonable amount of money per benefited residence to spend on abatement. The estimated total allowance begins with a base allowance $32,000 with additional allowances per benefited residences determined by Absolute Noise Levels, Noise Level Increase, Achievable Noise Reduction, and if the project is a new highway construction or more than 50 percent of the benefited residences' construction pre-date 1978. Therefore, the estimated total cost allowance per benefited residence is different for different soundwalls. Please refer to Table 1, Cost Allowance Per Residence, (Volume 1 of 2) in the Preliminary Noise Abatement Decision

Report (NADR). If the cost estimate for the soundwall and easements is less than the allowance, then the preliminary determination is that the abatement is reasonable. If the cost estimate is greater than the allowance, the preliminary determination is that abatement is not reasonable. The NADR presents the preliminary noise abatement decision based on acoustical and non-acoustical feasibility factors and the relationship between noise abatement allowances and the engineer's cost estimate.

There may be situations where “severe” traffic noise impacts exist or are expected but the abatement measures are not feasible or reasonable. A severe noise impact is considered to occur when predicted exterior noise levels equal or exceed 75 dBA peak noise hour equivalent sound level (L_{eq}(h)) or are 30 decibels (dB) or more above existing noise levels. In these instances, noise abatement measures must be considered. Such measures are considered “unusual and extraordinary” abatement measures and may include measures such as constructing soundwalls that have an estimated construction cost that exceeds the reasonable allowance or providing interior abatement in residential units. Unusual and extraordinary abatement proposed on a federal-aid project is subject to approval by the FHWA on a case-by-case basis. When noise abatement is provided on public or private properties consistent with this policy, an agreement must be entered into with the owner of the subject property that specifies that Caltrans is not responsible for any future costs of operating or maintaining the noise abatement measures. Unusual and extraordinary abatement must reduce noise by at least 5 dB to be considered feasible from an acoustical perspective.

Several site visits were conducted to identify representative noise sensitive receptor locations and noise measurement sites. Noise measurement sites are locations where noise measurements are taken in order to determine existing noise levels and to verify or calibrate computer noise models. These sites were chosen as being representative of similar sensitive sites in the area. Locations that are expected to receive the greatest noise impacts, such as the first row of houses from the noise source, are generally chosen. Noise measurements were conducted in frequent outdoor human-use areas and indoor classroom locations. All measurement sites were selected so that there would be no unusual noises from sources such as dogs, pool pumps, or children that could affect the measured levels. It is also desirable to choose sites that are free of major obstructions or contamination.

Noise measurements were taken at sensitive locations within the project limits to establish baseline conditions, to calibrate the future traffic noise model, to determine the interior noise levels in classrooms, and to determine the drop-off rate from the front to backyard at certain residences. Noise measurements were conducted in conformance with Caltrans and FHWA standards and guidance.

Existing land uses within the study area are primarily residential, with some schools, parks, and commercial land uses that include hotels/motels, restaurants, as well as wholesale and retail stores.

Due to the length of the proposed project, the noise impact analysis was divided into 22 roadway segments for organizational purposes. *Table 3.15.2* provides the segmental distribution (by major intersections) in the project area, and also refers the reader to the corresponding figures in *Chapter 2* for receptor locations. It should be mentioned here that there were no noise sensitive areas in Segment 15; therefore, no noise analysis was conducted, nor were there segment assignments for this area.

Table 3.15.2: Roadway Segment Location

Segment No.	Major Intersection	Figure 2-2.3
1	La Jolla Village Drive to Genesee Avenue	Sheets 1–4
2	Genesee Avenue to Carmel Mountain Road	Sheets 4–10
3	Carmel Mountain Road to Carmel Valley Road	Sheets 10–12
4	Carmel Valley Road to Del Mar Heights Road	Sheets 12–15
5	Del Mar Heights Road to Via de la Valle	Sheets 15–20
6	Via de la Valle to Lomas Santa Fe Drive	Sheets 20–23
7	Lomas Santa Fe Drive to Manchester Avenue	Sheets 23–26
8	Manchester Avenue to Birmingham Drive	Sheets 26–30
9	Birmingham Drive to Santa Fe Drive	Sheets 30–32
10	Santa Fe Drive to Encinitas Boulevard	Sheets 32–34
11	Encinitas Boulevard to Leucadia Boulevard	Sheets 34–37
12	Leucadia Boulevard to La Costa Avenue	Sheets 37–40
13	La Costa Avenue to Poinsettia Lane	Sheets 40–43
14	Poinsettia Lane to Palomar Airport Road	Sheets 43–47
15	Palomar Airport Road to Cannon Road	Sheets 47–49
16	Cannon Road to Tamarack Avenue	Sheets 49–52
17	Tamarack Avenue to Carlsbad Village Drive	Sheets 52–54
18	Carlsbad Village Drive to Vista Way (SR-78)	Sheets 54–56
19	Vista Way (SR-78) to Oceanside Boulevard	Sheets 56–60
20	Oceanside Boulevard to Mission Avenue	Sheets 60–62
21	Mission Avenue to SR-76	Sheets 62–64
22	SR-76 to Wire Mountain Road	Sheets 64–66

3.15.3 Environmental Consequences

Build Alternatives

Traffic noise levels were modeled using the LOS C traffic volumes to obtain the worst-case noise scenario. LOS C volumes of 1,800 vphpl were assumed for the build condition. There would be a difference of 3 dBA or less between the predicted No Build and build conditions for the vast majority of noise sensitive receptors, with one receptor experiencing a noise level increase as high as 12 dBA. These noise differences between the No Build and build conditions would be primarily due to the presence of HOV/Managed Lanes and expanding the outer lanes closer to the receptors in the build alternatives. The predicted 2030 peak hour L_{eq}(h) at the representative receptors range from 57 to 82 dBA, which would exceed the NAC at most locations. Approximately 531 receptor locations would exceed the NAC under the build conditions prior to consideration of any noise abatement measures. In instances where the predicted exterior noise levels equal or exceed 75 dBA, abatement must be considered.

Section 3.15.4 below discusses the future traffic noise levels for the No Build and build conditions after all noise abatement measures have been considered. The resulting traffic noise levels are organized by roadway segment (please refer to *Table 3.15.2* above and corresponding figures in *Chapter 2*).

No Build Alternative

Traffic noise levels were modeled using the LOS C traffic volumes to obtain the worst-case noise scenario. The traffic volumes of on- and off-ramps under the No Build conditions were capped at 1,000 vphpl. Approximately 471 receptor locations, a majority of receptors, would exceed the NAC in 2030 under the No Build condition. At many of the receptor locations, the future peak noise levels for 2030 are predicted to increase 3 to 5 BA over existing peak hour noise levels. There would be no project-related noise impacts under the No Build condition.

3.15.4 Avoidance, Minimization, and/or Mitigation Measures

Measures to Abate Highway Traffic Noise

Soundwall heights from 8 ft up to 16 ft were considered to abate the predicted traffic noise impacts at the representative noise sensitive areas within the proposed project area. Soundwalls were modeled to reduce traffic noise levels by at least the minimum requirement of 5 dB. In addition, the soundwall heights were modeled to block the line-of-sight to heavy truck exhaust stacks. The Noise Study Report identified 82 feasible soundwalls totaling a length of approximately 21 mi to abate for traffic noise impacts. These soundwalls were then further evaluated for feasibility and reasonableness to construct.

Feasibility and Reasonableness of Recommended Soundwalls (Decision for Noise Abatement)

A preliminary NADR was prepared in June 2007 to further evaluate the 82 feasible soundwalls identified in the Noise Study Report. The preliminary NADR is incorporated into this document by reference. The purpose of the preliminary NADR is to document the process in deciding the overall feasibility and reasonableness of providing abatement measures. The preliminary NADR presents the preliminary noise abatement decision based on the acoustical and non-acoustical feasibility factors, and the relationship between noise abatement allowances and the cost estimates.

The preliminary NADR does not present the final decision regarding noise abatement, but rather presents key information on abatement to be considered based on the available information at the time of Draft EIR/EIS circulation for public review. The final overall reasonableness decision would consider the reasonableness factors mentioned above, as well as comments received during the public review period. Additionally, if pertinent parameters change, such as vertical and/or horizontal alignment or an increase in reasonable allowance, during the final project design, the results of the preliminary noise abatement design may also change. That is, abatement features, such as berms or walls, could be added or deleted based on final project design and changes in the dollar amount of the reasonable allowance.

The following section summarizes the existing and future predicted noise levels for the No Build and build conditions, soundwall analyses, estimated costs, and preliminary abatement decisions for each roadway segment designated in *Table 3.15.2.* For outdoor land use areas such as schools and parks, 100-ft “frontage units” were totaled for use in consideration of cost effectiveness. Street addresses representing the noise receptor locations are also provided. All soundwall heights and locations are based on the latest available drawings and elevation information as of the time of the Noise Study Report and preliminary NADR. Details on the estimated costs for each soundwall can be found in the preliminary NADR. The Computer Noise Modeling Input/Output files for Calibration, No Build, Build, and Design for each segment can be found in Appendix D of the Noise Study Report.

SEGMENT 1 – La Jolla Village Drive to Genesee Avenue

Areas with Noise Abatement

Table 3.15.3 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB insertion loss (I.L.). *Table 3.15.4* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 1 are shown in the Project Features Maps in *Chapter 2* (*Figures 2-2.3, Sheets 1* through *4).* The following paragraphs describe the preliminary abatement decisions for Segment 1.

Soundwall S475: Soundwall S475 would be located on a frontage road along the southbound side of I-5 just north of La Jolla Village Drive. The soundwall would provide a feasible reduction in highway traffic noise for the outdoor use area of two university housing units, represented by Receptor R1.4. The common outdoor use area for this complex is behind the laundromat building. The existing 5.5-ft property wall already provides the required abatement from highway traffic noise, except for Receptors R1.2 to R1.4. Soundwalls modeled for these receptors did not meet the feasible reduction criteria, except for Receptor R1.4. However, constructing Soundwall S475 for R1.4 would not be reasonable due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.4*). Therefore, construction of Soundwall S475 would not be recommended.

Areas without Noise Abatement

Receptor R1.1: Receptor R1.1 is located on the southbound side of I-5, south of Voigt Drive. Receptor R1.1 is not currently experiencing traffic noise levels approaching or exceeding the NAC for Category B receivers, nor would predicted noise levels approach or exceed the NAC with the proposed project. Therefore, no abatement would be required (*Table 3.15.3*).

Receptor R1.5: Receptor 1.5 is located on the southbound side of I-5, south of Voigt Drive. Future predicted noise levels for Receptor R1.5 would not exceed the NAC for Category B receivers with the No Build alternative (*Table 3.15.3*). Future predicted noise levels for Receptor R1.5 would exceed the NAC with the build alternatives; however, it would not meet the feasible reduction criteria for noise abatement.

Receptors R1.6 and R1.7: Receptors R1.6 and R1.7 represent a baseball field at the east side of I-5 and south of Voigt Drive. A soundwall at the right-of-way line was considered for this area, but it would not be feasible to construct because there is a park and ride facility between the baseball field and I-5 (*Table 3.15.3*). There are no future noise impacts predicted for Receptor R1.7 with the proposed build alternatives.

Table 3.15.3: Predicted Future Noise Levels and Soundwall Feasibility for Segment 1

Receptor No.	Site Address	Existing Noise Levels[1] $L_{eq}(h)$, dBA	Future Peak Hour Noise Levels, $L_{eq}(h)$, dBA[1,2] Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.) 8 ft $L_{eq}(h)$	8 ft I.L.	10 ft $L_{eq}(h)$	10 ft I.L.	12 ft $L_{eq}(h)$	12 ft I.L.	14 ft $L_{eq}(h)$	14 ft I.L.	16 ft $L_{eq}(h)$	16 ft I.L.	Soundwall No. / Feasibility
La Jolla Village Drive to Genesee Avenue - SB															
R1.1	Pepper Canyon Apartments – Student Housing	61	62	64 [N]	63	1	63	1	62	2	62	2	62	2	Not Feasible
R1.2	Pepper Canyon Apartments – Student Housing	66	67	69 [A/E]	68	1	68	1	67	2	66	3	65	4	Not Feasible
R1.3	Pepper Canyon Apartments – Student Housing	71	72	74 [A/E]	74	0	73	1	72	2	72	2	70	4	Not Feasible
R1.4	Pepper Canyon Apartments – Student Housing	70	71	73 [A/E]	73[T]	0	72	1	71	2	69	4	**68[R]**	**5**	S475 / Feasible
R1.5	Pepper Canyon Apartments – Student Housing	64	65	68 [A/E]	66	2	66	2	65	3	65	3	64	4	Not Feasible
La Jolla Village Drive to Genesee Avenue – NB															
R1.6	Baseball Diamond	62	63	66 [A/E]	65	1	64	2	64	2	64	2	64	2	Not Feasible
R1.7	Baseball Diamond	61	62	64 [N]	--	--	--	--	--	--	--	--	--	--	--

[1] – $L_{eq}(h)$ is A-weighted, peak hour noise levels in decibels
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – Includes the benefits of an existing soundwall / property wall.

Table 3.15.4: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 1

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location/ Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S475	R1.4	2 UH Units	Frontage Road / SB	16 ft / 1178 ft	$1,140,388	$96,000	Not Reasonable	Not Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; UH – University Housing

SEGMENT 2 – Genesee Avenue to Carmel Mountain Road

Areas with Noise Abatement

Table 3.15.5 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.6* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 2 are shown in *Chapter 2* (*Figures 2-2.3, Sheets 4* through *10*. The following paragraphs describe the preliminary abatement decisions for Segment 2.

Soundwall S518: Soundwall S518 would be located on private property and Caltrans right-of-way on the northbound side of I-5, just south of Carmel Mountain Road. The soundwall would provide a feasible reduction in highway traffic noise for 30 multi-family residences represented by Receptors R2.1 through R2.5. Soundwall S518 would replace an existing 6-ft-high glass/block property wall located on the right-of-way. Soundwall S518 would not be reasonable due to the estimated construction cost exceeding the reasonable cost allowance (*Table 3.15.6*). Cost of acquisition for right-of-way is assumed to be $349,315 for this wall, and when added to the construction cost, it exceeds the reasonable allowance. If estimated construction cost could not be reduced to less than or equal to the reasonable allowance, construction of S518 would not be recommended (*Table 3.15.6).*

Areas without Noise Abatement

There are no noise sensitive areas in Segment 2 that would be impacted by the proposed project where abatement would not be feasible.

Table 3.15.5: Predicted Future Noise Levels and Soundwall Feasibility for Segment 2

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No. / Feasibility
			Future "No Build"	Project "Build" Without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					8 ft		10 ft		12 ft		14 ft		16 ft			
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.		
Genesee Avenue to Carmel Mountain Road – NB																
R2.1[W]	Torrey Villa Resort Apartments	68	69	70 [A/E]	67	3	**65**[R]	**5**	63	7	62	8	61	9	S518 / Feasible
R2.2[W]	Torrey Villa Resort Apartments	68	69	70 [A/E]	68	2	66	4	**65**[R]	5	63	7	62	8	S518 / Feasible
R2.3[W]	Torrey Villa Resort Apartments	69	70	70 [A/E]	68	2	66	4	**64**[R]	6	62	8	61	9	S518 / Feasible
R2.4[W]	Torrey Villa Resort Apartments	69	70	70 [A/E]	68	2	65	5	**63**[R]	**7**	62	8	61	9	S518 / Feasible
R2.5[W]	Torrey Villa Resort Apartments	65	66	66 [A/E]	64	2	62	4	**61**[R]	**5**	60	6	59	7	S518 / Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.2 – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – Includes the benefits of an existing property wall.

Table 3.15.6: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 2

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location/ Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S518	R2.1-R2.5	30 MFR	R/W and Private Property / NB	10 ft to 12 ft /1404 ft	$1,433,640	$1,140,000	Not Reasonable	Not Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence.
[2] – Estimated construction cost includes cost of easements.
R/W – right-of-way

SEGMENT 3 – Carmel Mountain Road to Carmel Valley Road

Areas with Noise Abatement

Table 3.15.7 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.8* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 3 are shown in *Figures 2-2.3, Sheets 10* through *12*. The following paragraphs describe the preliminary abatement decisions for Segment 3.

Soundwall S526: Soundwall S526 would be located on private property and Caltrans right-of-way along the northbound side of I-5, north of Carmel Mountain Road. The soundwall would provide a feasible reduction in highway traffic noise for 28 single-family residences represented by receptors R3.2 through R3.10, and R3.10A (*Table 3.15.7*). The soundwall would replace an existing 6-ft-high glass/block property wall. Construction of S526 would not be reasonable due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.8*). Therefore, construction of Soundwall S526 would not be recommended (*Table 3.15.8).*

Soundwall S528: Soundwall S528 would be located on private property along the northbound side of I-5, north of Carmel Mountain Road. The soundwall would replace an existing 6-ft-high glass/block property wall. The soundwall would provide a feasible reduction in highway traffic noise for two single-family residences represented by Receptors R3.13 and R3.14 *(Table 3.15.7*). Soundwall S528 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable cost allowance. Therefore, Soundwall S528 would not be recommended (*Table 3.15.8*).

Areas without Noise Abatement

Receptors R3.1 and R3.1A: Receptors R3.1 and R3.1A are not currently experiencing traffic noise levels approaching or exceeding the NAC for Category B receivers, nor would predicted noise levels approach or exceed the NAC with or without the proposed project (*Table 3.15.7*). Therefore, no abatement would be required.

Receptors R3.11 and R3.12: These receptors are not currently experiencing traffic noise levels approaching or exceeding the NAC for Category B receivers, nor would predicted noise levels approach or exceed the NAC with or without the proposed project (*Table 3.15.7*). Therefore, no abatement would be required.

Table 3.15.7: Predicted Future Noise Levels and Soundwall Feasibility for Segment 3

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					8 ft		10 ft		12 ft		14 ft		16 ft			
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.		
Carmel Mountain Road to Carmel Valley Road – NB																
R3.1[W]	13777 Torrey View Court	59	62	62	--	--	--	--	--	--	--	--	--	--		--
R3.1A[W]	13763 Torrey View Court	62	65	65	--	--	--	--	--	--	--	--	--	--		--
R3.2[W]	13759 Torrey View Court	63	66	66[A/E]	64[T]	2	**61**[R]	**5**	59	7	58	8	57	9		S526 / Feasible
R3.3[W]	13735 Torrey View Court	64	67	68[A/E]	65[T]	3	**63**[R]	**5**	61	7	60	8	59	9		S526 / Feasible
R3.4[W]	13715 Torrey View Court	65	68	69[A/E]	66[T]	3	**64**[R]	**5**	63	6	61	8	60	9		S526 / Feasible
R3.5*[W]	13719 Torrey View Court	55	58	58[N]	58	0	57	1	56	2	55	3	55	3		--
R3.6[W]	13707 Torrey View Court	67	70	71[A/E]	67[T]	4	**65**[R]	**6**	63	8	61	10	61	10		S526 / Feasible
R3.7[W]	13699 Torrey View Court	60	63	64[N]	62	2	61	3	60	4	60	4	59	5		--
R3.8[W]	13690 Torrey View Court	64	65	66[A/E]	64[T]	2	62	4	**61**[R]	**5**	59	7	58	8		S526 / Feasible
R3.9[W]	13680 Torrey View Court	67	68	69[A/E]	65[T]	4	63	6	61	8	**60**[R]	**9**	59	10		S526 / Feasible
R3.10[W]	13676 Torrey View Court	70	71	72[A/E]	69[T]	3	67	5	64	8	**63**[R]	**9**	62	10		S526 / Feasible
R3.10A[W]	13670 Torrey View Court	68	66	66[A/E]	65[T]	1	63	3	62	4	**61**[R]	**5**	60	6		S526 / Feasible
R3.11[W]	13664 Torrey View Court	64	65	65[N]	63	2	62	3	61	4	60	5	59	6		--
R3.12[W]	13654 Torrey View Court	63	64	65[N]	63	2	61	4	60	5	59	6	58	7		--
R3.13[W]	13648 Torrey View Court	66	67	67[A/E]	64[T]	3	**62**[R]	**5**	60	7	59	8	58	9		S528 / Feasible
R3.14[W]	13652 Torrey View Court	64	65	65[N]	63	2	62	3	60	5	59	6	58	7		--

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – Includes the benefits of an existing 6-ft high property wall.
* Non first-row receiver

Table 3.15.8: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 3

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S526	R3.2 - R3.10A	28 SFR	R/W and Private Property / NB	10 ft to 14 ft / 1893 ft	$2,004,741	$1,120,000	Not Reasonable	Not Recommended
S528	R3.13 – R3.14	2 SFR	Private Property / NB	10 ft / 381 ft	$380,702	$68,000	Not Reasonable	Not Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence
[2] – Estimated construction cost includes cost of easements
R/W – right-of-way

SEGMENT 4 – Carmel Valley Road to Del Mar Heights Road

Areas with Noise Abatement

Table 3.15.9 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 B I.L. *Table 3.15.10* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 4 are shown in *Figures 2-2.3, Sheets 12* through*15*. The following paragraphs describe the preliminary abatement decisions for Segment 4.

Soundwall S541: Soundwall S541 would be located on the southbound side of I-5 on private property, north of Carmel Valley Road. The soundwall would provide a feasible reduction in highway traffic noise for the recreational area of a gated housing community, comprised of a pool and tennis courts, represented by Receptors R4.2 and R4.4 (*Table 3.15.9*). Soundwall S541 would not provide a feasible noise reduction for Receptor R4.3 because the elevation of R4.3 would be approximately 13 ft higher than the proposed soundwall. Soundwall S541 would replace an existing 6- to 7-ft-high property wall located on the property line. Soundwall S541 would not be reasonable due to the estimated construction cost exceeding the reasonable cost allowance (*Table 3.15.10*). Therefore, construction of Soundwall S541 would not be recommended (*Table 3.15.10*).

Soundwall S543: Soundwall S543 would be located on the southbound side of I-5 on private property, north of Carmel Valley Road. The soundwall would provide a feasible reduction in highway traffic noise for six multi-family residences represented by Receptor R4.5 and is considered feasible *(Table 3.15.9*). It would replace the eastern side of an existing 7.5-ft high glass/block property wall located on the property line. Soundwall S543 would not be reasonable due to the estimated construction cost exceeding the reasonable cost allowance (*Table 3.15.10).* Cost of acquisition for right-of-way is assumed to be $94,010 for this wall, and when added to the construction cost, it exceeds the reasonable allowance. If the estimated construction cost could not be reduced to less than or equal to the reasonable allowance, construction of S543 would not be recommended (*Table 3.15.10).*

Soundwall S551: Soundwall S551 would be located on the southbound side of I-5 on private property between Carmel Valley Road and Del Mar Heights Road. The soundwall would provide a feasible reduction in highway traffic noise for 51 single-family residences represented by Receptors R4.11 through R4.21, and would be feasible (*Table 3.15.9*). It would replace an existing 7-ft-high glass/block property wall located on the property line. Soundwall S551 would not be reasonable due to the estimated construction cost exceeding the reasonable cost allowance *(Table 3.15.10*). Therefore, Soundwall S551 would not be recommended (*Table 3.15.10*). However, Receptor R4.11 would be severely impacted with highway traffic noise levels at or higher than 75 dBA with the proposed build alternatives, and would require abatement (*Table 3.15.9*). It would be recommended that interior abatement be provided for R4.11 and the existing glass/block wall would be left in place. No further abatement would be provided.

Soundwall S557: Soundwall S557 would be located on the southbound side of I-5 on private property south of Del Mar Heights Road. The soundwall would provide a feasible reduction in highway traffic noise for 10 multi-family residences represented by Receptors R4.22A, R4.23, and R4.24, and is considered feasible (*Table 3.15.9*). Soundwall S557 would not be reasonable due to the estimated construction cost exceeding the reasonable cost allowance (*Table 3.15.10*). Therefore, Soundwall S557 would not be recommended as proposed (*Table 3.15.10*). However, Receptor R4.23 would be severely impacted, with highway traffic noise levels at or higher than 75 dBA with the proposed build alternatives, and would require abatement (*Table 3.15.9*). It would, therefore, be recommended that Receptor R4.23 receive individual abatement.

Areas without Noise Abatement

Receptor R4.1: Receptor R4.1 represents a single-family residence in a gated community on the southbound side of I-5, just north of Carmel Valley Road. A soundwall located on the shoulder or the right-of-way would not be feasible due to the elevation at the residence. Constructing a soundwall on private property to provide abatement for one residence would also not be practical (*Table 3.15.9).*

Receptors R4.6 through R4.10: Receptors R4.6 through R4.10 represent a group of multi-family residences on the southbound side of I-5, north of Carmel Valley Road. Receptors R4.6 through R4.8 are protected by an existing 15-ft high soundwall. A soundwall at this location would not provide the required 5 dBA noise reduction; therefore, abatement would not be feasible (*Table 3.15.9).*

Receptor R4.22: Receptor R4.22 represents a single-family residence on the southbound side of I-5, south of Del Mar Heights Road. Soundwall S551 would not provide a feasible noise reduction for this receptor (*Table 3.15.9*).

Table 3.15.9: Predicted Future Noise Levels and Soundwall Feasibility for Segment 4

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Carmel Valley Road to Del Mar Heights Road – SB																
R4.1	13538 Caminito Carmel	68	71	72 [A/E]	72	0	71	1	71	1	71	1	71	1	Not Feasible
R4.2[W]	12943 Caminito Pointe Del Mar	69	72	72 [A/E]	70[T]	2	**67[R]**	**5**	65	7	63	9	62	10	S541 / Feasible
R4.3[W]	12943 Caminito Pointe Del Mar	70	73	73 [A/E]	73	0	72	1	71	2	71	2	70	3	Not Feasible
R4.4[W]	13933 Caminito Pointe Del Mar	67	70	71 [A/E]	69[T]	2	**66[R]**	**5**	64	7	62	9	61	10	S541 / Feasible
R4.5[W]	2784 Caminito San Marino	69	72	73 [A/E]	72[T]	1	71	2	69	4	**67[R]**	**6**	66	7	S543 / Feasible
R4.6[WZ]	2783 Caminito Cedros	65	68	69 [A/E]	--	--	--	--	--	--	--	--	67	2	--
R4.7[W,Z]	2766 Caminito San Pablo	63	66	67 [A/E]	--	--	--	--	--	--	--	--	67	0	--
R4.8[W,Z]	2777 Caminito El Dorado	62	65	66 [A/E]	--	--	--	--	--	--	--	--	65	1	--
R4.9[W,Z]	13080 Caminito Cristobal	68	67	67 [A/E]	--	--	--	--	--	--	66	1	67	0	--
R4.10[W,Z]	13110 Portofino Drive	66	65	66 [A/E]	66	0	65	1	65	1	65	1	65	1	Not Feasible
R4.11[W]	13131 Portofino Drive	74	74	75 [A/E]	74[T]	1	71	4	**68[R]**	**7**	66	9	65	10	S551 / Feasible
R4.12[W]	13163 Portofino Drive	72	72	73 [A/E]	72[T]	1	67	3	**68[R]**	**5**	67	6	65	8	S551 / Feasible
R4.13[W]	13231 Portofino Drive	69	69	69 [A/E]	68[T]	1	67	2	65	4	**64[R]**	**5**	64	5	S551 / Feasible
R4.14[W]	13303 Portofino Drive	69	69	70 [A/E]	69[T]	1	67	3	66	4	**65[R]**	**5**	64	6	S551 / Feasible
R4.15[W]	13333 Portofino Drive	68	69	69 [A/E]	69[T]	0	67	2	65	4	**64[R]**	**5**	64	5	S551 / Feasible
R4.16[W]	13363 Portofino Drive	68	69	70 [A/E]	69[T]	1	67	3	65	5	**64[R]**	**6**	63	7	S551 / Feasible
R4.17[W]	13395 Portofino Drive	67	68	69 [A/E]	68[T]	1	67	2	65	4	**64[R]**	**5**	63	6	S551 / Feasible
R4.18[W]	13451 Portofino Drive	67	68	69 [A/E]	68[T]	1	67	2	65	4	**64[R]**	**5**	63	6	S551 / Feasible
R4.19[W]	13505 Portofino Drive	68	69	70 [A/E]	69[T]	1	67	3	65	5	**64[R]**	**6**	63	7	S551 / Feasible
R4.20[W]	13555 Portofino Drive	68	69	69 [A/E]	68[T]	1	67	2	65	4	**64[R]**	**5**	63	6	S551 / Feasible
R4.21[W]	13603 Portofino Drive	68	69	69 [A/E]	68[T]	1	67	2	65	4	**64[R]**	**5**	63	6	S551 / Feasible
R4.22[W]	13651 Portofino Drive	67	68	69 [A/E]	68[T]	1	67	2	66	3	65	4	65	4	S551 / Not Feasible
R4.22A	Casa Del Mar Apartments - Ruette Le Parc	71	71	71 [A/E]	68[T]	3	**66[R]**	**5**	64	7	62	9	61	10	S557 / Feasible
R4.23	Casa Del Mar Apartments - Ruette Le Parc	77	77	78 [A/E]	73[T]	5	**71[R]**	**7**	69	9	66	12	65	13	S557 / Feasible
R4.24	Casa Del Mar Apartments - Ruette Le Parc	72	72	73 [A/E]	69[T]	4	**66[R]**	**7**	63	10	62	11	61	12	S557 / Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – Includes the benefits of an existing soundwall/property wall.
[Z] – Receivers R4.6 through R4.9 are behind an existing 11- to 15-ft high soundwall; therefore, a soundwall of lesser height has been considered for these receivers.

Table 3.15.10: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 4

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S541	R4.2 and R4.4	1 REC (4 Frontage Units)	Private Property / SB	10 ft / 571 ft	$586,292	$152,000	Not Reasonable	Not Recommended
S543	R4.5	6 MFR	Private Property / SB	14 ft / 259 ft	$324,382	$300,000	Not Reasonable	Not Recommended
S551	R4.11-R4.22	51 SFR	Private Property / SB	12 ft to 14 ft / 3615 ft	$4,462,391	$2,550,000	Not Reasonable	Not Recommended, Individual Abatement for SI[3]
S557	R4.22A, R4.23, and R4.24	10 MFR	Private Property / SB	10 ft / 889 ft	$828,681	$400,000	Not Reasonable	Not Recommended, Individual Abatement for SI[3]

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; SCH – school; REC – recreational
[2] – Estimated construction cost includes cost of easements
[3] – SI – Severely Impacted

SEGMENT 5 – Del Mar Heights Road to Via de la Valle Undercrossing

Areas with Noise Abatement

Table 3.15.11 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.12* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 5 are shown in *Figures 2-2.3, Sheets 15* through *20*. The following paragraphs describe the preliminary abatement decisions for Segment 5.

Soundwall S561: Soundwall S561 would be located along the southbound side of I-5, north of Del Mar Heights Road. This soundwall would provide a feasible reduction in highway traffic noise for six multi-family residences represented by Receptors R5.1 and R5.2 (*Table 3.15.11*). Soundwall S561 would not be reasonable due to the estimated construction cost exceeding the reasonable cost allowance (*Table 3.15.12*). Therefore, construction of Soundwall S561 would not be recommended (*Table 3.15.12).*

Soundwall S563: Soundwall S563 would be located along the southbound side of I-5 north of Del Mar Heights Road. Soundwall S563 would provide a feasible reduction in highway traffic noise for the outdoor use area at Del Mar Hills Academy, represented by Receptor R5.3 (*Table 3.15.11*). Soundwall S563 would not be reasonable due to the estimated construction cost exceeding the reasonable cost allowance (*Table 3.15.12*). Therefore, Soundwall S563 would not be recommended (*Table 3.15.12*).

Soundwall S565: Soundwall S565 would be located along the southbound side of I-5, north of Del Mar Heights Road. This soundwall would provide a feasible reduction in highway traffic noise for Del Mar Hills Academy, represented by Receptors R5.5 and R5.6, and would be considered feasible (*Table 3.15.11*). Soundwall S565 would not be reasonable due to the estimated construction cost exceeding the reasonable cost allowance (*Table 3.15.12*). Therefore, construction of Soundwall S565 would not be recommended (*Table 3.15.12*).

Soundwall S567: Soundwall S567 would be located along the southbound side of I-5, north of Del Mar Heights Road. The soundwall would provide a feasible reduction in highway traffic noise for seven single-family residences, represented by Receptors R5.7A, R5.8, and R5.8A (*Table 3.15.11*). Soundwall S567 would not be reasonable due to the estimated construction cost exceeding the reasonable cost allowance (*Table 3.15.12*). Cost of acquisition for right-of-way is assumed to be $96,670 for this wall, and when added to the construction cost, it exceeds the reasonable allowance. If the estimated construction cost could not be reduced to less than or equal to the reasonable allowance, construction of S567 would not be recommended (*Table 3.15.12*).

Soundwall S568: Soundwall S568 would be located on the right-of-way and on private property along the northbound side of I-5, north of Del Mar Heights Road. This soundwall would provide a feasible reduction in highway traffic noise for 11 single-family residences, represented by Receptors R5.21 to R5.23 (*Table 3.15.11*). Soundwall S568 would not be reasonable due to the estimated construction cost exceeding the reasonable cost allowance (*Table 3.15.12*). Therefore, Soundwall S568 would not be recommended (*Table 3.15.12*).

Soundwall S569: Soundwall S569 would be located along the southbound side of I-5, north of Del Mar Heights Road. The soundwall would provide a feasible reduction in highway traffic noise for three single-family residences, represented by Receptor R5.9 (*Table 3.15.11*). Soundwall S569 would not be reasonable due to the estimated construction cost exceeding the reasonable cost allowance (*Table 3.15.12*). Therefore, Soundwall S569 would not be recommended (*Table 3.15.12*).

Soundwall S573: Soundwall S573 would be located along the southbound side of I-5, between Del Mar Heights Road and Via de la Valle. The soundwall would provide a feasible reduction in highway traffic noise for eight single-family residences, represented by Receptors R5.10 to R5.14 (*Table 3.15.11*). Construction of Soundwall S573 could potentially create an adverse visual impact, as it would block scenic views of the ocean for motorists traveling on I-5. Soundwall S573 would not be reasonable due to the estimated construction cost exceeding the reasonable cost allowance (*Table 3.15.12*). Therefore, Soundwall S573 would not be recommended (*Table 3.15.12*).

Soundwall S589: Soundwall S589 would be located along the southbound side of I-5, just south of Via de la Valle. The wall would provide feasible abatement for three recreational areas, represented by Receptors R5.24 to R5.26 (*Table 3.15.11*). Soundwall S589 would not be reasonable due to the estimated construction cost exceeding the reasonable cost allowance (*Table 3.15.12*). Therefore, Soundwall S589 would not be recommended (*Table 3.15.12*).

Areas without Noise Abatement

Receptor R5.7: Receptor R5.7 represents a single-family residence located on the southbound side of I-5, north of Del Mar Heights Road. It would not be feasible to abate highway traffic noise due to elevation differences between the right-of-way and the residence (*Table 3.15.11*). Additionally, a soundwall on the property line would not be feasible due to elevation differences between the property line and the residence's outdoor use area.

Receptor R5.15: Receptor R5.15 represents a single-family residence located on the southbound side of I-5, north of Del Mar Heights Road. Soundwall S753 would not provide a feasible noise reduction for this residence (*Table 3.15.11).*

Receptors R5.17 to R5.20: Receptors R5.17 to R5.20 are located on the northbound side of I-5, north of Del Mar Heights Road. The existing 10-ft-high property wall already provides the required abatement from highway traffic noise, except for R5.17. However, a soundwall modeled in place of the existing property wall would not meet the required 5 dB noise reduction to be considered feasible for R5.17 (*Table 3.15.11*).

Table 3.15.11: Predicted Future Noise Levels and Soundwall Feasibility for Segment 5

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No./ Location Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Del Mar Heights Road to Via de la Valle Undercrossing – SB															
R5.1	14031 Mango Drive – Bella Del Mar Apartment Homes	70	71	73 [A/E]	**67[R,T]**	**6**	65	8	64	9	63	10	62	11	S561 / Feasible
R5.2	14065 Mango Drive – Bella Del Mar Apartment Homes	71	72	74 [A/E]	**68[R,T]**	**6**	66	8	64	10	63	11	62	12	S561 / Feasible
R5.3[W]	14085 Mango Drive – Del Mar Hills Academy Playground	68	69	71 [A/E]	68[T]	3	67	4	**66[R]**	**5**	65	6	65	6	S563 / Feasible
R5.4[O,W]	14085 Mango Drive – Del Mar Hills Academy	64	65	67 [A/E]	66	1	65	2	65	2	65	2	64	3	--
R5.5	14085 Mango Drive – Del Mar Hills Academy – Athletic Field	68	69	71 [A/E]	65[T]	6	**64[R]**	**7**	63	8	62	9	62	9	S565 / Feasible
R5.6	14085 Mango Drive – Del Mar Hills Academy – Athletic Field	69	70	72 [A/E]	68[T]	4	**67[R]**	**5**	67	5	67	5	66	6	S565 Feasible
R5.7	14175 Minorca Cove	72	71	73 [A/E]	--	--	--	--	--	--	--	--	--	--	Not Feasible
R5.7A	14243 Minorca Cove	72	71	73 [A/E]	**67[R,T]**	**6**	66	7	65	8	64	9	64	9	S567 / Feasible
R5.8	14251 Minorca Cove	72	71	72 [A/E]	**66[R,T]**	**6**	64	8	62	10	61	11	60	12	S567 / Feasible
R5.8A	14269 Minorca Cove	70	69	71 [A/E]	**65[R,T]**	**6**	65	6	64	7	63	8	63	8	S567 Feasible
R5.9	14295 Minorca Cove	71	70	72 [A/E]	72	0	72	0	71[T]	1	69	3	**67[R]**	**5**	S569 / Feasible
R5.10	13413 Racetrack View Court	68	73	73 [A/E]	70[T]	3	69	4	**68[R]**	**5**	67	6	67	6	S573 / Feasible
R5.11	13433 Racetrack View Court	66	71	70 [A/E]	67[T]	3	66	4	**65[R]**	**5**	65	5	64	6	S573 / Feasible
R5.12	3053 Racetrack View Court	65	70	70 [A/E]	67[T]	3	66	4	**65[R]**	**5**	65	5	64	6	S573 / Feasible
R5.13	3073 Racetrack View Court	63	68	68 [A/E]	65[T]	3	64	4	64	4	**63[R]**	**5**	63	5	S573 / Feasible
R5.14	3093 Racetrack View Court	62	67	68 [A/E]	65[T]	3	64	4	64	4	**63[R]**	**5**	63	5	S573 / Feasible
R5.15	3080 Racetrack View Court	62	67	67 [A/E]	65[T]	2	64	3	64	3	63	4	63	4	Not Feasible
R5.16[W]	Bella Del Mar Apartments – Voyager Circle	67	68	70 [A/E]	67	3	65	5	64	6	62	8	61	9	Not Feasible
R5.16A[W,K]	Bella Del Mar Apartments – Voyager Circle	59	60	62 [N]	--	--	--	--	--	--	--	--	--	--	--
Del Mar Heights Road to Via de la Valle Undercrossing – NB															
R5.17[W]	3355 Lower Ridge Road	63	64	66 [A/E]	--	--	--	--	64	2	62	4	62	4	Not Feasible
R5.18[W]	3295 Lower Ridge Road	62	63	65 [N]	--	--	--	--	--	--	--	--	--	--	--
R5.19[W]	13126 Windbreak Road	62	63	65 [N]	--	--	--	--	--	--	--	--	--	--	--
R5.20[W]	3404 Lady Hill Road	61	62	63 [N]	--	--	--	--	--	--	--	--	--	--	--
R5.21	13204 Ocean Vista Road	65	67	69 [A/E]	66[T]	3	65	4	65	4	**64[R]**	**5**	63	6	S568 / Feasible
R5.22	13212 Ocean Vista Road	68	70	72 [A/E]	**67[R,T]**	**5**	66	6	64	8	63	9	62	10	S568 / Feasible
R5.23	13228 Ocean Vista Road	70	72	74 [A/E]	**68[R,T]**	**6**	66	8	64	10	62	12	61	13	S568 / Feasible

Table 3.15.11 (cont.): Predicted Future Noise Levels and Soundwall Feasibility for Segment 5

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]												Soundwall No./ Location Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Del Mar Heights Road to Via de la Valle Undercrossing – SB															
R5.24	Mini Golf Course – Jimmy Durante Boulevard	74	74	74 [A/E]	71[T]	3	70	4	**69[R]**	5	68	6	67	7	S589 / Feasible
R5.25	Surf -N-Turf RV Park – Jimmy Durante Boulevard	74	74	74 [A/E]	70[T]	4	69	5	**68[R]**	6	67	7	66	8	S589 / Feasible
R5.26	Surf -N-Turf RV Park – Jimmy Durante Boulevard	71	71	71 [A/E]	69	2	68	3	67[T]	4	**66[R]**	**5**	65	6	S589 / Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[M] – This receptor represents a measurement site. It is not an area of frequent human use.
[N] – No noise impact.
[O] – Outdoor measurement site at school.
[K] – A shielding factor of 5 dB has been applied to Receptor 5.16A to account for attenuation provided by first-row buildings.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future no build noise levels at this receiver include the benefits of an existing property wall.

Table 3.15.12: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 5

Soundwall No	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S561	R5.1 – R5.2	6 MFR	Private Property / SB	8 ft / 492 ft	$407,215	$240,000	Not Reasonable	Not Recommended
S563	R5.3	1 SCH (3 Frontage Units)	School Property / SB	12 ft / 318 ft	$357,592	$144,000	Not Reasonable	Not Recommended
S565	R5.5 – R5.6	1 SCH (4 Frontage Units)	School Property / SB	10 ft / 364 ft	$344,879	$200,000	Not Reasonable	Not Recommended
S567	R5.7A, R5.8, R5.8A	7 SFR	R/W / SB	8 ft / 459 ft	$348,948	$336,000	Not Reasonable	Not Recommended
S568	R5.21 – R5.23	11 SFR	R/W and Private Property / SB	8 ft to 14 ft / 709 ft	$675,865	$440,000	Not Reasonable	Not Recommended
S569	R5.9	3 SFR	R/W / SB	16 ft / 253 ft	$311,330	$138,000	Not Reasonable	Not Recommended
S573	R5.10 – 5.14	8 SFR	Shoulder / SB	12 ft to 14 ft / 2133 ft	$1,396,532	$304,000	Not Reasonable	Not Recommended
S589	R5.24 – R5.26	3 REC (8 Frontage Units)	Shoulder / SB	12 ft to 14 ft / 1844 ft	$964,869	$384,000	Not Reasonable	Not Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; SCH – school; REC – recreational
[2] – Estimated construction cost includes cost of easements
R/W – right-of-way

SEGMENT 6 – Via de la Valle Undercrossing to Lomas Santa Fe Drive

Areas with Noise Abatement

Table 3.15.13 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.14* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 6 are shown in *Figures 2-2.3, Sheets 20* through *23*. The following paragraphs describe the preliminary abatement decisions for Segment 6.

Soundwall S602 (Option 1): Soundwall S602 would be located on private property and Caltrans right-of-way along the northbound side of I-5, north of Del Mar Heights Road. The soundwall would provide a feasible reduction in highway traffic noise for 10 single- and 20 multi-family residences, represented by Receptors R6.12A and R6.12 to R6.21 (*Table 3.15.13*). Soundwall S602 Option 1 would not provide feasible noise reduction for Receptors R6.12B, R6.13A, and R6.15; and Receptor R6.14A would not be impacted by freeway noise (*Table 3.15.13*). Soundwall S602 Option 1 would not be reasonable to construct due to the estimated construction cost exceeding the total reasonable allowance (*Table 3.15.14*). Therefore, Soundwall S602 Option 1 would not be recommended as proposed (*Table 3.15.14*). Since Receptors R6.12A, R6.17, R6.19, and R6.20 are predicted to be severely impacted by future traffic noise levels at or higher than 75 dBA with the proposed build alternatives, abatement must be provided. Since this wall would potentially block scenic ocean views for nearby residences, a second option, Option 2, would be proposed.

Soundwall S602 (Option 2): Soundwall S602 Option 2 would be a shorter wall located on Caltrans right-of-way along the northbound side of I-5, north of Via de la Valle. This soundwall would provide a feasible reduction in highway traffic noise for six single-family residences, represented by Receptors R6.17A and R6.17 to R6.20, of which Receptors R6.17, R6.19, and R6.20 would be severely impacted under the proposed build alternatives (*Table 3.15.13*). Soundwall 602 Option 2 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.14*). However, abatement would be required for the three severely impacted receptors, represented by R6.17, R6.19, and R6.20. Therefore, the preliminary recommendation would be to construct S602 Option 2 to abate highway traffic noise only for the severely impacted residences (*Table 3.15.14*). Individual abatement would be provided for severely impacted residences represented by Receptor R6.12A.

Soundwall S603 (Option 1): Soundwall S603 Option 1 would be located along the southbound side of I-5, north of Via de la Valle. The soundwall, as proposed in the Draft EIR/EIS, would provide a feasible reduction in highway traffic noise for 14 single-family and 20 multi-family residences, as well as St. Leo's Head Start Pre School and Santa Fe Christian School, all represented by Receptors R6.4A and R6.4 to R6.11 (*Table 3.15.13*). The estimated construction cost of S603 (Option 1) including all easement costs, would be less than the reasonable cost allowance, and so would be reasonable (*Table 3.15.14*). For purposes of the noise analysis, the solid soundwall has been identified in *Table 3.15.13*. A solid soundwall, however, would have the potential to block scenic coastal views for freeway motorists protected under the Coastal Act. For that reason, and based on general comments received on loss of potential ocean views during public review of the Draft EIR/EIS and Supplemental Draft EIR/EIS, as well as coordination with the CCC, it is now recommended to create a gap in the

Soundwall S603 (Option 1) to maintain the coastal view (see Soundwall S603 [Option 1A], below). The potential visual impacts are further discussed in *Section 3.7, Visual/Aesthetics*. Soundwall S603 Option 1 is not recommended (*Table 3.15.14*).

Soundwall S603 (Option 1A): As discussed above, Soundwall S603 (Option 1A) would create a gap in Soundwall S603 (Option 1). This would divide the soundwall into S603A and S603B, and would retain the potential for a coastal view in this area. The gap would start at Station 601+00 and would end at Station 605+00 (see *Figures 2-2.3, Sheets 22* and *23*).

Soundwall S603A would provide a feasible reduction in highway traffic noise for 12 multi-family residences, represented by Receptors R6.4A and R6.4, and 1 single-family residence, represented by Receptor R6.5. Soundwall S603B would provide a feasible reduction in highway traffic noise for four multi-family residences, represented by Receptor R6.9A, as well as Santa Fe Christian School, represented by Receptors R6.10 and R6.11, which counts for seven frequent human-use areas. Receptors R6.6 through R6.9 would not receive a feasible noise reduction with the gap in the soundwall (*Table 3.15.13*). The estimated construction cost of S603A and S603B, including all easement costs, would be less than the reasonable cost allowance. Therefore, Soundwalls S603A and S603B are preliminarily recommended. The potential visual impacts are further discussed in *Section 3.7, Visual/Aesthetics,* under Key View 3.

Soundwall S603 (Option 2): Soundwall S603 Option 2 would be located on private property along the southbound side of I-5, north of Via de la Valle. This wall would provide a feasible reduction in highway traffic noise for three multi-family residences, represented by Receptors R6.9 and R6.9A (*Table 3.15.13*). In this option, Soundwall S603 would be partially founded on a proposed retaining wall. Soundwall S603 would not be reasonable due to the estimated construction costs exceeding the reasonable cost allowance (*Table 3.15.14*). Therefore, this option is not recommended (*Table 3.15.14*).

Areas without Noise Abatement

Receptors R6.1 through R6.2: Single- and multi-family residences, represented by Receptor R6.1, are located on the southbound side of I-5. It would not be feasible to abate for highway traffic noise for R6.1 due to elevation differences between the highway and the residences (*Table 3.15.13*). Receptor R6.2 is in a front yard and is not an outdoor use area, and the backyard for this area wound not be impacted. It was modeled because it was meant to be a calibration site; however, the noise data collected from this site were contaminated from other noise sources and was not used for calibration (*Table 3.15.13*).

Receptors R6.1A and R6.3: Future noise at these locations is not predicted to approach or exceed the NAC for these Category B receivers under the proposed build alternatives (*Table 3.15.13*).

Receptors R6.6 through R6.9A: 13 single-family and 8 multi-family residences, as well as St. Leo's Head Start Pre School, are represented by these receptors. As discussed above, a soundwall within this portion of the corridor would have the potential to block scenic coastal views, which are protected under the Coastal Act, for freeway motorists. A soundwall in this location is therefore not feasible.

Receptors R6.22 and R6.23: Santa Fe Montessori School is represented by Receptors R6.22 and R6.23 and is located on the northbound side of I-5. A soundwall within the right-of-way would not be feasible to construct because of elevation differences between the school and the right-of-way (*Table 3.15.13*). A soundwall on school property would not be feasible because the outdoor use area is located behind the school and a soundwall would not provide the required minimum 5 dB noise reduction (*Table 3.15.13*). Receptor R6.22 is located in the school's front parking lot and is not an outdoor use area, but it was modeled to aide in estimating existing noise levels in this area. Building acoustical treatment may need to be considered for this school due to the high exterior noise levels (74 dBA) at the facade of the building.

Receptors R6.24 and R6.25: Receptors R6.24 and R6.25 represent a single-family residence and a home office, located on the northbound side of I-5, south of Lomas Santa Fe Drive. These receptors are protected by an existing 12.8-ft-high glass-and-block wall specifically designed to reduce traffic noise at this property. A 14-ft-high and 16-ft-high soundwall proposed along the right-of-way, in front of R6.24 and R6.25, was modeled and did not meet the 5 dB reduction requirement to be considered feasible (*Table 3.15.13*).

Table 3.15.13: Predicted Future Noise Levels and Soundwall Feasibility for Segment 6

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No./ Location Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					8 ft		10 ft		12 ft		14 ft		16 ft			
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.		
Via de la Valle to Lomas Santa Fe Drive – SB																
R6.1	15808 Highland Court	66	66	68 [A/E]	67	1	67	1	66	2	66	2	65	3		Not Feasible
R6.1A	15834 Highland Court	60	60	62 [N]	--	--	--	--	--	--	--	--	--	--		--
R6.2	15863 Highland Court	65	65	67 [A/E]	67	0	66	1	64	3	64	3	63	4		Not Feasible
R6.3	15877 Highland Court	62	62	64 [N]	--	--	--	--	--	--	--	--	--	--		--
R6.4A	803 Highland Drive	67	67	72 [A/E]	**67**[R,T]	**5**	66	6	65	7	65	7	64	8		S603[3] / Feasible
R6.4	804 Ida Avenue	71	76	80 [A/E]	**73**[R,T]	**7**	71	9	70	10	69	11	68	12		S603[3] / Feasible
R6.5	828 Ida Avenue	64	69	74 [A/E]	69	5	**68**[R]	**6**	67	7	67	7	66	8		S603[3] / Feasible
R6.6*	708 Castro Street	61	66	69 [A/E]	66	3	65[T]	4	**64**[R]	**5**	63	6	63	6		S603[3] / Feasible
R6.7*	709 Ida Avenue	64	69	71 [A/E]	68[T]	3	67	4	**66**[R]	**5**	65	6	64	7		S603[3] / Feasible
R6.7A	635 Ida Avenue	64	69	68 [A/E]	65[T]	3	64	4	**63**[R]	**5**	63	5	62	6		S603[3] / Feasible
R6.8	St Leo's Head Start Preschool – Playground	68	73	70 [A/E]	66[T]	4	**65**[R]	**5**	65	5	64	6	64	6		S603[3] / Feasible
R6.9	865 Mola Vista Way	69	74	74 [A/E]	70[T]	4	**68**[R]	**6**	67	7	66	8	65	9		S603[3] / Feasible
R6.9A	865 Mola Vista Way	67	73	73 [A/E]	69[T]	4	**68**[R]	**5**	66	7	65	8	65	8		S603[3] / Feasible
R6.10	838 Academy Drive - Santa Fe Christian	75	73	76 [A/E]	71	5	**70**[R,T]	**6**	69	7	68	8	67	9		S603[3] / Feasible
R6.11	838 Academy Drive- Santa Fe Christian School	76	74	75 [A/E]	73	2	**70**[R,T]	**5**	68	7	67	8	66	9		S603[3] / Feasible
Via de la Valle to Lomas Santa Fe Drive – NB																
R6.12A	801 America Way	70	73	75 [A/E]	75[T]	0	73	2	71	4	**69**[R]	**6**	67	8		S602 / Feasible
R6.12[#]	818 America Way	65	68	69 [A/E]	67[T]	2	66	3	65	4	**64**[R]	**5**	63	6		S602 / Feasible
R6.12B	1013 America Way	65	68	69 [A/E]	68	1	67	2	66	3	65	4	65	4		Not Feasible
R6.13	847 America Way	68	71	73 [A/E]	70[T]	3	69	4	**67**[R]	**6**	66	7	65	8		S602 / Feasible
R6.13A	1003 Reliance Way	64	67	68 [A/E]	67	1	66	2	66	2	65	3	65	3		Not Feasible
R6.14	1015 Freedom Court	67	70	72 [A/E]	68[T]	4	67	5	**66**[R]	**6**	65	7	65	7		S602 / Feasible
R6.14A	817 America Way	61	64	65 [N]	64	1	64	1	64	1	63	2	63	2		--
R6.15	803 Spindrift Drive	68	71	72 [A/E]	70	2	69	3	69	3	68	4	68	4		Not Feasible
R6.16	1005 Highland Drive	69	71	72 [A/E]	70	2	69	3	68[T]	4	6	4	**67**[R]	5		S602 / Feasible
R6.16A	1005 Highland Drive	69	71	72 [A/E]	70	2	69	3	68[T]	4	6	4	**67**[R]	5		S602 / Feasible
R6.17A	695 Marine View Avenue	72	71	72 [A/E]	69	3	68	4	67[T]	5	66	6	**65**[R]	**7**		S602 / Feasible
R6.17	683 Marine View Avenue	71	73	75 [A/E]	70	5	69[T]	6	68	7	67	8	**67**[R]	**8**		S602 / Feasible
R6.18	677 Marine View Avenue	69	71	73 [A/E]	70	3	70	3	69	4	68	5	**68**[R,T]	**5**		S602 / Feasible
R6.19	641 Marine View Avenue	70	72	75 [A/E]	73	2	73	2	72	3	71	4	**70**[R,T]	**5**		S602 / Feasible
R6.20	959 Genevieve Street	73	75	75 [A/E]	74	1	73	2	72	3	70	5	**68**[R]	**7**		S602 / Feasible

Table 3.15.13 (cont.): Predicted Future Noise Levels and Soundwall Feasibility for Segment 6

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No./ Location Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Via de la Valle to Lomas Santa Fe Drive – NB(cont.)															
R6.21	621 Marine View Avenue	66	70	72 [A/E]	70	2	69	3	68	4	67	5	**66[R,T]**	**6**	S602 / Feasible
R6.22[W]	1010 Solano Drive - Santa Fe Montessori	69	73	74 [A/E]	73	1	72	2	72	2	71	3	70	4	Not Feasible
R6.23[W]	1010 Solano Drive - Santa Fe Montessori	61	65	67 [A/E]	65	2	65	2	64	3	64	3	64	3	Not Feasible
R6.24[W]	200 Marine View Avenue	66	68	70 [A/E]	--	--	--	--	--	--	--	--	--	--	Not Feasible
R6.25[W]	200 Marine View Avenue	63	65	66 [A/E]	--	--	--	--	--	--	66	0	66	0	Not Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[3] – Following receipt of public comments on the Draft EIR/EIS, this soundwall was redesigned to recommend breaking the wall into two parts with a gap in the center to maintain the potential coastal view. The southern portion of this segmented soundwall (S603A) would extend from milepost 597+80 to milepost 601+00. The northern portion of this soundwall (S603B) would extend from milepost 604+80 to milepost 608+15. This segmented soundwall would attenuate project noise levels by 5 to 7 dBA with a height ranging from 8 to 12 feet.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future noise levels at this receiver include the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.13: Predicted Future Noise Levels and Soundwall Feasibility for Segment 6 (Option 2)

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No./ Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Via de la Valle to Lomas Santa Fe Drive – SB															
R6.9	865 Mola Vista Way	69	74	74 [A/E]	74	0	74	0	74	0	73[T]	1	70	4	Not Feasible
R6.9A	865 Mola Vista Way	67	73	73 [A/E]	71	2	69	4	69	4	**68[R,T]**	**5**	68	5	S603 (Option 2) / Feasible
Via de la Valle to Lomas Santa Fe Drive – NB															
R6.17A	695 Marine View Avenue	72	71	72 [A/E]	69	3	68	4	**67[R,T]**	**5**	66	6	65	7	S602 (Option 2) / Feasible
R6.17	683 Marine View Avenue	71	72	75 [A/E]	70	5	69[T]	6	**68[R]**	**7**	67	8	67	8	S602 (Option 2) / Feasible
R6.18	677 Marine View Avenue	69	71	73 [A/E]	70	3	70	3	69	4	68	5	**68[R,T]**	**5**	S602 (Option 2) / Feasible
R6.19	641 Marine View Avenue	70	72	75 [A/E]	73	2	73	2	72	3	71	4	**70[R,T]**	**5**	S602 (Option 2) / Feasible
R6.20	959 Genevieve Street	73	75	75 [A/E]	75[T]	0	74	1	71	4	69	6	**68[R,4]**	**7**	S602 (Option 2) / Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future noise levels at this receiver include the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.14: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 6

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S602 Option 1	R6.12A, R6.12 – R6.21	20 MFR, 10 SFR	Shoulder and R/W / NB	12 ft to 16 ft / 2877 ft	$2,827,296	$1,260,000	Not Reasonable	Not Recommended
S603 Option 1	R6.4A, R6.4 – R6.11	20 MFR, 14 SFR, 2 SCH (10 Frontage Units)	Shoulder and R/W / SB	8 ft to 12 ft / 3439 ft	$1,717,564	$2,024,000	Reasonable	Not Recommended
S603A, S603B Option 1A	R6.4A, R6.4, R6.5, R6.9A, R6.10, and R6.11	16 MFR, 1 SFR, 1 SCH	Shoulder and R/W / SB	8 ft to 12 ft / 610 ft (S603A) 10 ft / 1109 ft (S603B)	$998,421 (S603A) $656,404 (S603B)	$598,000 (S603A) $440,000 (S603B)	Not Reasonable	Recommended for SI[3]
S602 Option 2	R6.17A, R6.17 – R6.20	6 SFR	Shoulder and R/W / NB	12 ft to 16 ft / 1509 ft	$1,286,701	$252,000	Not Reasonable	Recommended for SI[3]
S603 Option 2	R6.9 and R6.9A	3 MFR	Private Property / SB	14 ft to 16 ft / 394 ft	$492,094	$114,000	Not Reasonable	Not Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; SCH – school; REC – recreational
[2] – Estimated construction cost includes cost of easements
[3] – SI – Severely Impacted
R/W – right-of-way

SEGMENT 7 – Lomas Santa Fe Drive to Manchester Avenue

Areas with Noise Abatement

Table 3.15.15 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.16* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 7 are shown in *Figures 2-2.3, Sheets 23* through *26*. The following paragraphs describe the preliminary abatement decisions for Segment 7.

Soundwall S614: Soundwall S614 would be located in the right-of-way, along the northbound side of I-5, north of Lomas Santa Fe Drive. The wall would provide a feasible reduction in highway traffic noise for four single-family residences, represented by Receptor R7.14 (*Table 3.15.15*). Currently, there is an existing 12-ft-high soundwall in front of the residences represented by Receptors R7.12 and R7.13, but this soundwall would be demolished and rebuilt to make room for the new northbound access ramp alignment for Lomas Santa Fe Drive. Soundwall S614 would be coupled to the rebuilt project wall by a 10-ft-high connecting wall. Soundwall S614 would be reasonable to construct since the estimated cost would be less than the reasonable cost allowance. Therefore, construction of Soundwall S614 would be recommended (*Table 3.15.16*).

Soundwall S622 (Option 1): Soundwall S622 would be located in the right of-way, along the northbound side of I-5, south of Manchester Avenue. The wall would provide a feasible reduction in highway traffic noise for 32 single-family residences, represented by Receptors R7.18 and R7.20 to R7.32 (*Table 3.15.15*). Four residences, represented by Receptors R7.19 and R7.21A, would be enclosed by this wall but would not benefit from a noise reduction due to elevation differences between the right-of-way and these residences. Soundwall S622 would not be reasonable to construct due to the estimated construction cost being higher than the reasonable cost allowance (*Table 3.15.16*). Therefore, construction of Soundwall S622 (Option 1) would not be recommended. However, nine residences represented by Receptors R7.23 through R7.26 are predicted to be severely impacted by the future noise levels, equal or higher than 75 dBA, under the proposed build alternatives (*Table 3.15.15*). A second iteration of S622 has been proposed as S622 (Option 2), and is described below.

Soundwall S622 (Option 2): Soundwall S622 Option 2 would be a shorter wall located along the northbound side of I-5, south of Manchester Avenue. The wall would provide a feasible reduction in highway traffic noise for the nine severely impacted single-family residences represented by Receptors R7.23 to R7.26 (*Table 3.15.15*). Construction of Soundwall S622 would not be reasonable due to the estimated construction cost being higher than the total cost allowance (*Table 3.15.16*). However, S622 Option 2 would be recommended to abate for the severely impacted Receptors R7.23 through R7.26 (*Table 3.15.15*).

Areas without Noise Abatement

Receptors R7.1 to R7.6: The multi-family residences represented by Receptors R7.1 and R7.2 and the single-family residences that are represented by Receptors R7.3 to R7.6 are located on the southbound side of I-5, north of Lomas Santa Fe Drive. It would not be practical to abate for highway traffic noise for these residences due to the topography of the area (*Table 3.15.15*). These residences have tiered lots, and the elevation at the residential outdoor use area is much higher than the elevation of the highway and right-of-way, making the construction of a soundwall within the right-of-way not feasible (*Table 3.15.15*). Also, installing a soundwall on private property would not be feasible in this area, because the local street alignments prevent the construction of a continuous soundwall that would be required to effectively abate noise in this location.

Receptors R7.7 to R7.11: These receptors represent single-family residences located on the southbound side of I-5, north of Lomas Santa Fe Drive. Only Receptor R7.7 would be impacted, and due to elevation differences between the residential outdoor use area and the highway, there would be no feasible area within the right-of-way to place a soundwall (*Table 3.15.15*). Additionally, a soundwall could not be placed on private property for these residences because the lots have large backyard decks that would hinder the placement of a soundwall.

Receptors R7.15 and R7.16: The single-family residences represented by Receptors R7.15 and R7.16 are located on the northbound side of I-5, north of Lomas Santa Fe Drive. The residence, represented by Receptor R7.16, is in an enclosed depressed area and is not impacted by highway noise (*Table 3.15.15*). It would not be feasible to abate for highway traffic noise for the residence represented by Receptor R7.15 due to elevation differences between the residence and the highway (*Table 3.15.15*).

Receptor R7.17: The single-family residence represented by Receptor R7.17 is located on the northbound side of I-5, north of Lomas Santa Fe Drive. It would not be feasible to abate for highway traffic noise at this residence due to the elevation differences between the residential outdoor use area and the highway, making the construction of a soundwall within the right-of-way not feasible (*Table 3.15.15*). A soundwall on private property was not considered because it would be a stand-alone soundwall for only one house.

Table 3.15.15: Predicted Future Noise Levels and Soundwall Feasibility for Segment 7

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]												Soundwall No./ Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Lomas Santa Fe Drive to Manchester Avenue – SB															
R7.1	305 Solana Hills Drive	68	69	71[A/E]	71	0	71	0	70	1	70	1	70	1	Not Feasible
R7.2	305 Solana Hills Drive	71	71	74[A/E]	73	1	72	2	71	3	70	4	70	4	Not Feasible
R7.3	691 Dell Street	70	71	73[A/E]	73	0	73	0	72	1	71	2	71	2	Not Feasible
R7.4*	673 Solana Glen Court	67	68	70[A/E]	70	0	69	1	68	2	68	2	67	3	Not Feasible
R7.5	679 Solana Glen Court	69	70	72[A/E]	72	0	71	1	70	2	70	2	69	3	Not Feasible
R7.6	667 Solana Hills Court	67	68	70[A/E]	70	0	70	0	70	0	69	1	68	2	Not Feasible
R7.7	602 Ridgeline Place	63	64	66[A/E]	66	0	66	0	66	0	66	0	66	0	Not Feasible
R7.8	616 Ridgeline Place	60	61	64[N]	--	--	--	--	--	--	--	--	--	--	--
R7.9	624 Ridgeline Place	61	62	64[N]	--	--	--	--	--	--	--	--	--	--	--
R7.10	674 Canyon Drive	61	62	64[N]	--	--	--	--	--	--	--	--	--	--	--
R7.11	656 Canyon Drive	62	63	65[N]	--	--	--	--	--	--	--	--	--	--	--
Lomas Santa Fe Drive to Manchester Avenue – NB															
R7.12[W]	307 Santa Helena Drive	68	67	70[A/E]	--	--	--	--	--	--	69	1	67	3	Not Feasible
R7.13[W]	325 Santa Helena Drive	65	66	68[A/E]	--	--	--	--	--	--	67	1	66	2	Not Feasible
R7.14	807 Santa Regina	71	72	74[A/E]	**68**[R]	**6**	67	7	66	8	65	9	65	9	S614 / Feasible
R7.15	807 Santa Regina	63	64	66[A/E]	64	2	64	2	64	2	63	3	63	3	Not Feasible
R7.16	801 Santa Regina	61	62	64[N]	63	1	63	1	62	2	62	2	62	2	Not Feasible
R7.17	837 Santa Rosita	62	63	66[A/E]	64	2	64	2	63	3	63	3	62	4	Not Feasible
R7.18	831 Santa Rosita	65	66	68[A/E]	66	2	64	4	**62**[R]	**6**	61	7	60	8	S622 / Feasible
R7.19	819 Santa Rosita	64	64	66[A/E]	64	2	64	2	63	3	62	4	62	4	Not Feasible
R7.20	803 Santa Rosita	63	63	66[A/E]	62[I]	4	62	4	**61**[R]	**5**	61	5	61	5	S622 / Feasible
R7.21	757 Santa Rosita	72	70	72[A/E]	69[I]	3	67	5	**65**[R,4]	**7**	64	8	62	10	S622 / Feasible
R7.21A	745 Santa Rosita	63	63	66[A/E]	64	2	63	3	63	3	62	4	62	4	Not Feasible
R7.22	833 Santa Florencia	72	72	74[A/E]	72[I]	2	70	4	**69**[R]	**5**	68	6	67	7	S622 / Feasible
R7.23	825 Santa Florencia	73	73	76[A/E]	74	2	73	3	72[I]	4	**71**[R]	**5**	69	7	S622 / Feasible
R7.24	809 Santa Florencia	74	74	76[A/E]	74	2	73	3	**71**[R,T]	5	70	6	69	7	S622 / Feasible
R7.25	783 Santa Florencia	75	75	77[A/E]	74	3	73	4	**72**[R,T]	5	71	6	70	7	S622 / Feasible
R7.26	771 Santa Florencia	74	74	76[A/E]	72[I]	4	70	6	**69**[R]	7	68	8	67	9	S622 / Feasible
R7.27	755 Santa Florencia	67	67	70[A/E]	66	4	66[I]	4	**65**[R]	5	64	6	64	6	S622 / Feasible
R7.28	733 Santa Florencia	68	68	70[A/E]	66[I]	4	65	5	**64**[R]	6	64	6	64	6	S622 / Feasible
R7.29	717 Santa Florencia	68	68	68[A/E]	64[I]	4	64	4	63	5	**63**[R]	**5**	63	5	S622 / Feasible
R7.30	810 Santa Inez	67	67	67[A/E]	64[I]	3	63	4	63	4	**62**[R]	**5**	62	5	S622 / Feasible
R7.31	828 Santa Inez	68	68	70[A/E]	65[I]	5	64	6	63	7	**63**[R]	**7**	62	8	S622 / Feasible
R7.32*	825 Santa Inez	68	67	68[A/E]	64[I]	4	63	5	62	6	**62**[R]	**6**	60	8	S622 / Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future no build noise levels at this receiver include the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.15: Predicted Future Noise Levels and Soundwall Feasibility for Segment 7 (Option 2)

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]												Soundwall No./ Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Lomas Santa Fe Drive to Manchester Avenue – NB															
R7.23	825 Santa Florencia	73	73	76 [A/ E]	74	2	73	3	72[T]	4	**71[R]**	**5**	69	7	S622 (Option 2) / Feasible
R7.24	809 Santa Florencia	74	74	76 [A/E]	74	2	73	3	**71[R,T]**	**5**	70	6	69	7	S622 (Option 2) / Feasible
R7.25	783 Santa Florencia	75	75	77 [A/E]	74	3	73	4	**72[R,T]**	**5**	71	6	70	7	S622 (Option 2) / Feasible
R7.26	771 Santa Florencia	74	74	76 [A/E]	72[T]	4	72[T]	6	**69[R]**	**7**	68	8	67	9	S622 (Option 2) / Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future no build noise levels at this receiver include the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.16: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 7

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S614	R7.14	4SFR	R/W / NB	8 ft to 10 ft / 499 ft	$110,718	$200,000	Reasonable	Recommended
S622 Option 1	R7.18, R7.20 – R7.32	32 SFR	R/W, Shoulder, and Private Property / NB	10 ft to 14 ft / 3648 ft	$2,261,800	$1,600,000	Not Reasonable	Not Recommended
S622 Option 2	R7.23 – R7.26	9SFR	R/W / NB	12 ft to 14 ft / 896 ft	$706,752	$450,000	Not Reasonable	Recommended for SI[3]

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence
[2] – Estimated construction cost includes cost of easements
[3] – SI – Severely Impacted
R/W – right-of-way

SEGMENT 8 – Manchester Avenue to Birmingham Drive

Areas with Noise Abatement

Table 3.15.17 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.18* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 8 are shown in *Figures 2-2.3, Sheets 26* through *30*. The following paragraphs describe the preliminary abatement decisions for Segment 8.

Soundwalls S631: Soundwall S631 would be located along the southbound side of I-5 on private property, north of Manchester Avenue. The soundwall would provide a feasible reduction in highway traffic noise for 22 multi-family residences represented by Receptors R8.1, R8.2, and R8.4A (*Table 3.15.17*). The estimated construction cost of S631, including all easement costs, would be less than the reasonable cost allowance and so would be considered reasonable (*Table 3.15.18*). Soundwall S631 would be recommended in conjunction with Soundwalls S633 and S635 in order to adequately attenuate traffic noise (*Table 3.15.18*).

Soundwall S633: Soundwall S633 would be located on private property and in Caltrans right-of-way, along the southbound side of I-5, north of Manchester Avenue. The soundwall would provide a feasible reduction in highway traffic noise for 20 multi-family residences represented by Receptors R8.4 and R8.5, as well as one single-family residence represented by R8.3 (*Table 3.15.17*). The estimated construction cost of S633, including all easement costs, would be less than the reasonable cost allowance and so would be considered reasonable (*Table 3.15.18*). Soundwall S633 would be recommended in conjunction with Soundwalls S631 and S635 in order to adequately attenuate traffic noise (*Table 3.15.18*).

Soundwall S635: Soundwall S635 would be located along the shoulder of southbound I-5, just north of Manchester Avenue. The wall would provide a feasible reduction in highway traffic noise for eight multi-family residences represented by Receptor R8.6 (*Table 3.15.17).* Soundwall S635 would provide less than 5 dB noise reduction for R8.7; however, the wall would bring the future noise level below the NAC (*Table 3.15.17*). The estimated construction cost of S635, including all easement costs, would be less that the reasonable cost allowance and so would be considered reasonable (*Table 3.15.18*). Soundwall S635 would be recommended in conjunction with Soundwall S633 in order to adequately attenuate traffic noise (*Table 3.15.18*).

Soundwall S640: Soundwall S640 would be located on private property along the northbound side of I-5, north of Manchester Avenue. The wall would provide a feasible reduction in highway traffic noise for two single-family residences represented by Receptor R8.18 (*Table 3.15.17*). Soundwall S640 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.18*). Therefore, Soundwall S640 would not be recommended (*Table 3.15.18*).

Soundwall S647: Soundwall S647 would be located on the shoulder of southbound I-5, south of Birmingham Drive. The wall would provide a feasible reduction in highway traffic noise for outdoor use areas at five multi-family residences represented by Receptors R8.10A and R8.11 (*Table 3.15.17*). Soundwall S647 would not be reasonable to construct due to the estimated cost exceeding the reasonable cost allowance (*Table 3.15.18*). Therefore, Soundwall S647 would not be recommended (*Table 3.15.18*).

Soundwalls S644 and S646: Soundwalls S644 and S646 would be located on private property and Caltrans right-of-way along the northbound side of I-5, south of Birmingham Drive. The soundwalls would provide a feasible reduction in highway traffic noise for 12 single-family residences represented by Receptors R8.23 to R8.26 (*Table 3.15.17*). Future traffic noise at Receptors R8.23 to R8.26 is predicted to be severe (at or above 75 dBA) with the proposed build alternatives, and all but R8.25 and R8.26 would be severe with the No Build alternative (*Table 3.15.17*). Soundwalls S644 and S646 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.18*). Therefore, Soundwalls S644 and S646 would not be recommended as proposed (*Table 3.15.18*). With the proposed project, abatement would be required for the severely impacted residences. However, because of the poor soil quality in the location of the proposed soundwalls, construction may not be possible. Based on these constraints, the recommendation would be to extend the yards of the severely impacted residences and construct Soundwalls S644 and S646 on the new pads (*Table 3.15.18*).

Areas without Noise Abatement

Receptor R8.10: Receptor R8.10 represents a short-term measurement site taken at the Cardiff-by-the-Sea apartment complex located on the southbound side of I-5, south of Birmingham Drive. This site does not represent an area of frequent human use.

Receptor R8.12: Receptor R8.12 represents a group of single-family residences located on the southbound side of I-5, just south of Birmingham Drive. A soundwall located on the shoulder of the southbound Birmingham Drive on-ramp would not provide the required 5 dB noise reduction for these residences, and, therefore, would not be feasible (*Table 3.15.17*).

Receptor R8.13: A single-family residence represented by Receptor R8.13 is located on the northbound side of I-5, immediately east of the Manchester Avenue on-ramp. It would not be feasible to abate for highway traffic noise impacts due to the elevation differences between the right-of-way and the receptor (*Table 3.15.17*).

Receptors R8.14 to R8.17: Receptors R8.14 to R8.17 represent a group of single-family residences located on the northbound side of I-5 on a hill elevated approximately 148 ft above the highway. It would not be feasible to abate for highway traffic noise in this area due to constraints related to the topography of the area (*Table 3.15.17*). A soundwall could not be placed on private property for these residences because the lots are tiered and have large backyard decks that would hinder the placement of a soundwall.

Receptors R8.19 to R8.21: Receptors R8.19 to R8.21 are located on the northbound side of I-5 on a hill elevated approximately 98 ft above the highway. It would not be feasible to abate for highway traffic noise in this area due to constraints related to the topography of the area (*Table 3.15.17*). A soundwall could not be placed on private property for the residences represented by Receptors R8.19 to R8.21 because the lots are tiered and have large backyard decks that would hinder the placement of a soundwall.

Receptors R8.27 to R8.30: Receptors R8.27 to R8.30 are located on the northbound side of I-5. These receptors are elevated approximately 60 ft above the freeway. A soundwall within the State right-of-way would not be feasible because of elevation differences between the highway and the receptors (*Table 3.15.17*). Due to the topography of this area, it would also not be feasible to construct a soundwall located at the property line of Receptors R8.28 and R8.29 (*Table 3.15.17*).

Table 3.15.17: Predicted Future Noise Levels and Soundwall Feasibility for Segment 8

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]												Soundwall No./ Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Manchester Avenue to Birmingham Drive - SB															
R8.1	2559 Manchester Avenue	62 [N]	65	68	63	5	**62[R,T]**	**6**	61	7	60	8	59	9	S631 / Feasible
R8.2	2527 Ocean Cove Drive	65 [N]	68	70	69	1	67[I]	3	**65[R]**	**5**	63	7	62	8	S631 / Feasible
R8.4A	2380 Newport Avenue	68 [A/E]	71	73	71	2	70	3	**68[R,T]**	**5**	67	6	66	7	S631 / Feasible
R8.3*	2483 Caminito Ocean Cove	69 [A/E]	72	74	73	1	72[I]	2	**69[R]**	**5**	67	7	66	8	S633 / Feasible
R8.4	2495 Caminito Ocean Cove	71 [A/E]	74	76	73	3	71	5	**69[R,T]**	**7**	68	8	66	10	S633 / Feasible
R8.5	2463 Caminito Ocean Cove	72 [A/E]	75	78	73	5	71[I]	7	**70[R,]**	**8**	69	9	68	10	S633 / Feasible
R8.6	2449 Caminito Ocean Cove	71 [A/E]	74	77	75	2	74	3	73[I]	4	**72[R]**	**5**	70	7	S635 / Feasible
R8.7*	2433 Caminito Ocean Cove	57 [N]	69	68	67	1	67	1	66[I]	2	65	3	64	4	Not Feasible
R8.8	Cardiff-by-the-Sea Apartment Complex – south building	57 [N]	60	62	61	1	61	1	61	1	61	1	60	2	Not Feasible
R8.9	Cardiff-by-the-Sea Apartment Complex – tennis court	58 [N]	61	63	62	1	62	1	62	1	61	2	61	2	Not Feasible
R8.10[M]	Cardiff-by-the-Sea Apartment Complex	70 [A/E]	72	73	70	3	69	4	67	6	66	7	65	8	--
R8.10A	Cardiff-by-the-Sea Apartment Complex	69 [A/E]	72	74	71	3	69	5	68	6	**68[R,]**	**6**	66	8	S647 / Feasible
R8.11	Cardiff-by-the-Sea Apartment Complex – north building	66 [A/E]	69	70	67	3	67	3	66	4	**65[R]**	**5**	64	6	S647 / Feasible
R8.12	2061 MacKinnon Avenue	63 [N]	66	68	68	0	68	0	68	0	67	1	67	1	Not Feasible
Manchester Avenue to Birmingham Drive – NB															
R8.13	3107 Manchester Avenue	65 [N]	68	70	--	--	--	--	--	--	--	--	--	--	--
R8.14	2379 Lagoon View Drive	62 [N]	65	67	--	--	--	--	--	--	--	--	--	--	--
R8.15	1139 Lagoon View Court	63 [N]	66	68	--	--	--	--	--	--	--	--	--	--	--
R8.16	1115 Lagoon View Court	64 [N]	67	69	--	--	--	--	--	--	--	--	--	--	--
R8.17	1101 Lagoon View Court	63 [N]	66	68	--	--	--	--	--	--	--	--	--	--	--
R8.18	2148 Bulrush Lane	71 [A/E]	71	73	71[I]	2	70	3	69	4	**68[R]**	**5**	66	7	S640 / Feasible
R8.19	2136 Bulrush Lane	75 [A/E]	71	73	72	1	72	1	71	2	71	2	70	3	Not Feasible
R8.20	2050 Bulrush Lane	71 [A/E]	71	74	--	--	--	--	--	--	--	--	--	--	--
R8.21	2010 Bulrush Lane	71 [A/E]	69	71	--	--	--	--	--	--	--	--	--	--	--
R8.22	1945 Playa Riviera Drive	71 [A/E]	69	71	71	0	71	0	71	0	71	0	71	0	Not Feasible
R8.23	1944 Playa Riviera Drive	79 [A/E]	76	79	77	2	75[I]	4	**72[R]**	**7**	70	9	68	11	S644 / Feasible
R8.24	1932 Playa Riviera Drive	78 [A/E]	76	78	78	0	78	0	76	2	75	3	**73[R,T]**	**5**	S644 / Feasible
R8.25	1914 Playa Riviera Drive	77 [A/E]	74	77	71[I]	6	69[R]	8	67	10	66	11	65	12	S646 / Feasible
R8.26	1884 Playa Riviera Drive	76 [A/E]	74	76	74[I]	2	71[R]	5	68	8	66	10	65	11	S646 / Feasible
R8.27	1860 Playa Riviera Drive	73 [A/E]	72	74	--	--	--	--	--	--	--	--	--	--	--
R8.28	1830 Playa Riviera Drive	71 [A/E]	70	72	--	--	--	--	--	--	--	--	--	--	--
R8.29	915 Emma Drive	71 [A/E]	70	72	--	--	--	--	--	--	--	--	--	--	--
R8.30	906 Emma Drive	67 [A/E]	65	67	--	--	--	--	--	--	--	--	--	--	--

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[N] – No noise impact.
[M] – Receptor is not an area of frequent human use. Receptor represents a measurement site.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future no build noise levels at this receiver include the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.18: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 8

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S631	R8.1, R8.2, and R8.4A	22 MFR	Private Property / SB	10 ft to 12 ft / 758 ft	$807,239	$1,056,000	Reasonable	Recommended
S633	R8.3, R8.4, and R8.5	1 SFR and 20 MFR	R/W / SB	12 ft / 837ft	$771,426	$1,092,000	Reasonable	Recommended
S635	R8.6	8 MFR	Shoulder / SB	14 ft / 322 ft	$346,323	$400,000	Reasonable	Recommended
S640	R8.18	2 SFR	R/W / NB	14 ft / 420 ft	$463,147	$92,000	Not Reasonable	Not Recommended
S647	R8.10A and R8.11	5 MFR	Shoulder / SB	14 ft / 696 ft	$293,478	$200,000	Not Reasonable	Not Recommended
S644 and S646	R8.23 – R8.26	12 SFR	R/W and Private Property / NB	10 ft to 16 ft / 899 ft and 10 ft / 899 ft	$990,771	$624,000	Not Reasonable	Recommended for SI[3]

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence.
[2] – Estimated construction cost includes cost of easements.
[3] – Recommended to extend backyards & construct for SI receptors
R/W – right-of-way

SEGMENT 9 – Birmingham Drive to Santa Fe Drive

Areas with Noise Abatement

Table 3.15.19 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.20* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 9 are shown in *Figures 2-2.3, Sheets 30* through *32*. The following paragraphs describe the preliminary abatement decisions for Segment 9.

Soundwall S652: Soundwall S652 would be located along the property line on the northbound side of I-5, north of Birmingham Drive. The soundwall would provide feasible reduction in highway traffic noise for six single-family residences, represented by Receptors R9.11 and R9.12, of which R9.12 would be severely impacted by the build alternatives (*Table 3.15.19*). Cost of acquisition for right-of-way is assumed to be $115,807 for this wall, and when added to the construction cost, it exceeds the reasonable allowance. If the estimated construction cost could not be reduced to less than or equal to the reasonable allowance, construction of S652 would not be recommended *(Table 3.15.20*) and individual abatement would be provided only for the severely impacted receptor, R9.12.

Soundwall S653: Soundwall S653 would be located on the right-of-way on the southbound side of I-5, north of Birmingham Drive. The soundwall would provide feasible reduction in highway traffic noise for four single-family residences represented by Receptors R9.3 and R9.4, but not for 9.4A. Receptor R9.4 would be severely impacted by build alternatives, with noise levels predicted to be at or higher than 75 dBA (*Table 3.15.19*). Soundwall S653 would not be reasonable to construct due to the estimated construction cost exceeding the total reasonable allowance *(Table 3.15.20)*. Therefore Soundwall S653 would not be recommended as proposed *(Table 3.15.20*). Individual abatement would be provided only for the severely impacted receptor, R9.4.

Soundwall S654 (Option 1): Soundwall S654 Option 1 would be located along the right-of-way on the northbound side of I-5, north of Birmingham Drive. It would provide a feasible reduction in highway traffic noise for nine single-family residences represented by Receptors R9.13 to R9.15, but not R9.15A. Receptor R9.13 would be severely impacted by the build alternatives, with noise levels predicted to be at or higher than 75 dBA *(Table 3.15.19)*. Construction of Soundwall S654 Option 1 would not be reasonable to construct due to the estimated construction cost exceeding the total reasonable allowance (*Table 3.15.20*). Therefore, Soundwall S654 would not be recommended as proposed *(Table 3.15.20*). To abate for the severely impacted receptor represented by R9.13, Option 2 would be considered.

Soundwall S654 (Option 2): Soundwall S654 Option 2 would be a shorter wall that would wrap around the private property line, providing a feasible reduction in highway traffic noise for the severely impacted residential unit represented by Receptor R9.13. Option 2 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.20*). However, it would be recommended that S654 Option 2 be constructed to abate severe highway traffic noise for Receptor R9.13 *(Table 3.15.20*).

Soundwall S658: Soundwall S658 would be located along the right-of-way and the shoulder of northbound I-5, south of Santa Fe Drive. The wall would provide feasible reduction in highway traffic noise for 20 single-family residences represented by Receptors R9.17 through R9.22, of which Receptors R9.17, R9.18, and R9.21 would be severely impacted by the proposed build alternatives *(Table 3.15.19*). Construction of Soundwall S658 would not be reasonable due to the estimated construction cost exceeding the total reasonable allowance (*Table 3.15.20*). However, to abate for the severely impacted receptors, Soundwall S658 would be recommended (*Table 3.15.20).*

Areas without Noise Abatement

Receptors R9.1 and R9.2: These receptors are located on the southbound side of I-5, just north of Birmingham Drive. A soundwall would not provide the required 5 dB noise reduction for these receptors; therefore, it would not be feasible (*Table 3.15.19*). It also would not be feasible to build a soundwall on the property of these receptors due to the sloped and tiered backyards of these residences (*Table 3.15.19*).

Receptor R9.10: Receptor R9.10 represents the pool area at the Country Inn Hotel on the northbound side of I-5. A soundwall located on the shoulder of the northbound Birmingham Drive on-ramp would not provide the required 5 dB noise reduction, and, therefore, would not be feasible (*Table 3.15.19*).

Table 3.15.19: Predicted Future Noise Levels and Soundwall Feasibility for Segment 9

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]												Soundwall No./ Feasibility
			Future “No Build”	Project without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Birmingham Drive to Santa Fe Drive – SB															
R9.1	1855 MacKinnon Avenue	63	67	69[A/E]	68	1	68	1	68	1	67	2	67	2	Not Feasible
R9.2	1815 MacKinnon Avenue	64	69	71[A/E]	71	0	70	1	70	1	70	1	69	2	Not Feasible
R9.3	1725 MacKinnon Avenue	67	72	74[A/E]	71[T]	3	**69**[R]	**5**	68	6	67	7	67	7	S653 / Feasible
R9.4	1633 MacKinnon Avenue	70	75	77[A/E]	70[T]	7	**68**[R]	**9**	66	11	65	12	65	12	S653 / Feasible
R9.4A	1606 MacKinnon Avenue	60	65	68[A/E]	66	2	65	3	65	3	65	3	64	4	Not Feasible
Birmingham Drive to Santa Fe Drive – NB															
R9.10	1661 Villa Cardiff Drive	67	68	69[A/E]	69	0	68	1	68	1	67	2	67	2	Not Feasible
R9.11	1630 Falcon Hill Court	70	71	74[A/E]	**67**[R,T]	**7**	64	10	62	12	62	12	61	13	S652 / Feasible
R9.12	811 Nolbey Street	71	72	75[A/E]	**69**[R,T]	**6**	66	9	63	12	61	14	61	14	S652 / Feasible
R9.13	804 Nolbey Street	70	71	75[A/E]	72[T]	3	71	4	**70**[R]	**5**	68	7	67	8	S654 / Feasible
R9.14[B,K]	1551 Villa Cardiff Drive	57	60	67[A/E]	65[T]	2	64	3	63	4	**62**[R]	**5**	62	5	S654 / Feasible
R9.15[B]	1511 Villa Cardiff Drive	64	67	73[A/E]	70[T]	3	69	4	69	4	68	5	**68**[R]	**5**	S654 / Feasible
R9.15A[K]	1511 Villa Cardiff Drive	58	61	66[A/E]	64[T]	2	63	3	63	3	62	4	62	4	Not Feasible
R9.16[K]	1451 MacKinnon Avenue	60	63	65[N]	64[T]	1	63	2	63	2	62	3	62	3	--
R9.17	1470 MacKinnon Avenue	73	76	79[A/E]	**74**[R,T]	**5**	72	7	70	9	69	10	68	11	S658 / Feasible
R9.18	609 Ocean Crest Road	72	72	75[A/E]	71	4	**70**[R,T]	**5**	68	7	66	9	66	9	S658 / Feasible
R9.19	1360 Loch Lomond Drive	71	71	74[A/E]	69[T]	5	**68**[R]	**6**	67	7	66	8	65	9	S658 / Feasible
R9.20	1266 Loch Lomond Drive	67	69	71[A/E]	67[T]	4	**66**[R]	**5**	65	6	64	7	64	7	S658 / Feasible
R9.21	553 Faith Avenue	71	73	76[A/E]	74	2	73	3	**71**[R,T]	**5**	69	7	67	9	S658 / Feasible
R9.22	546 Faith Avenue	70	72	74[A/E]	73	1	71[T]	3	**69**[R]	**5**	67	7	66	8	S658 / Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[N] – No noise impact.
[B] – The existing and future “No Build” levels at Receptors R9.14 and R9.15 include the benefits of an existing berm that would be removed under the project “build” alternatives.
[K] – A shielding factor of 5 dB has been applied to Receptor R9.14 and R9.15A to account for attenuation provided by first-row buildings.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
* – Non first-row receiver.

Table 3.15.20: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 9

Soundwall No	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S653	R9.3 and R9.4	4 SFR	R/W / SB	10 ft / 709 ft	$638,653	$216,000	Not Reasonable	Not Recommended, Individual Abatement for SI[3]
S652	R9.11 and R9.12	6 SFR	Property Line / NB	8 ft / 407 ft	$339,956	$252,000	Not Reasonable	Not Recommended, Individual Abatement for SI[3]
S654 Option 1	R9.13 to R9.15	9 SFR	R/W / NB	12 ft to 16 ft / 1073 ft	$849,352	$360,000	Not Reasonable	Not Recommended
S654 Option 2	R9.13	1 SFR	Private Property / NB	10 ft / 187 ft	$177,100	$42,000	Not Reasonable	Recommended for SI[3]
S658	R9.17 to R9.22	20 SFR	R/W and Shoulder / NB	8 ft to 12 ft / 2136 ft	$1,382,331	$1,040,000	Not Reasonable	Recommended for SI[3]

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; SCH – school; REC – recreational
[2] – Estimated construction cost includes cost of easements
[3] – SI – Severely Impacted
R/W – right-of-way

SEGMENT 10 – Santa Fe Drive to Encinitas Boulevard

Areas with Noise Abatement

Table 3.15.21 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.22* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 10 are shown in *Figures 2-2.3, Sheets 32* through *34.* The following paragraphs describe the preliminary abatement decisions for Segment 10.

Soundwall S664: Soundwall S664 would be located along the northbound side of I-5, just north of Santa Fe Drive. It would provide a feasible reduction in highway traffic noise for three single-family and eight multi-family residences represented by Receptors R10.11 and R10.12; and the Seacoast Community Church/School playground represented by Receptor R10.13 (*Table 3.15.21*). Receptors R10.11 and R10.13 are predicted to be severely impacted by future noise levels, equal or higher than 75 dBA, under the proposed build alternatives (*Table 3.15.21).* Soundwall S664 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.22).* Soundwall S664 would not be recommended (*Table 3.15.22*). However, the severely impacted receptors, R10.11 and R10.13, would receive individual abatement.

Soundwall S670: Soundwall S670 would be located along the shoulder of the northbound side of I-5, just south of Requeza Street. It would provide a feasible reduction in highway traffic noise for the outdoor use area of a nursing/rehab center and the playground area of a multi-family complex, represented by Receptors R10.14 and R10.15, respectively (*Table 3.15.21).* Soundwall S670 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.22*). Therefore, Soundwall S670 would not be recommended (*Table 3.15.22*).

Soundwall S671: Soundwall S671 would be located along the southbound side of I-5, just south of Requeza Street. The soundwall would provide a feasible reduction in highway traffic noise for 11 single-family residences represented by Receptors R10.3B, R10.3A, R10.4, and R10.4A (*Table 3.15.21*). Receptors R10.3A and R10.4 are predicted to be severely impacted by traffic noise at or higher than 75 dBA (*Table 3.15.21*). Soundwall S671 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.22*). Soundwall S671, however, would preliminarily be recommended in order to abate for the severely impacted receptors, R10.3A and R10.4.

Soundwall S675: Soundwall S675 would be located along the southbound side of I-5, just south of Encinitas Boulevard. The wall would provide a feasible reduction in highway traffic noise for 18 single-family residences, represented by Receptors R10.5 through R10.8, of which R10.6 would be severely impacted by traffic noise at or higher than 75 dBA under the build alternatives (*Table 3.15.21).* Soundwall S675 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.22*). Cost of acquisition for right-of-way is assumed to be $227,594 for this wall, and when added to the construction cost, it exceeds the reasonable allowance. If the estimated construction cost could not be reduced to less than or equal to the reasonable allowance, construction of S675 would not be recommended (*Table 3.15.22*) and individual abatement would be provided only for the severely impacted receptor, R10.6.

Areas without Noise Abatement

Receptors R10.1 and R10.2: These receptors are located on the southbound side of I-5 just south of Requeza Street. Soundwalls at two locations were modeled to abate traffic noise for receptors R10.1 and R10.2. A soundwall located at the shoulder of I-5 or along Devonshire Drive would not provide a 5 dB noise reduction for any of these receptors; therefore, it would not be feasible (*Table 3.15.21*).

Receptor R10.9: Receptor R10.9 represents a group of second-row single-family residences located on the southbound side of I-5. Due to elevation differences between these receptors and the highway, a soundwall would not be feasible (*Table 3.15.21).*

Receptor R10.10: Receptor R10.10 represents a group of third-row single-family residences located on the northbound side of I-5. A soundwall located at the right-of-way would not provide a 5 dB noise reduction for any of the receptors; therefore, it would not be feasible.

Receptors R10.16 and R10.17: Receptor 10.16 represents a group of second-row multi-family residences, and Receptor R10.17 represents a single-family residence located on the northbound side of I-5. A soundwall on the shoulder south of Requeza Street was analyzed and was found to provide less than 5 dB noise reduction to either receptor; therefore, it would not be feasible (*Table 3.15.21*). Also, it would not be possible to construct a soundwall at the right-of-way because of elevation differences between the freeway and the receptors.

Receptors R10.18, R10.19, and R10.19A: These receptors are located on the northbound side of I-5 just north of Requeza Street, and they represent a new single-family residential development. The new residential development has a block wall at the property line, a large landscaped area, and a transparent wall located at each backyard. Soundwalls would not be feasible for this area due to the two existing walls (*Table 3.15.21*).

Receptor R10.20: Receptor R10.20 represents a preschool located on the northbound side of I-5 just north of Requeza Street. There is a commercial property between the preschool and the freeway; therefore, locating a soundwall at the property line would not be considered practical. A soundwall located on the right-of-way was analyzed and found to provide a less than 5 dB noise reduction at these receptors; therefore, it would not be feasible *(Table 3.15.21).*

Table 3.15.21: Predicted Future Noise Levels and Soundwall Feasibility for Segment 10

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Santa Fe Drive to Encinitas Boulevard – SB															
R10.1	946 Devonshire Drive	65	67	70 [A/E]	70	0	70	0	69	1	68	2	67	3	Not Feasible
R10.2	870 Devonshire Drive	66	68	71 [A/E]	70	1	69	2	69	2	68	3	67	4	Not Feasible
R10.3[M]	826 Devonshire Drive	71	72	75 [A/E]	72[T]	3	71	4	69	6	68	7	66	9	S671 / Feasible
R10.3B[K]	826 Devonshire Drive	67	66	68 [A/E]	65[T]	3	65	3	63	5	**63[R]**	**5**	62	6	S671 / Feasible
R10.3A	768 Devonshire Drive	77	76	79 [A/E]	75	4	74	5	73	6	**72[R,T]**	**7**	71	8	S671 / Feasible
R10.4	720 Devonshire Drive	77	76	78 [A/E]	74	4	73	5	**72[R,T]**	**6**	71	7	70	8	S671 / Feasible
R10.4A	715 Devonshire Drive	72	71	74 [A/E]	70T	4	70	4	**69[R]**	**5**	68	6	68	6	S671 / Feasible
R10.5	655 Stratford Drive	72	72	74 [A/E]	**69[R,T]**	**5**	68	6	67	7	66	8	66	8	S675 / Feasible
R10.6	611 Stratford Drive	68	74	76 [A/E]	**70[R,T]**	**6**	68	8	67	9	66	10	64	12	S675 / Feasible
R10.7	212 East D Street	71	71	73 [A/E]	**68[R,T]**	**5**	66	7	65	8	64	9	63	10	S675 / Feasible
R10.8	428 Arden Drive	71	71	73 [A/E]	69[T]	4	**68[R]**	**5**	68	5	67	6	67	6	S675 / Feasible
R10.9*	401 Arden Drive	68	68	70 [A/E]	69	1	68	2	68	2	67	3	67	3	Not Feasible
Santa Fe Drive to Encinitas Boulevard – NB															
R10.10*	1143 Golden Road	71	69	71 [A/E]	71	0	71	0	71	0	70	1	70	1	Not Feasible
R10.11	1125 Regal Road	76	74	77 [A/E]	75	2	74[T]	3	72	5	**70[R]**	**7**	69	8	S664 / Feasible
R10.12[K]	1085 Regal Road	66	65	68 [A/E]	66	2	65	3	64[T]	4	**63[R]**	**5**	62	6	S664 / Feasible
R10.13	1050 Regal Road – Seacoast	76	75	77 [A/E]	74	3	73[T]	4	**72[R]**	**5**	71	6	69	8	S664 / Feasible
R10.14	944 Regal Road	69	70	73 [A/E]	71	2	71	2	69[T]	4	69	4	**68[R]**	**5**	S670 / Feasible
R10.15*	806-810 Regal Road – Regal Playground	70	71	74 [A/E]	71	3	70	4	69[T]	5	**69[R]**	**5**	67	7	S670 / Feasible
R10.16*	Regal Condos	66	67	70 [A/E]	69	1	69	1	68	2	67	3	66	4	Not Feasible
R10.17*	395 Requeza Street Water District	68	69	71 [A/E]	70	1	70	1	69	2	68	3	67	4	Not Feasible
R10.18[W]	648 Beach Street	67	68	71 [A/E]	70	1	70	1	69	2	69	2	69	2	Not Feasible
R10.19[W]	542 Beach Street	66	67	70 [A/E]	70	0	69	1	69	1	69	1	69	1	Not Feasible
RR10.19A[W]	526 Beach Street	66	67	69 [A/E]	69	0	69	0	69	0	68	1	68	1	Not Feasible
R10.20	333 Encinitas Boulevard	67	68	70 [A/E]	70	0	69	1	69	1	68	2	68	2	Not Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[K] – A shielding factor of 5 dB has been applied to Receptor 10.12 and to R10.3B to account for attenuation provided by first-row buildings.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[M] – This receptor represents a measurement site. It is not an area of frequent human use.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – Includes the benefits of an existing five-ft high block wall and six-ft high glass wall.
* – Non first-row receiver.

Table 3.15.22: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 10

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S671	R10.3B, R10.3A, R10.4, R10.4A	11 SFR	Private Property and R/W / SB	12 ft to 14 ft / 860 ft	$555,708	$462,000	Not Reasonable	Recommended for SI[3]
S675	R10.5 – R10 8	18 SFR	R/W / SB	8 ft to 10 ft / 1437 ft	$1,025,864	$972,000	Not Reasonable	Not Recommended, Individual Abatement for SI[3]
S664	R10.11 – R10.13	3 SFR, 8 MFR and SCH (3 Frontage Units)	R/W / NB	12 ft to 14 ft / 1263 ft	$1,171,232	$700,000	Not Reasonable	Not Recommended, Individual Abatement for SI[3]
S670	R10.14 and R10.15	2 REC (2 Frontage Units)	Shoulder / NB	14 ft to 16 ft / 1217 ft	$365,633	$96,000	Not Reasonable	Not Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; SCH – school; REC – recreational
[2] – Estimated construction cost includes cost of easements
[3] – SI – Severely Impacted
R/W – right-of-way

SEGMENT 11 – Encinitas Boulevard to Leucadia Boulevard

Areas with Noise Abatement

Table 3.15.23 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.24* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 11 are shown in *Figures 2-2.3, Sheets 34* through *37*. The following paragraphs describe the preliminary abatement decisions for Segment 11.

Soundwall S680: Soundwall S680 would be located on the right-of-way and private property along the northbound side of I-5, just north of Encinitas Boulevard. The soundwall would provide a feasible reduction in highway traffic noise for 30 multi-family residences represented by Receptors R11.22 and R11.23, and one recreational area at the Encinitas YMCA, represented by Receptors R11.24 and R11.25 (*Table 3.15.23*). Soundwall S680 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.24*). Cost of acquisition for right-of-way is assumed to be $636,703 for this wall, and when added to the construction cost, it exceeds the reasonable allowance. If the estimated construction cost could not be reduced to less than or equal to the reasonable allowance, construction of S680 would not be recommended.

Soundwall S686A: Soundwall S686A would be located on private property along the northbound side of I-5, north of Encinitas Boulevard. The soundwall would provide a feasible reduction in highway traffic noise for a park represented by Receptor R11.27 (*Table 3.15.23*). It is predicted that R11.27 would be severely impacted by the proposed build alternatives with noise levels at or above 75 dBA. Soundwall S686A would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.24*). However, S686A would be recommended in order to abate for the severely impacted receptor, R11.27.

Soundwalls S686B and S686C: Soundwalls S686B and S686C would be located on private property along the northbound side of I-5, north of Encinitas Boulevard. The soundwalls would provide a feasible reduction in highway traffic noise for sixteen single-family residences represented by Receptors R11.26 and R11.28 (*Table 3.15.23*). Soundwalls S686B and S686C would be reasonable to construct (*Table 3.15.24*). Therefore, Soundwalls S686B and S686C would be recommended (Table 3.15.24).

Soundwall S688: Soundwall S688 would be located along the northbound side of I-5, north of Encinitas Boulevard. The soundwall would provide a feasible reduction in highway traffic noise for one single-family residence represented by Receptor R11.29 (*Table 3.15.23*). Receptor R11.29 is predicted to be severely impacted by the proposed build alternatives with noise levels at or higher than 75 dBA (*Table 3.15.23*). Soundwall S688 would not be reasonable to construct due to the estimated construction cost would exceed the reasonable allowance (*Table 3.15.24*). However, S688 would be recommended to provide the required abatement for the severely impacted receptor, R11.29 (*Table 3.15.24*).

Soundwall S689: Soundwall S689 would be located along the southbound side of I-5, just south of Leucadia Boulevard. The soundwall would provide a feasible reduction in highway traffic noise for 26 single-family residences represented by Receptors R11.5A, R11.6, R11.7, R11.9, R11.11 through R11.14, R11.16 through R11.18, and R11.20 (*Table 3.15.23*). Residences that would be enclosed by this wall, but would not benefit from a feasible noise reduction, are represented by Receptors R11.5, R11.8, R11.10, R11.15, and R11.19 *(Table 3.15.23)*. Receptors R11.5A, R11.6, R11.7, R11.9, R11.11, R11.13, R11.14, R11.16, R11.17, and R11.18 are predicted to be severely impacted with noise levels at or higher than 75 dBA with the proposed build alternatives (*Table 3.15.23*). With the No Build alternative, Receptors R11.9, R11.11, R11.14, and R11.18 would still be severely impacted (*Table 3.15.23*). Soundwall S689 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.24*). Constructing S689 has the potential to create a high visual impact for motorists traveling on I-5 (refer to *Section 3.7* for details on visual impacts). In an effort to avoid potential visual impacts, individual abatement for the severely impacted residences would be proposed. However, if agreements with property owners could not be reached regarding individual abatement, then Soundwall S689 would be preliminarily recommended as proposed (*Table 3.15.24*).

Soundwall S692: Soundwall S692 would be located along the shoulder of northbound side of I-5, south of Leucadia Boulevard. The soundwall would provide a feasible reduction in highway traffic noise for Poinsettia Park represented by Receptors R11.31 and R11.31A, and for 10 single-family residences represented by Receptors R11.32 through R11.36 (*Table 3.15.23*). Receptors R11.31, R11.32, R11.34, and R11.35 are predicted to be severely impacted with noise levels at or higher than 75 dBA under the build alternatives (*Table 3.15.23*). Soundwall S692 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.24*). However, Soundwall S692 would be recommended to provide the required abatement for the severely impacted receptors (*Table 3.15.24*).

Areas without Noise Abatement

Receptors R11.1 through R11.4: These receptors are located on the southbound side of I-5, just north of Encinitas Boulevard. It would not be feasible to provide abatement for this area due to elevation differences between the shoulder and right-of-way, and the residences (*Table 3.15.23*). Extending Soundwall S689 to the south was modeled; however, the soundwall would still not provide the minimum required 5 dB noise reduction for Receptors R11.1 through R11.4, and, therefore, would not be feasible (*Table 3.15.23*). It also would not be practical to build a soundwall at the property line of these receivers due to the topography of the area. Each house is located at a different elevation and at a different distance to the freeway, which would not allow for construction of a continuous wall.

Receptor R11.30: Receptor R11.30 represents a group of second-row single-family residences located on the northbound side of I-5. A soundwall placed at the shoulder of the highway would not provide the required 5 dB noise reduction to these residences due to topography, and shielding provided by first-row buildings (*Table 3.15.23*). Therefore, it would not be feasible to construct (*Table 3.15.23*).

Table 3.15.23: Predicted Future Noise Levels and Soundwall Feasibility for Segment 11

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					8 ft		10 ft		12 ft		14 ft		16 ft			
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.		
Encinitas Boulevard to Leucadia Boulevard – SB																
R11.1	469 Arroyo Drive	66	65	68 [A/E]	67	1	66	2	66	2	65	3	65	3	Not Feasible
R11.1A	333 Via Nancita	66	65	68 [A/E]	68	0	67	1	67	1	66	2	66	2	Not Feasible
R11.2	325 Via Nancita	66	65	67 [A/E]	67	0	67	0	67	0	67	0	66	1	Not Feasible
R11.3	309 Via Nancita	70	69	71 [A/E]	71	0	70	1	70	1	69	2	69	2	Not Feasible
R11.4	438 Ocean View Terrace	69	68	70 [A/E]	70	0	70	0	70	0	69	1	69	1	Not Feasible
R.11.5*	363 Ocean View Avenue	69	69	71 [A/E]	70	1	70	1	70	1	69	2	68	3	Not Feasible
R11.5A	365 1/2 Ocean View Avenue, 1/2	73	73	75 [A/E]	72	3	70	5	**70**[R,T]	**5**	68	7	67	8	S689 / Feasible
R11.6	365 Ocean View Avenue	73	73	75 [A/E]	71	4	70	5	**69**[R,T]	**6**	67	8	66	9	S689 / Feasible
R11.7	452 Alviso Way	74	74	75 [A/E]	71	4	70	5	**68**[R,T]	**7**	67	8	66	9	S689 / Feasible
R11.8*	436 Alviso Way	71	71	73 [A/E]	72	1	72	1	71	2	71	2	70	3	Not Feasible
R11.9	453 Ocean View Avenue	75	75	78 [A/E]	75	3	74	4	73	5	**73**[R,T]	**5**	71	7	S689 / Feasible
R11.10	455 Ocean View Avenue	69	69	72 [A/E]	71	1	71	1	70	2	70[T]	2	69	3	Not Feasible
R11.11	457 Union Street	75	76	76 [A/E]	70[T]	6	69	7	67	9	66	10	**66**[R,T]	**10**	S689 / Feasible
R11.12*	420 Union Street	68	63	72 [A/E]	70	2	70	2	71[T]	3	68	4	**67**[R]	**5**	S689 / Feasible
R11.13	541 Guidero Way	71	72	75 [A/E]	73	2	72	3	73[T]	4	69	6	**68**[R]	**7**	S689 / Feasible
R11.14	569 Ocean View Avenue	74	75	78 [A/E]	75	3	74	4	72	5	71	7	**70**[R]	**8**	S689 / Feasible
R11.15	537 Ocean View Avenue	71	71	74 [A/E]	73	1	73	1	72[T]	2	72[T]	2	71	3	Not Feasible
R11.16	611 Ocean View Avenue	73	73	76 [A/E]	74	2	73	3	72	4	70	6	**69**[R]	**7**	S689 / Feasible
R11.17	675 Ocean View Avenue	72	72	75 [A/E]	74	1	73	2	72	3	71[T]	4	**70**[R]	**5**	S689 / Feasible
R11.18	709 Ocean View Avenue	78	78	81 [A/E]	78	3	76[T]	5	73	8	71	10	**70**[R]	**11**	S689 / Feasible
R11.19	734 Ocean View Avenue	71	71	74 [A/E]	74	0	73	1	73	1	73	1	72	2	Not Feasible
R11.20	775 Orpheus Avenue	70	70	72 [A/E]	70	2	69[T]	3	68	4	**67**[R]	**5**	67	5	S689 / Feasible
R11.21[C]	801 Orpheus Avenue	67	67	70 [N]	--	--	--	--	--	--	--	--	--	--	--

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[N] – No noise impact.
[C] – This receptor represents a Fire Station, which is a Category C receptor with a NAC of 72 dBA. No noise impact occurs at this location.
[K] – A shielding factor of 5 dB has been applied to Receptor 10.12 to account for attenuation provided by first-row buildings.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
* – Non first-row receiver.

Table 3.15.23 (cont.): Predicted Future Noise Levels and Soundwall Feasibility for Segment 11

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					8 ft		10 ft		12 ft		14 ft		16 ft			
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Encinitas Boulevard to Leucadia Boulevard – NB																
R11.22[W]	247 Mangano Circle – West Hampton Cove Apts	66	66	68 [A/E]	--	--	67	1	65	3	64	4	**63[R]**	**5**	S680 / Feasible
R11.23[W]	165 Mangano Circle – West Hampton Cove Apts	70	70	72 [A/E]	--	--	70	2	68	4	**66[R]**	**6**	65	7	S680 / Feasible
R11.24	200 Saxony Road – Encinitas YMCA	72	72	74 [A/E]	70[T]	4	**68[R]**	**6**	67	7	66	8	65	9	S680 / Feasible
R11.25	200 Saxony Road – Encinitas YMCA	71	71	73 [A/E]	**68[R,T]**	**5**	67	6	66	7	66	7	65	8	S680 / Feasible
R11.26	342 Carmel Creeper Place	67	70	72 [A/E]	68[T]	4	**65[R]**	**7**	63	9	61	11	60	12	S686B/C / Feasible
R11.27	Saxony Condominiums - Park	70	73	77 [A/E]	**71[R,T]**	**6**	69	8	66	11	65	12	63	14	S686A / Feasible
R.11.28	402 Carmel Creeper Place	66	69	72 [A/E]	69[T]	3	**67[R]**	**5**	65	7	64	8	63	9	S686B/C / Feasible
R11.29	501 Union Street	69	72	75 [A/E]	72[T]	3	71	4	71	4	71	4	**70[R]**	**5**	S688 / Feasible
R11.30*	559 Union Street	66	69	71 [A/E]	69	2	69	2	68	3	68	3	68	3	Not Feasible
R11.31	Poinsettia Park	69	72	75 [A/E]	72	3	71[T]	4	**70[R]**	**5**	69	6	68	7	S692 / Feasible
R11.31A	Poinsettia Park	67	70	72 [A/E]	69	3	68[T]	4	**66[R]**	**6**	65	7	65	7	S692 / Feasible
R11.32	682 Clark Avenue	72	75	78 [A/E]	72[T]	6	70	8	**69[R]**	**9**	67	11	66	12	S692 / Feasible
R11.33	752 Clark Avenue	65	68	70 [A/E]	67[T]	3	67	3	66	4	**65[R]**	**5**	65	5	S692 / Feasible
R11.34	796 Clark Avenue	70	73	75 [A/E]	72[T]	3	70	5	69	6	**68[R]**	**7**	67	8	S692 / Feasible
R11.35	816 Clark Avenue	74	75	77 [A/E]	72[T]	5	70	7	**69[R]**	**8**	67	10	66	11	S692 / Feasible
R11.36	637 Leucadia Boulevard	68	69	73 [A/E]	69[T]	4	68	5	**67[R]**	**6**	66	7	66	7	S692 / Feasible
R11.37	607 Leucadia Boulevard	59	60	62 [N]	--	--	--	--	--	--	--	--	--	--	--

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – Receivers R11.22 and R11.23 include the benefits of an existing nine-ft high wall.
* – Non first-row receiver.

Table 3.15.24: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 11

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S680	R11.22 – R11-25	30 MFR and 1 REC (12 Frontage Units)	R/W and Private Property / NB	8 ft to 16 ft / 2178 ft	$2,224,864	$1,596,000	Not Reasonable	Not Recommended
S686A	R11.27	1 Park (2 Frontage Units)	Private Property / NB	8 ft / 276 ft	$300,628	$84,000	Not Reasonable	Recommended for SI[3]
S686B & S686C	R11.26, R11.28	16 SFR	Private Property / NB	10 ft / 505 ft	$478,480	$640,000	Reasonable	Recommended
S688	R11.29	1 SFR	Shoulder / NB	16 ft / 443 ft	$375,374	$50,000	Not Reasonable	Recommended for SI[3]
S689	R11.5A – R11.20	26 SFR	R/W and Shoulder / SB	12 ft to 16 ft / 4529 ft	$1,966,677	$1,456,000	Not Reasonable	Recommended for SI[3]
S692	R11.31 – R11.36	10 SFR and 1 Park (6 Frontage Units)	R/W and Shoulder / NB	12 ft to 14 ft / 1778 ft	$1,331,713	$864,000	Not Reasonable	Recommended For SI[3]

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; SCH – school; REC – recreational
[2] – Estimated construction cost includes cost of easements
[3] – SI – Severely Impacted
R/W – right-of-way

SEGMENT 12 – Leucadia Boulevard to La Costa Avenue

Areas with Noise Abatement

Table 3.15.25 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.26* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 12 are shown in *Figures 2-2.3, Sheets 37* through *40*. The following paragraphs describe the preliminary abatement decisions for Segment 12.

Soundwall S702: Soundwall S702 would be located in the right-of-way, on the northbound side of I-5, north of Leucadia Boulevard. Soundwall S702 would provide feasible noise reduction to one single-family residence located at the corner of Piraeus Street and Sparta Drive, represented by Receptor 12.34 (*Table 3.15.25*). Soundwall S702 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.26*). Therefore, S702 would not be recommended (*Table 3.15.26*).

Soundwall S706: Soundwall S706 would be located in the right-of-way, on the northbound side of I-5, north of Leucadia Boulevard. Soundwall S706 would provide feasible noise reduction to one single-family residence represented by Receptor 12.39 (*Table 3.15.25*). Soundwall S706 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.26*). Therefore, S706 would not be recommended (*Table 3.15.26*).

Soundwall S709: Soundwall S709 would be located in the right-of-way, and along the southbound shoulder of I-5, just south of La Costa Avenue. The soundwall would provide a feasible reduction in highway traffic noise for 14 single-family residences represented by Receptors R12.5, R12.12, R12.14, R12.14A, R12.16, R12.16A, R12.17, and R12.19; and 11 multi-family residences represented by Receptors R12.22, R12.24, and R12.26A. A feasible noise reduction would not be provided for Receptors R12.4, R12.6, R12.7, R12.8, R12.9, R12.10, R12.11, R12.12A, R12.13, R12.15, R12.18, R12.20, R12.21, R12.23, R12.25, R12.26, R12.27, and R12.28 (*Table 3.15.25*). Receptors R12.4, R12.5, R12.6, R12.7, R12.14, R12.16, R12.19, and R12.21 are predicted to be severely impacted with noise levels at or higher than 75 dBA with the build alternatives (*Table 3.15.26*). Soundwall S709 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.26*). Construction would not be recommended as proposed (*Table 3.15.26*). It would instead be recommended that the severely impacted receptors, R12.4, R12.5, R12.6, R12.7, R12.14, R12.16, R12.19, and R12.21 receive individual abatement.

Soundwall S719: Soundwall S719 would be located on private property and in the right-of-way along southbound I-5, just south of La Costa Avenue. Soundwall S719 would provide a feasible reduction in highway traffic noise for one single-family residence represented by Receptor 12.29 (*Table 3.15.25*). Soundwall S719 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.26*). Therefore, S719 would not be recommended (*Table 3.15.26*).

Areas without Noise Abatement

Receptors R12.1 through R12.3: These receptors are located on the southbound side of I-5, just north of Leucadia Boulevard. It would not be feasible to abate for highway traffic noise in this area due to the elevation of the receptors with respect to the freeway and the right-of-way (*Table 3.15.25*). Locating a soundwall outside Caltrans right-of-way, on the eastern edge of Orpheus Avenue would also not be feasible because it would block access to the land between Orpheus Avenue and the freeway (*Table 3.15.25*).

Receptors R12.27 and R12.28: Receptors R12.27 and R12.28 represent single-family residences located on the southbound side of I-5, south of La Costa Avenue. An existing soundwall is located on the shoulder of the southbound La Costa Avenue on-ramp. A soundwall would not provide feasible noise reduction for any of the receptors (*Table 3.15.25*). Also, it would not be practical to build a soundwall at the property line of these residences due to the topography of the area.

Receptors R12.31 to R12.33: Receptors R12.31 through R12.33 represent a group of single-family residences located on the northbound side of I-5, just north of Leucadia Boulevard. Receptor R12.31 is located between Leucadia Boulevard and the entrance to the Leucadia Boulevard on-ramp, which would be realigned with the build alternatives. This would limit the area available for a soundwall for R12.31. There is an existing 7-ft-high property wall at the residences represented by Receptor R12.32. Replacing this existing wall with a soundwall would not provide feasible noise reduction for Receptors R12.31 or R12.32 (*Table 3.15.25*). It would provide a feasible noise reduction to Receptor R12.33, which represents one single-family residence (*Table 3.15.25*); however, a soundwall would not be practical for only one residence.

Receptors R12.35 through R12.38: Receptors R12.35 through R12.38 represent single-family residences in a new housing development located on the northbound side of I-5. There is an existing 6- to 7-ft-high high property wall along the backyards of these residences. A soundwall located on the right-of-way would not provide a feasible noise reduction for these receptors (*Table 3.15.25*).

Receptors R12.43 through R12.48: These receptors are located on the northbound side of I-5, just south of La Costa Avenue. A feasible reduction in highway traffic noise could not be achieved in this area because the receptors are elevated by approximately 65 to 80 ft above the freeway and the right-of-way (*Table 3.15.25*). A soundwall at the property line of these receivers would also not provide feasible noise reduction due to the topography of the area (*Table 3.15.25*).

Table 3.15.25: Predicted Future Noise Levels and Soundwall Feasibility for Segment 12

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					8 ft		10 ft		12 ft		14 ft		16 ft			
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.		
Leucadia Boulevard to La Costa Avenue – SB																
R12.1*	930 Orpheus Avenue	65	66	69[A/E]	69	0	69	0	68	1	66	1	68	1	Not Feasible
R12.2	960 Orpheus Avenue	70	71	73[A/E]	73	0	72	1	72	1	718	2	71	2	Not Feasible
R12.3	1030 Orpheus Avenue	70	71	73[A/E]	73	0	73	0	73	0	72	1	72	1	Not Feasible
R12.4	1034 Orpheus Avenue	73	74	76[A/E]	75	1	74	2	74	2	**73**[R,X,T]	**3**	72	4	Not Feasible
R12.5	1040 Orpheus Avenue	74	75	78[A/E]	76	2	76	2	75	3	**73**[R,T]	**5**	72	6	S709 / Feasible
R12.6	1144 Orpheus Avenue	71	72	75[A/E]	74	1	74	1	73	2	**72**[R,X]	**3**	72	3	Not Feasible
R12.7	1214 Orpheus Avenue	72	73	76[A/E]	75	1	75	1	74	2	**73**[R,X,T]	**3**	72	4	Not Feasible
R12.8*	1217 Eolus Avenue	70	71	73[A/E]	73	0	73	0	73	0	73	0	72	1	Not Feasible
R12.9	1280 Orpheus Avenue	71	72	74[A/E]	74	0	74	0	73	1	73	1	72	2	Not Feasible
R12.10	521 East Glaucus Street	68	69	71[A/E]	71	0	71	0	71	0	70	1	70	1	Not Feasible
R12.11	520 East Glaucus Street	68	69	72[A/E]	71	1	71	1	70	2	70	2	69	3	Not Feasible
R12.12[M]	1362 Orpheus Avenue	73	74	77[A/E]	74	3	73	4	71	6	69	8	68	9	Feasible
R12.12A[K]	1362 Orpheus Avenue	64	65	68[A/E]	67	1	67	1	66	2	65	3	64	4	Not Feasible
R12.13*	1345 Eolus Avenue	67	68	71[A/E]	70	1	70	1	70	1	69	2	69	2	Not Feasible
R12.14	1374 Orpheus Avenue	72	73	75[A/E]	73	2	72	3	71[T]	4	70	5	**68**[R]	**7**	S709 / Feasible
R12.14A[K]	1390 Orpheus Avenue	66	67	69[A/E]	68	1	67	2	66[T]	3	65	4	**64**[R]	**5**	S709 / Feasible
R12.15	1403 Eolus Avenue	69	70	72[A/E]	71	1	71	1	71	1	70	2	70	2	Not Feasible
R12.16	1442 Orpheus Avenue	71	72	75[A/E]	73	2	72	3	70[T]	5	69	6	**68**[R]	**7**	S709 / Feasible
R12.16A[K]	1448 Orpheus Avenue	65	66	69[A/E]	67	2	66	3	65[T]	4	63	6	**62**[R]	**7**	S709 / Feasible
R12.17	1472 Orpheus Avenue	70	71	74[A/E]	72	2	70[T]	4	69	5	68	6	**67**[R]	**7**	S709 / Feasible
R12.18*	1468 Orpheus Avenue	69	70	72[A/E]	71	1	71	1	70	2	70	2	70	2	Not Feasible
R12.19	1530 Orpheus Avenue	72	72	75[A/E]	73	2	73	2	72	3	71	4	**70**[R]	**5**	S709 / Feasible
R12.20	1565 Eolus Avenue	68	68	71[A/E]	71	0	71	0	71	0	70	1	70	1	Not Feasible
R12.21	1593 Eolus Avenue	75	75	77[A/E]	76	1	76	1	75	2	75	2	**74**[R,X]	**3**	Not Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[K] – A shielding factor of 5 dB has been applied to Receptors R12.12A, R12.14A, and R12.16A to account for attenuation provided by first-row buildings.
[M] – This receptor represents a measurement site. It is not an area of frequent human use.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[X] – Soundwall S709 would be recommended for these receivers because future noise levels are 75 dBA or greater, which would otherwise necessitate the consideration of unusual and extraordinary abatement strategies such as building insulation.
* – Non first-row receiver.

Table 3.15.25 (cont.): Predicted Future Noise Levels and Soundwall Feasibility for Segment 12

Receptor No.	Site Address	Existing Noise Levels[1] $L_{eq}(h)$, dBA	Future Peak Hour Noise Levels, $L_{eq}(h)$, dBA[1,2]													Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					8 ft		10 ft		12 ft		14 ft		16 ft		
					$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	
Leucadia Boulevard to La Costa Avenue – SB (Continued)																
12.22[W]	586 Southbridge Court	67	68	71 [A/E]	67[T]	4	66	5	65	6	64	7	**64[R]**	**7**	S709 / Feasible
R12.23[W]	583 Nantucket Court	65	66	68 [A/E]	67	1	67[T]	1	66	2	65	3	64	4	Not Feasible
R12.24[W]	576 Leucadia Village Court	69	70	72 [A/E]	71	1	70	2	68[T]	4	67	5	**66[R]**	**6**	S709 / Feasible
R12.25	Leucadia Park - Pool	67	67	69 [A/E]	69	0	69[T]	0	68	1	67	2	66	3	Not Feasible
R12.26	Leucadia Park - Tennis Court	68	68	70 [A/E]	70	0	69	1	69[T]	1	68	2	68	2	Not Feasible
R12.26A[W]	595 Leucadia Village Court	69	69	72 [A/E]	71	1	71	1	70[T]	2	68	4	**67[R]**	**5**	S709 / Feasible
R12.27	1923 Leucadia Scenic Court	70	70	72 [A/E]	72	0	72	0	72	0	72	0	72	0	Not Feasible
R12.28[W]	1940 Leucadia Scenic Court	65	65	68 [A/E]	68	0	68	0	68	0	68	0	68	0	Not Feasible
R12.29	579 La Costa Avenue	72	72	74 [A/E]	**69[R,T]**	**5**	67	7	66	8	65	9	64	10	S719 / Feasible
R12.30	561 La Costa Avenue	66	66	67 [A/E]	66	1	66	1	66	1	66	1	66	1	Not Feasible
Leucadia Boulevard to La Costa Avenue – NB																
R12.31	636 Leucadia Boulevard	65	68	70 [A/E]	69	1	69	1	68	2	68	2	68	2	Not Feasible
R12.32[W]	949 Piraeus Street	64	67	69 [A/E]	69	0	68	1	67	2	67	2	66	3	Not Feasible
R12.33	975 Piraeus Street	68	71	73 [A/E]	71	2	70	3	69	4	68	5	68	5	Not Feasible
R12.34	633 Sparta Drive	68	71	74 [A/E]	72	2	71	3	70	4	70	4	**69[R]**	**5**	S702 / Feasible
R12.35[W]	1212 Skyros Way	69	71	73 [A/E]	73	0	72	1	71	2	70	3	69	4	Not Feasible
R12.36[W]	1258 Skyros Way	68	71	73 [A/E]	72	1	71	2	71	2	71	2	70	3	Not Feasible
R12.37[W]	1288 Skyros Way	67	70	72 [A/E]	71	1	70	2	70	2	69	3	69	3	Not Feasible
R12.38[W]	1344 Skyros Way	66	69	71 [A/E]	70	1	70	1	70	1	69	2	69	2	Not Feasible
R12.39	1411 Piraeus Street	68	71	71 [A/E]	69[T]	2	68	3	67	4	67	4	**66[R]**	**5**	S706 / Feasible
R12.40	1437 Piraeus Street	71	69	70 [A/E]	68[T]	2	68	2	67	3	66	4	66	4	Not Feasible
R12.41*	1423 Arbor Court	65	68	69 [A/E]	68	1	67	2	67	2	66	3	66	3	Not Feasible
R12.42	1433 Piraeus Street	66	69	70 [A/E]	69	1	68	2	68	2	67	3	67	3	Not Feasible
R12.43	1570 Caudor Street	62	65	66 [A/E]	--	--	--	--	--	--	--	--	--	--	--
R12.44	746 Plato Place	60	63	65 [N]	--	--	--	--	--	--	--	--	--	--	--
R12.45	750 Plato Place	61	64	66 [A/E]	--	--	--	--	--	--	--	--	--	--	--
R12.46	1660 Leora Lane	60	63	66 [A/E]	--	--	--	--	--	--	--	--	--	--	--
R12.47	1645 Noma Lane	61	64	66 [A/E]	--	--	--	--	--	--	--	--	--	--	--
R12.48	1748 Noma Lane	67	70	73 [A/E]	--	--	--	--	--	--	--	--	--	--	--

[1] – $L_{eq}(h)$ is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future noise levels at this receiver include the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.26: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 12

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S702	R12.34	1 SFR	R/W / NB	16 ft / 574 ft	$189,079	$48,000	Not Reasonable	Not Recommended
S706	R12.39	1 SFR	R/W / NB	16 ft / 892 ft	$292,802	$48,000	Not Reasonable	Not Recommended
S709	R12.4, R12.5, R12.6, R12.7, R12.14, R12.14A, R12.16, R12.16A, R12.17, R12.19, R12.21, R12.22, R12.24, and R12.26A	14 SFR and 11 MFR	Shoulder and R/W /SB	14 ft and 16 ft / 5463 ft	$4,686,290	$1,050,000	Not Reasonable	Not Recommended Individual Abatement for SI[3]
S719	R12.29	1 SFR	R/W / SB	8 ft / 364 ft	$275,469	$36,000	Not Reasonable	Not Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; SCH – school; REC – recreational
[2] – Estimated construction cost includes cost of easements
[3] – SI – Severely Impacted
R/W – right-of-way

SEGMENT 13 – La Costa Avenue to Poinsettia Lane

Areas with Noise Abatement

Table 3.15.27 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.28* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 13 are shown in *Figures 2-2.3, Sheets 40* through *43*. The following paragraphs describe the preliminary abatement decisions for Segment 13.

Soundwall S723: Soundwall S723 would be located on private property on the southbound side of I-5, north of La Costa Avenue. The soundwall would provide a feasible reduction in highway traffic noise for two single-family residences represented by Receptors R13.1 and R13.2 and R13.2A, of which Receptor R13.2 would be severely impacted with noise levels at or higher than 75 dBA under the build alternatives (*Table 3.15.27*). Soundwall S723 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance; therefore, S723 would not be recommended as proposed (*Table 3.15.28*). However, the severely impacted receptor, R13.2, would receive individual abatement.

Soundwall S729: Soundwall S729 would be located on private property on the southbound side of I-5, north of Batiquitos Lagoon. The soundwall would provide a feasible reduction in highway traffic noise for 12 single-family residences represented by Receptors R13.3 through R13.5 (*Table 3.15.27)*. Soundwall S729 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.27*). Cost of acquisition for right-of-way is assumed to be $186,843 for this wall, and when added to the construction cost, it exceeds the reasonable allowance. If the estimated construction cost could not be reduced to less than or equal to the reasonable allowance, construction of S729 would not be recommended (*Table 3.15.28*).

Soundwall S730: Soundwall S730 would be located on private property along the northbound side of I-5, north of Batiquitos Lagoon. The soundwall would provide a feasible reduction in highway traffic noise for eight single-family residences represented by Receptors R13.18 through R13.20A, and R13.20 (*Table 3.15.27*). Soundwall S730 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.28*). Therefore, S730 would not be recommended (*Table 3.15.28*).

Soundwall S736: Soundwall S736 would be located on private property, along the northbound side of I-5, south of Poinsettia Lane. Soundwall S736 would replace the existing 6-ft-high glass/block property wall and would provide a feasible reduction in highway traffic noise for 32 single- and 46 multi-family residences represented by Receptors R13.21 and R13.21A through R13.26 (*Table 3.15.27*). Soundwall S736 would be reasonable to construct due to the estimated construction cost being lower than the reasonable allowance; therefore, S736 would be recommended (*Table 3.15.28).*

Soundwall S737: Soundwall S737 would be located in the right-of-way along the southbound side of I-5, just south of Poinsettia Lane. The soundwall would provide a feasible reduction in highway traffic noise for 17 mobile homes represented by Receptors R13.13 through R13.16 (*Table 3.15.27*). Soundwall S737 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance; therefore, S737 would not be recommended (*Table 3.15.28*).

Areas without Noise Abatement

Receptor R13.10: Receptor R13.10 represents the backyard of one multi-family residence located on the southbound side of I-5. There is an existing 6-ft-high property wall located on the top of a berm, approximately 33 to 66 ft above the freeway. This existing wall is not predicted to attenuate noise levels to below the NAC for Category B receivers under the No Build or the build alternatives (*Table 3.15.27*). Replacing this wall with a higher wall would still not provide the required 5 dBA noise reduction for this residence; therefore, a soundwall would not be feasible (*Table 3.15.27*).

Receptor R13.17: Receptor R13.17 represents a single-family residence located on the northbound side of I-5. A soundwall proposed on the shoulder would not provide a 5 dB noise reduction for this residence due to the topography of the area and its distance from the freeway (*Table 3.15.27*). A soundwall was not considered on this private property, because constructing a soundwall on private property is not considered practical for only one receptor.

Table 3.15.27: Predicted Future Noise Levels and Soundwall Feasibility for Segment 13

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					8 ft		10 ft		12 ft		14 ft		16 ft			
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.		
La Costa Avenue to Poinsettia Lane – SB																
R13.1	514 La Costa Avenue	72	71	74 [A/E]	**69[R,T]**	**5**	68	6	67	7	67	7	66	8		S723 / Feasible
R13.2	510 La Costa Avenue	75	74	77 [A/E]	**71[R,T]**	**6**	69	8	67	10	66	11	65	12		S723 / Feasible
R132.A	510 La Costa Avenue	73	72	74 [A/E]	**69[R,T]**	**5**	68	6	66	8	65	9	64	10		S723 / Feasible
R13.3	7542 Navigator Circle	63	64	67 [A/E]	66[I]	1	64	3	**62[R]**	**5**	60	7	58	9		S729 / Feasible
R13.4	7534 Navigator Circle	64	65	68 [A/E]	64[I]	4	**62[R]**	**6**	61	7	59	9	58	10		S729 / Feasible
R13.5	7522 Navigator Circle	66	67	70 [A/E]	67[I]	3	**65[R]**	**5**	63	7	62	8	61	9		S729 / Feasible
R13.6[W]	7491 Mermaid Lane	58	59	61 [N]	--	--	--	--	--	--	--	--	--	--		--
R13.7[W]	7459 Mermaid Lane	54	55	57 [N]	--	--	--	--	--	--	--	--	--	--		--
R13.8[W]	7452 Neptune Drive	54	59	61 [N]	--	--	--	--	--	--	--	--	--	--		--
R13.9[W]	7439 Neptune Drive	53	54	57 [N]	--	--	--	--	--	--	--	--	--	--		--
R13.10[W]	7403 Neptune Drive	65	66	68 [A/E]	67	1	66	2	65	3	65	3	64	4		Not Feasible
R13.11[W]	7308 Binnacle Drive	57	59	61 [N]	--	--	--	--	--	--	--	--	--	--		--
R13.12[W]	7340 San Bartolo Street	56	58	61 [N]	--	--	--	--	--	--	--	--	--	--		--
R13.13[W]	7330 San Bartolo Street	66	68	71 [A/E]	67[I]	4	66	5	65	6	**65[R]**	**6**	64	7		S737/ Feasible
R13.14[W]	7320 San Bartolo Street	68	70	72 [A/E]	68[I]	4	67	5	66	6	**65[R]**	**7**	64	8		S737/ Feasible
R13.15[W]	7312 San Bartolo Street	65	67	70 [A/E]	67[I]	3	66	4	65	5	**64[R]**	**6**	64	6		S737/ Feasible
R13.16[W]	7306 San Bartolo Street	64	66	68 [A/E]	66[I]	2	65	3	64	4	**63[R]**	**5**	63	5		S737/ Feasible
La Costa Avenue to Poinsettia Lane – NB																
R13.17	7362 Gabbiano Lane	66	66	68 [A/E]	67	1	67	1	66	2	66	2	66	2		Not Feasible
R13.18	7357 Gabbiano Lane	67	67	69 [A/E]	65[I]	4	**62[R]**	**7**	60	9	58	11	57	12		S730 / Feasible
R13.19	889 Piovana Court	66	66	67 [A/E]	63[I]	4	**60[R]**	**7**	58	9	56	11	56	11		S730 / Feasible
R13.20A	880 Piovana Court	68	66	67 [A/E]	63[I]	4	**60[R]**	**7**	58	9	57	10	56	11		S730 / Feasible
R13.20	880 Piovana Court	64	64	66 [A/E]	61[I]	5	**60[R]**	**6**	58	8	58	8	57	9		S730 / Feasible
R13.21	7429 Linden Terrace	63	65	68 [A/E]	65[I]	3	64	4	**63[R]**	**5**	62	6	61	7		S736 / Feasible
R13.21A	7429 Linden Terrace	67	69	71 [A/E]	67[I]	4	66	5	**64[R]**	**7**	63	8	61	10		S736 / Feasible
R13.22	7413 Linden Terrace	69	71	73 [A/E]	**67[R,T]**	**6**	65	8	63	10	62	11	61	12		S736 / Feasible
R13.23	7315 Linden Terrace	70	72	74 [A/E]	**66[R,T]**	**8**	64	10	63	11	62	12	61	13		S736 / Feasible
R13.24	7213 Linden Terrace	72	74	76 [A/E]	**69[R,T]**	**7**	67	9	65	11	63	13	63	13		S736 / Feasible
R13.24A	7153 Linden Terrace	72	74	76 [A/E]	**69[R,T]**	**7**	67	9	65	11	64	12	63	13		S736 / Feasible
R13.25[W]	7141 Linden Terrace	68	69	71 [A/E]	69[I]	2	67	4	**65[R]**	**6**	64	7	63	8		S736 / Feasible
R13.26[W]	7103 Linden Terrace	68	69	71 [A/E]	69[I]	2	67	4	**65[R]**	**6**	63	8	63	8		S736 / Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – Includes the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.28: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 13

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S723	R13.1 – R13.2 and R13.2A	2 SFR	Private Property / SB	8 ft / 705 ft	$587,592	$100,000	Not Reasonable	Not Recommended, Individual Abatement for SI[3]
S729	R13.3 – R13.5	12 SFR	Private Property / SB	10 ft to 12 ft /604 ft	$592,139	$456,000	Not Reasonable	Not Recommended
S730	R13.18 – R13.20A and R13.20	8 SFR	Private Property / NB	10 ft / 814 ft	$786,075	$288,000	Not Reasonable	Not Recommended
S736	R13.21 – R13.26	32 SFR and 46 MFR	Private Property / NB	8 ft to 12 ft / 2910 ft	$2,755,354	$3,276,000	Reasonable	Recommended
S737	R13.13 – R13.16	17 MH	R/W and Shoulder / SB	14 ft / 1457 ft	$1,288,714	$850,000	Not Reasonable	Not Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; MH – mobile home; SCH – school; REC – recreational
[2] – Estimated construction cost includes cost of easements
[3] – SI – Severely Impacted
R/W – right-of-way

SEGMENT 14 – Poinsettia Lane to Palomar Airport Road

Areas with Noise Abatement

Table 3.15.29 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.30* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 14 are shown in *Figures 2-2.3, Sheets 43* through *47*. The following paragraphs describe the preliminary abatement decisions for Segment 14.

Soundwall S750: Soundwall S750 would be located on private property and Caltrans right-of-way, along the northbound side of I-5, just north of Poinsettia Lane. The soundwall would provide a feasible reduction in highway traffic noise for 36 single- and 56 multi-family residences, represented by Receptors R14.8 and R14.10 through R14.28 (*Table 3.15.29*). Receptors R14.11, R14.12, R14.14, R14.17, R14.19, R14.21, R14.23, R14.25, R14.26, and R14.28 are predicted to be severely impacted with noise levels at or higher than 75 dBA (*Table 3.15.29*). Soundwall S750 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.30*). However, S750 would be recommended to provide the required abatement for the severely impacted receptors (*Table 3.15.30*).

Areas without Noise Abatement

Receptors R14.1 through R14.6: These receptors are located on the southbound side of I-5 north of Poinsettia Lane. These receptors would not qualify because they are second-row receptors behind property walls and are shielded by a row of hotels and commercial structures. Receptors R14.1 through R14.3 are located behind an existing 6-ft-high property wall, and Receptors R14.4 through R14.6 are located behind an existing 9-ft-high property wall. A soundwall located along the right-of-way would not provide feasible noise reduction to these second-row receptors (*Table 3.15.29*).

Receptors R14.7 and R14.9: These receptors are located on the northbound side of I-5 just north of Poinsettia Lane. These receptors are second-row receptors located behind an existing 6-ft property wall and are elevated above the freeway. Soundwall S750 would not provide feasible noise reduction to these receptors (*Table 3.15.29*).

Receptors R14.29 and R14.30: These receptors are located on the northbound side of I-5, south of Palomar Airport Road. Receptor R14.30 represents the pool area at a Motel 6. This location would not benefit from a soundwall located on the right-of-way because it is shielded by the Motel 6 structure, and a soundwall would not provide feasible noise reduction at this location (*Table 3.15.29*). Receptor R14.29 represents the Discovery Isle Child Development Center's playground. This location would not benefit from a soundwall located on the right-of-way because the playground is 394 ft from the edge of the highway and is partially shielded by the Motel 6 structure. A soundwall would not provide feasible noise reduction at this location (*Table 3.15.29*). A soundwall on private property for R14.29 would have to be constructed on the east side of Paseo del Norte to be effective, but would block access to the property and, therefore, would not be practical. The measurement taken at Receptor R14.29 includes traffic noise from Paseo del Norte, a four-lane road directly in front of the building. This extraneous noise caused the existing noise level to be higher than the future "No Build" level calculated by the model.

Table 3.15.29: Predicted Future Noise Levels and Soundwall Feasibility for Segment 14

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{e}q(h)	I.L.	
Poinsettia Lane to Palomar Airport Road – SB															
R14.1*	6968 Waters End Drive	61	62	64[N]	--	--	--	--	--	--	--	--	--	--	--
R14.2*	6932 Waters End Drive	62	63	65[N]	--	--	--	--	--	--	--	--	--	--	--
R14.2A*	Fairfield Inn - 760 Macadamia Drive - Pool Area	57	58	60[N]	--	--	--	--	--	--	--	--	--	--	--
R14.3*	6908 Waters End Drive	63	64	66[A/E]	65	1	64	2	63	3	63	3	62	4	Not Feasible
R14.4*	Poinsettia Station Apartment Homes - Embarcadero Lane	62	63	65[N]	--	--	--	--	--	--	--	--	--	--	--
R14.5*	Poinsettia Station Apartment Homes - Embarcadero Lane	64	65	67[A/E]	66	1	66	1	65	2	65	2	65	2	Not Feasible
R14.6*	Poinsettia Station Apartment Homes - Embarcadero Lane	58	63	66[A/E]	66	0	66	0	65	1	65	1	64	2	Not Feasible
Poinsettia Lane to Palomar Airport Road – NB															
R14.7*	6995 Sandcastle Drive	68	69	71[A/E]	71	0	71	0	71	0	70	1	70	1	Not Feasible
R14.8	6995 Whitecap Drive	68	69	71[A/E]	69[T]	2	67	4	**66**[R]	**5**	64	7	63	8	S750 / Feasible
R14.9*	6977 Whitecap Drive	70	71	73[A/E]	73	0	73	0	72	1	71[T]	2	70	3	Not Feasible
R14.10	6976 Quiet Cove Drive	70	71	73[A/E]	71[T]	2	70	3	**68**[R]	**5**	67	6	66	7	S750 / Feasible
R14.11	6951 Quiet Cove Drive	72	73	76[A/E]	72[T]	4	70	6	**68**[R]	**8**	66	10	65	11	S750 / Feasible
R14.12	803 Sandbar Way	72	73	75[A/E]	73[T]	2	71	4	**69**[R]	**6**	68	7	67	8	S750 / Feasible
R14.13*	808 Sandbar Way	69	70	72[A/E]	70	2	69	3	68	4	68	4	**67**[R]	**5**	S750 / Feasible
R14.14	803 Spindrift Lane	71	72	75[A/E]	73[T]	2	71	4	70	5	68	7	**68**[R]	**7**	S750 / Feasible
R14.15	804 Bluewater Road	71	72	74[A/E]	72[T]	2	71	3	69	5	**68**[R]	**6**	67	7	S750 / Feasible
R14.16*	805 Windcrest Drive	70	71	73[A/E]	72	1	71	2	69	4	**68**[R]	**5**	67	6	S750 / Feasible
R14.17	802 Windcrest Drive	74	75	77[A/E]	75[T]	2	73	4	71	6	**69**[R]	**8**	68	9	S750 / Feasible
R14.18*	804 Windward Lane	70	71	73[A/E]	72	1	71	2	69	4	**68**[R]	**5**	67	6	S750 / Feasible
R14.19	803 Skysail Avenue	72	73	75[A/E]	74[T]	1	72	3	70	5	**69**[R]	**6**	68	7	S750 / Feasible
R14.20*[W]	809 Caminito Azul	72	72	74[A/E]	72	2	71	3	69	5	**68**[R]	**6**	67	7	S750 / Feasible
R14.21[W]	803 Caminito Azul	75	75	78[A/E]	76	2	75[T]	3	73	5	**71**[R]	**7**	70	8	S750 / Feasible
R14.22*[W]	806 Caminito Rosa	72	72	74[A/E]	72	2	71	3	70	4	**69**[R]	**5**	68	6	S750 / Feasible
R14.23[W]	801 Caminito Verde	74	74	76[A/E]	74[T]	2	72	4	71	5	**69**[R]	**7**	68	8	S750 / Feasible
R14.24*[W]	813 Caminito del Sol	70	70	72[A/E]	70	2	69	3	68	4	**67**[R]	**5**	66	6	S750 / Feasible
R14.25[W]	801 Caminito del Sol	73	74	76[A/E]	73[T]	3	71	5	69	7	**68**[R]	**8**	66	10	S750 / Feasible
R14.26	803 Caminito del Mar	73	74	77[A/E]	75[T]	2	73	4	71	6	**69**[R]	**8**	68	9	S750 / Feasible
R14.27*[W]	804 Caminito del Mar	69	70	72[A/E]	70	2	69	3	68	4	**67**[R]	**5**	66	6	S750 / Feasible
Poinsettia Lane to Palomar Airport Road – NB (cont.)															
R14.28	801 Caminito del Reposo	73	74	76[A/E]	71[T]	5	70	6	69	7	**68**[R]	**8**	67	9	S750 / Feasible
R14.29*,**	6130 Paseo del Norte - Discovery Isle Child Development Center	67	66	68[A/E]	67	1	66	2	65	3	65	3	64	4	Not Feasible
R14.30	6117 Paseo del Norte	62	63	66[A/E]	65[T]	1	65	1	65	1	65	1	65	1	Not Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing, future "no build," and future "build" noise levels at this location include benefits of an existing property wall.
* – Non first-row receiver.
** – The existing noise level was higher than the "No Build" due to traffic noise from Paseo del Norte.

Table 3.15.30: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 14

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S750	R14.8, R14.10 – R14.28	36 SFR 56 MFR	R/W and Property Line / NB	12 ft to 16 ft / 4793 ft	$5,293,948	$4,784,000	Not Reasonable	Recommended For SI[3]

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence
[2] – Estimated construction cost includes cost of easements
[3] – SI – Severely Impacted
R/W – right-of-way

SEGMENT 15 – Palomar Airport Road to Cannon Road

Areas with Noise Abatement

Table 3.15.31 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.32* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 15 are shown in *Figures 2-2.3, Sheets 47* through *49*. The following paragraphs describe the preliminary abatement decisions for Receptors 15.1 and 15.2, located immediately north of Cannon Road.

<u>*Soundwall S783:*</u> Soundwall S783 would be located on private property along the northbound side of I-5, just north of Cannon Road. The soundwall would a provide feasible reduction in highway traffic noise for the outdoor swimming pool area of the West Inn Suites, represented by Receptors R15.1 and R15.2 (*Table 3.15.31*). Soundwall S783 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.32*). Therefore, S783 would not be recommended (*Table 3.15.32*).

Areas without Noise Abatement

There are no noise sensitive areas in Segment 15 south of Cannon Road that would be impacted by the proposed project.

Table 3.15.31: Predicted Future Noise Levels and Soundwall Feasibility for Segment 15

Receptor No.	Site Address	Existing Noise Levels[1] $L_{eq}(h)$, dBA	Future Peak Hour Noise Levels, $L_{eq}(h)$, dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					8 ft		10 ft		12 ft		14 ft		16 ft		
					$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	
Palomar Airport to Cannon Road – SB															
R15.1[W]	West Inn Suites	71	71	73 [A/E]	73[T]	0	72	1	70	3	**68[R]**	**5**	66	7	S783 / Feasible
R15.2[W]	West Inn Suites - Pool Area	68	68	71 [A/E]	71	0	70	1	70[T]	1	69	2	68	3	Not Feasible

[1] – $L_{eq}(h)$ is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – Includes the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.32: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 15

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S783	R15.1	1 HM	Private Property / SB	14 ft / 394 ft	$298,250	$36,000	Not Reasonable	Not Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; HM – hotel/motel
[2] – Estimated construction cost includes cost of easements.

SEGMENT 16 – Cannon Road to Tamarack Avenue

Areas with Noise Abatement

Table 3.15.33 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.34* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 16 are shown in *Figures 2-2.3, Sheets 49* through *52*. The following paragraphs describe the preliminary abatement decisions for Segment 16.

<u>*Soundwall S796:*</u> Soundwall S796 would be located on the shoulder along the northbound side of I-5, just north of Agua Hedionda. The soundwall would provide a feasible reduction in highway traffic noise for a single-family residence represented by Receptor R16.2, as well as a water front recreational area represented by Receptor R16.1 (*Table 3.15.33*). Soundwall S796 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance; therefore, S796 would not be recommended (*Table 3.15.34*).

<u>*Soundwall S798*:</u> Soundwall S798 would be located along the northbound right-of-way of I-5, just south of Chinquapin Avenue. The soundwall would provide a feasible reduction in highway traffic noise for 2 single- and 11 multi-family residences represented by Receptors R16.3, R16.3A, and R16.4A (*Table 3.15.33*). Receptors R16.3 and R16.4A are predicted to be severely impacted by future noise levels at or higher than 75 dBA with the No Build alternative (*Table 3.15.33*). Receptors R16.4 and R16.5 would not benefit from Soundwall S798 because they are shielded by existing structures (*Table 3.15.33*). Soundwall S798 would be reasonable to construct due to the estimated construction cost being less than the reasonable allowance; therefore, S798 would be recommended (*Table 3.15.34*).

<u>*Soundwall S799:*</u> Soundwall S799 would be located on private property and Caltrans right-of-way along the southbound side of I-5, just south of Chinquapin Avenue. The soundwall would provide a feasible noise reduction for nine multi-family residences represented by Receptors R16.14, R16.17, and R16.19; and one recreational area represented by Receptor R16.19 (*Table 3.15.33*). Receptors R16.14 and R16.17 are predicted to be severely impacted with noise levels at or higher than 75 dBA with the build alternatives (*Table 3.15.33*). Receptors R16.15, R16.16, and R16.18 would not receive feasible noise reduction from Soundwall S799 (*Table 3.15.24)*. Soundwall S799 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.34*). Soundwall S799 would not be recommended as proposed, and the severely impacted receptors, R16.14 and R16.17, would receive individual abatement (*Table 3.15.34*).

<u>*Soundwall S801:*</u> Soundwall S801 would be located on the right-of-way along southbound I-5, just south of Tamarack Avenue. The soundwall would provide a feasible reduction in highway traffic noise for 3 single- and 13 multi-family residences represented by receptors R16.8 through R16.10, and R16.13 (*Table 3.15.33*). Second row Receptors R16.11 and R16.12 would not benefit from Soundwall S801 (*Table 3.15.33*). Soundwall S801 would be reasonable to construct due to the estimated construction cost being less than the reasonable allowance; therefore, S801 would be recommended (*Table 3.15.34*).

Soundwall S802: Soundwall S802 would be located on the right-of-way along the northbound side of I-5, just south of Tamarack Avenue. The soundwall would provide a feasible reduction in highway traffic noise for 22 multi-family residences represented by Receptors R16.6 and R16.7 (*Table 3.15.33*). Soundwall S802 would be reasonable to construct due to the estimated construction cost being less than the reasonable allowance; therefore, S802 would be recommended (*Table 3.15.34*).

Areas without Noise Abatement

Receptors R16.4, R16.5, R16.11, R16.12, R16.16, and *R16.18:* These receptors are not feasible to abate with soundwalls and standard noise abatement techniques.

Table 3.15.33: Predicted Future Noise Levels and Soundwall Feasibility for Segment 16

Receptor No.	Site Address	Existing Noise Levels[1] $L_{eq}(h)$, dBA	Future Peak Hour Noise Levels, $L_{eq}(h)$, dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					8 ft		10 ft		12 ft		14 ft		16 ft		
					$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	
Cannon Road to Tamarack Avenue – NB															
R16.1	4133 Harrison Street	67	67	72 [A/E]	68[T]	4	67	5	66	6	**66**[R]	**6**	66	6	S796 / Feasible
R16.2	4215 Harrison Street	68	68	71 [A/E]	69	2	68	3	67	4	**66**[R]	**5**	65	6	S796 / Feasible
R16.3	4125 Harrison Street	80	80	81 [A/E]	81	0	81	0	78	3	73[T]	8	**71**[R]	**10**	S798 / Feasible
R16.3A	4115 Harrison Street	70	70	73 [A/E]	**67**[R,T]	**6**	67	6	66	7	65	8	65	8	S798 / Feasible
R16.4	4095 Harrison Street	66	66	69 [A/E]	66	3	66	3	66	3	65	4	65	4	Not Feasible
R16.4A	Carlsbad Sunset Apartments - Chinquapin Avenue	75	75	78 [A/E]	**71**[R,T]	**7**	69	9	67	11	65	13	64	14	S798 / Feasible
R16.5	Carlsbad Sunset Apartments - Chinquapin Avenue	64	64	66 [A/E]	65	1	64	2	64	2	63	3	63	3	Not Feasible
R16.6	Woodridge Village Apartments - Chinquapin Avenue	75	76	79 [A/E]	**74**[R,T]	**5**	72	7	70	9	68	11	66	13	S802 / Feasible
R16.7[F]	Woodridge Village Apartments - Chinquapin Avenue	75	76	79 [A/E]	**71**[R,T]	**8**	69	10	67	12	66	13	65	14	S802 / Feasible
Cannon Road to Tamarack Avenue – SB															
R16.8[W]	830 Citrus Place	70	71	74 [A/E]	70	4	**68**[R,T]	**6**	66	8	65	9	64	10	S801 / Feasible
R16.9*[W]	820 Citrus Place	68	69	72 [A/E]	68	4	**67**[R,T]	**5**	66	6	65	7	64	8	S801 / Feasible
R16.10[W]	827 Citrus Place	71	72	75 [A/E]	72	3	**70**[R,T]	**5**	68	7	67	8	66	9	S801 / Feasible
R16.11*	811 Citrus Place	63	64	67 [A/E]	65	2	64	3	63	4	63	4	62	5	Not Feasible
R16.12*	824 Chinquapin Avenue - Chinquapin Landing Apts - Pool Area	63	64	67 [A/E]	65	2	65	2	64	3	64	3	63	4	Not Feasible
R16.13	856 Chinquapin Avenue - Chinquapin Landing Apartments	74	75	78 [A/E]	**70**[R,T]	**8**	69	9	68	10	67	11	66	12	S801 / Feasible
R16.14	Windsong Papagallos Apartments - Park	72	72	75 [A/E]	70[T]	5	**69**[R]	**6**	68	7	66	9	66	9	S799 / Feasible
R16.15*	Windsong Papagallos Apartments - Pool Area	61	61	64 [N]	62	2	62	2	62	2	61	3	61	3	--
R16.16*	Windsong Papagallos Apartments	64	64	67 [A/E]	65	2	65	2	64	3	64	3	63	4	Not Feasible
R16.17	Windsong Papagallos Apartments - Pool Area	73	73	75 [A/E]	72	3	**70**[R,T]	**5**	69	6	67	8	66	9	S799 / Feasible
R16.18*	Windsong Papagallos Apartments	69	69	71 [A/E]	70	1	69	2	68	3	68	3	67	4	Not Feasible
R16.19	817 Kalpati Circle	68	68	71 [A/E]	66	5	**66**[R]	**5**	64	7	63	8	62	9	S799 / Feasible

[1] – $L_{eq}(h)$ is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[N] – No noise impact.
[F] – Existing noise levels at this location include the benefits of an existing wooden fence.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future noise levels at this receiver include the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.34: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 16

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S796	R16.1 – R16.2	1 SFR and I REC (3 Frontage Units)	Shoulder /NB	14 ft / 668 ft	$352,956	$200,000	Not Reasonable	Not Recommended
S798	R16.3, R16.3A, and R16.4A	2 SFR and 11 MFR	R/W /NB	16 ft and 8 ft / 663 ft	$556,208	$702,000	Reasonable	Recommended
S799	R16.14, R16.17, and R16.19	9 MFR and 1 REC (1 Frontage Unit)	Private Property and R/W /SB	8 ft and 10 ft / 1389 ft	$1,261,796	$480,000	Not Reasonable	Not Recommended, Individual Abatement for SI[3]
S801	R16.8 – R16.10, and R16.13	3 SFR and 13 MFR	R/W /SB	8 ft and 10 ft / 741 ft	$330,891	$672,000	Reasonable	Recommended
S802	R16.6 – R16.7	22 MFR	R/W /NB	8 ft / 538 ft	$468,649	$1,188,000	Reasonable	Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; SCH – school; REC – recreational
[2] – Estimated construction cost includes cost of easements
[3] – SI – Severely Impacted
R/W – right-of-way

SEGMENT 17 – Tamarack Avenue to Carlsbad Village Drive

Areas with Noise Abatement

Table 3.15.35 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.36* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 17 are shown in *Figures 2-2.3, Sheets 52* through *54*. The following paragraphs describe the preliminary abatement decisions for Segment 17.

Soundwall S810: Soundwall S810 would be located on Caltrans right-of-way and the shoulder of northbound I-5, just north of Tamarack Avenue. The soundwall would provide a feasible reduction in highway traffic noise for 10 single- and 16 multi-family residences, represented by Receptors R17.5, R17.7, R17.9, R17.11, and R17.13 through R17.15; the St. Patrick School represented by Receptors R17.1A and R17.1; a single-family residence and a day-care center playground represented by Receptor R17.4; the First Baptist Church represented by Receptor R17.2, and Holiday Park represented by Receptors R17.10 and R17.12 (*Table 3.15.35*). The pool areas at two hotels, the Carlsbad Lodge and the Travel Inn Motel, represented by Receptors R17.6 and R17.8, respectively, would also benefit from the soundwall. There are no apparent easements that would need to be acquired in order to construct S810. Soundwall S810 would be reasonable to construct due to the estimated construction cost being less than the reasonable allowance; therefore, S810 would be recommended *(Table 3.15.36*).

Soundwall S811: Soundwall S811 would be located along the southbound side of I-5, just north of Tamarack Avenue. The Noise Study Report identified a feasible soundwall of 8 to 16 feet in height that would benefit 28 single-family and 116 multi-family residences, represented by Receptors R17.17 through R17.20, and R17.22 through R17.34 (*Table 3.15.35*). The Caltrans District Landscape Architect has indicated that this soundwall would result in a visual impact. Therefore, the PDT decided to minimize visual impact by recommending lowering the entire wall to 10 ft. Receptors R17.22 and R17.31 would be attenuated by 3 and 4 dBA, respectively, with a 10-ft-high soundwall. There are no apparent easements that would need to be acquired in order to construct S811. The estimated construction cost of S811 would be less than the reasonable cost allowance. Therefore, construction of S811 is considered reasonable (*Table 3.15.36*). However, construction of S811 along with S810 would potentially create a tunneling effect. To minimize this possible visual impact, it would be recommended to reduce the entire wall height for S811.

Areas without Noise Abatement

There were no areas in Segment 17 where conventional noise abatement techniques would not be successful.

Table 3.15.35: Predicted Future Noise Levels and Soundwall Feasibility for Segment 17

Receptor No.	Site Address	Existing Noise Levels[1] $L_{eq}(h)$, dBA	Future Peak Hour Noise Levels, $L_{eq}(h)$, dBA[1,2]: Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.): 8 ft $L_{eq}(h)$	8 ft I.L.	10 ft $L_{eq}(h)$	10 ft I.L.	12 ft $L_{eq}(h)$	12 ft I.L.	14 ft $L_{eq}(h)$	14 ft I.L.	16 ft $L_{eq}(h)$	16 ft I.L.	Soundwall No. / Feasibility
Tamarack Avenue to Carlsbad Village Drive – NB															
R17.1	St Patrick School - 3820 Pio Pico Drive	73	74	76[A/E]	71[T]	5	**69[R]**	**7**	69	7	67	9	67	9	S810 / Feasible
R17.1A	St Patrick School - 3820 Pio Pico Drive	72	73	74[A/E]	70[T]	4	**69[R]**	**5**	68	6	67	7	67	7	S810 / Feasible
R17.2	3780 Pio Pico Drive - First Baptist Church	74	75	76[A/E]	72[T]	4	70	6	69	7	68	8	**67[R]**	**9**	S810 / Feasible
R17.3[W]	Motel 8 - Pool Area	67	68	70[A/E]	70	0	70	0	69	1	68	2	68	2	Not Feasible
R17.4*	Daycare	66	67	68[A/E]	66	2	65	3	64	4	64	4	**63[R]**	**5**	S810 / Feasible
R17.5	1061 Magnolia Avenue	70	72	73[A/E]	69	4	67[T]	6	66	7	**65[R]**	**8**	64	9	S810 / Feasible
R17.6	Travel Inn - 3666 Pio Pico Drive - Pool Area	67	69	71[A/E]	69	2	68[T]	3	67	4	**66[R]**	**5**	65	6	S810 / Feasible
R17.7	3610 Pio Pico Drive - Sierra Pines Apartments	75	75	77[A/E]	70[T]	7	69	8	**68[R]**	**9**	67	10	66	11	S810 / Feasible
R17.8	Carlsbad Lodge - 3570 Pio Pico Drive - Pool Area	74	74	76[A/E]	70[T]	6	69	7	**67[R]**	**9**	67	9	66	10	S810 / Feasible
R17.9	1042 Chestnut Avenue	71	71	73[A/E]	69	4	68[T]	5	**66[R]**	**7**	65	8	64	9	S810 / Feasible
R17.10	Holiday Park - Eureka Place	75	75	78[A/E]	70	8	69	9	**67[R]**	**11**	66	12	66	12	S810 / Feasible
R17.11*	3300 Eureka Place	64	68	71[A/E]	68	3	67	4	**66[R]**	**5**	65	6	64	7	S810 / Feasible
R17.12	Holiday Park - Eureka Place	66	70	72[A/E]	70	2	68	4	**67[R,T]**	**5**	66	6	65	7	S810 / Feasible
R17.13	1144 Pine Avenue	69	73	76[A/E]	70[T]	6	69	7	68	8	**67[R]**	**9**	66	10	S810 / Feasible
R17.14*[K]	1190 Pine Avenue	62	66	68[A/E]	66	2	65	3	63	5	**63[R]**	**5**	62	6	S810 / Feasible
R17.15	1095 Oak Avenue	68	72	74[A/E]	72	2	71	3	70	4	**69[R,T]**	**5**	68	6	S810 / Feasible
R17.16*[K]	1103 Oak Avenue	61	65	67[A/E]	66	1	65	2	65	2	64	3	63	4	Not Feasible

[1] – $L_{eq}(h)$ is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[K] – A shielding factor of 5 dB has been applied to these receptors to account for attenuation by first-row buildings.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future noise levels at this receiver include the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.35 (cont.): Predicted Future Noise Levels and Soundwall Feasibility for Segment 17

Receptor No.	Site Address	Existing Noise Levels[1] $L_{eq}(h)$, dBA	Future Peak Hour Noise Levels, $L_{eq}(h)$, dBA[1,2]													Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					8 ft		10 ft		12 ft		14 ft		16 ft		
					$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	$L_{eq}(h)$	I.L.	
Tamarack Avenue to Carlsbad Village Drive – SB																
R17.17	965 Oak Avenue	70	70	72 [A/E]	67[T]	5	**66[R]**	**6**	65	7	64	8	64	8	S811 / Feasible
R17.18*	951 Oak Avenue	70	70	73 [A/E]	69	4	**67[R]**	**6**	67	6	66	7	65	8	S811 / Feasible
R17.19	991 Pine Avenue - Whispering Pines	72	72	71 [A/E]	66[T]	5	66	5	65	6	65	6	**65[R]**	**6**	S811 / Feasible
R17.20*	3316 Harding Street	69	69	70 [A/E]	66	4	65	5	64	6	64	6	**64[R]**	**6**	S811 / Feasible
R17.21*	3330 Harding Street - Camino Point	61	61	63 [N]	--	--	--	--	--	--	--	--	--	--	--
R17.22*	3332 Harding Street - Camino Point	64	64	66 [A/E]	63	3	63	3	62	4	62	4	**61[R]**	**5**	S811 / Feasible
R17.23	3350 Harding Street	71	71	72 [A/E]	67	5	65[T]	7	65	7	64	8	**64[R]**	**8**	S811 / Feasible
R17.24*	3460 Harding Street	67	70	72 [A/E]	68	4	**67[R]**	**5**	65	7	64	8	64	8	S811 / Feasible
R17.25	945 Chestnut Avenue	70	73	74 [A/E]	68[T]	6	**67[R]**	**7**	66	8	65	9	65	9	S811 / Feasible
R17.26*	910 Palm Avenue	67	70	72 [A/E]	68	4	**67[R]**	**5**	66	6	65	7	64	8	S811 / Feasible
R17.27	930 Palm Avenue	67	70	72 [A/E]	68[T]	4	**67[R]**	**5**	65	7	65	7	64	8	S811 / Feasible
R17.28	3630 Harding Street	73	74	76 [A/E]	**69[R]**	**7**	68	8	67	9	66	10	65	11	S811 / Feasible
R17.29	930 Magnolia Avenue	72	73	76 [A/E]	**69[R,T]**	**7**	68	8	67	9	66	10	65	11	S811 / Feasible
R17.30*	3696 Harding Street	71	72	75 [A/E]	**70[R]**	**5**	69	6	68	7	66	9	65	10	S811 / Feasible
R17.31	901 Harding Street	72	73	74 [A/E]	71	3	70	4	**69[R,T]**	**5**	67	7	66	8	S811 / Feasible
R17.32	3748 Harding Street	72	73	76 [A/E]	73	3	71[T]	5	**70[R]**	**6**	68	8	67	9	S811 / Feasible
R17.33	3736 Harding Street	72	72	75 [A/E]	71	4	69[T]	6	**68[R]**	**7**	67	8	66	9	S811 / Feasible
R17.34	3836 Harding Street	74	74	77 [A/E]	70[T]	7	68	9	**67[R]**	**10**	66	11	65	12	S811 / Feasible

[1] – $L_{eq}(h)$ is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC. NAC for Activity Category B = 67 dBA.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
* – Non first-row receiver.

Table 3.15.36: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 17

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S810	R17.1A – R17.2, R17.4 – R17.15	10 SFR, 16 MFR (2 Hotel Pools), 1 Church, 1 Daycare, School and Park (13 Frontage Units)	R/W to Shoulder /NB	10 ft to 16 ft / 3829 ft	$1,178,176	$2,214,000	Reasonable	Recommended
S811	R17.17 – R17.20, R17.22 – R17.34	28 SFR and 116 MFR	Shoulder /SB	10 ft / 3937 ft	$1,181,326	$7,776,000	Reasonable	Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence
R/W – right-of-way

SEGMENT 18 – Carlsbad Village Drive to Vista Way (SR-78)

Areas with Noise Abatement

Table 3.15.37 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.38* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 18 are shown in *Figures 2-2.3, Sheets 54* through *56*. The following paragraphs describe the preliminary abatement decisions for Segment 18.

Soundwall S818: Soundwall S818 would be located along the northbound side of I-5, just north of Carlsbad Village Drive. This soundwall would provide a feasible reduction in highway traffic noise for one single-family residence, represented by Receptor R18.1 (*Table 3.15.37*). There are no apparent easements that would need to be acquired in order to construct S818. Soundwall S818 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.38*). Therefore, S818 would not be recommended (*Table 3.15.38*).

Soundwall S821: Soundwall S821 would be located on Caltrans right-of-way along the southbound side of I-5, between Carlsbad Village Drive and Las Flores Drive. Soundwall S821 would provide a feasible reduction in highway traffic noise for 17 single-family residences and 34 multi-family residences, represented by Receptors R18.15 through R18.20, R18.22, R18.24, and R18.25. The soundwall would be partially founded on a retaining wall, and would replace an existing 8-ft-high soundwall, which would be partially demolished for the proposed project. Soundwall S821 would be reasonable to construct due to the estimated construction cost being lower than the reasonable allowance; therefore, S821 would be recommended (*Table 3.15.38*).

Soundwall S822: Soundwall S822 would be located on Caltrans right-of-way and along the shoulder of northbound I-5, between Carlsbad Village Drive and Las Flores Drive. Soundwall S822 would provide a feasible reduction in highway traffic noise for 14 single-family residences, represented by Receptors R18.1A through R18.3, R18.5, and R18.7. Soundwall S822 would also benefit a recreational area represented by Receptor R18.2A. Receptors 18.1A, R18.2, R18.2A, and R18.3 are predicted to be severely impacted by the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.37*). There are no apparent easements that would need to be acquired in order to construct S822. Soundwall S822 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.38*). However, S822 would be recommended in order to abate for the severely impacted receptors (*Table 3.15.38*).

Soundwall S826: Soundwall S826 would be located on Caltrans right-of-way, along the northbound side of I-5, just north of Las Flores Drive. The soundwall would provide a feasible reduction in highway traffic noise for one single-family residence, represented by Receptor R18.7A (*Table 3.15.37*). Receptor R18.7A is predicted to be severely impacted by proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.37*). Soundwall S826 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.38*). However, S826 would be recommended in order to abate for the severely impacted receptor (*Table 3.15.38*).

Soundwall S827: Soundwall S827 would be located on Caltrans right-of-way, along the southbound side of I-5, just north of Las Flores Drive. The soundwall would provide a feasible reduction in highway traffic noise for three single-family residences, represented by Receptors R18.11 through R18.13 (*Table 3.15.37*). Receptor R18.11 is predicted to be severely impacted by the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.37*). Soundwall S827 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.38*). However, S827 would be recommended in order to abate for the severely impacted receptor (*Table 3.15.38)*.

Soundwall S829: Soundwall S829 would be located on Caltrans right-of-way along the southbound side of I-5, south of Vista Way/SR-78. The soundwall would provide a feasible reduction in highway traffic noise for one single-family residence, represented by Receptor R18.10 (*Table 3.15.37*). Soundwall S829 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance; therefore, S829 would not be recommended (*Table 3.15.38*).

Areas without Noise Abatement

Several areas in Segment 18 would be impacted by the proposed project, but would not be feasible to abate with standard noise abatement techniques. The receptor locations for these areas and the explanation for non-abatement are described in the following paragraphs.

Receptor R18.14: A soundwall would not be feasible for this receptor (residence).

Receptors R18.8 and R18.9: These receptors are located on the northbound side of I-5 just south of Jefferson Street. It would not be feasible to abate for highway traffic noise in this area because the freeway extends across the lagoon at a much lower elevation than the receptors (*Table 3.15.37*).

Receptor R18.27: Receptor R18.27 represents a single-family residence located on the southbound side of I-5. A soundwall would not be feasible for this residence due to the geometry of the site and shielding provided by first-row buildings (*Table 3.15.37*).

Table 3.15.37: Predicted Future Noise Levels and Soundwall Feasibility for Segment 18

Receiver No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]												Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										
					8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Carlsbad Village Drive to Vista Way (SR-78) – NB															
R18.1	1192 Laguna Drive	66	71	73 [A/E]	72	1	71	2	70 [T]	3	69	4	**68** [R]	**5**	S818 / Feasible
R18.1A	1239 Knowles Avenue	69	74	76 [A/E]	75	1	74	2	73 [T]	3	**71** [R]	**5**	70	6	S822 / Feasible
R18.2	1220 Knowles Avenue	69	74	76 [A/E]	74	2	73	3	72 [T]	4	**71** [R]	**5**	69	7	S822 / Feasible
R18.2A	Park - Pio Pico Drive	71	76	79 [A/E]	75	4	74	5	72 [T]	7	**71** [R]	**8**	70	9	S822 / Feasible
R18.3*	1255 Cynthia Lane	69	74	76 [A/E]	74	2	73	3	72 [T]	4	**70** [R]	**6**	69	7	S822 / Feasible
R18.4*[K]	Buena Vista Elementary School	58	63	65 [N]	63	2	62	3	62	3	61	4	60	5	S822 / Feasible
R18.5	Buena Vista Elementary School - Baseball Field	67	72	74 [A/E]	72	2	71	2	70 [T]	4	**69** [R]	**5**	68	6	S822 / Feasible
R18.6*	1291 Las Flores Drive	65	70	72 [A/E]	70	2	70	5	69	3	68	4	67	5	Not Feasible
R18.7	1277 Las Flores Drive	67	72	74 [A/E]	72 [T]	2	70	4	69	5	**68** [R]	**6**	67	7	S822 / Feasible
R18.7A	1288 Las Flores Drive	68	73	75 [A/E]	71	4	**70** [R,T]	**5**	68	7	67	8	65	10	S826 / Feasible
R18.8*	2351 Pio Pico Drive	60	65	67 [A/E]	66	1	66	1	65	2	65	2	65	2	Not Feasible
R18.9	2347 Pio Pico Drive	62	67	69 [A/E]	68	1	68	1	67	2	67	2	67	2	Not Feasible
Carlsbad Village Drive to Vista Way (SR-78) – SB															
R18.10	2363 Jefferson Street	71	72	73 [A/E]	69	4	69	4	69	4	69	4	**68** [R]	**5**	S829 Feasible
R18.11[F]	2380 Jefferson Street	68	70	76 [A/E]	71 [T]	5	70	6	68	8	67	9	**66** [R]	**10**	S827 / Feasible
R18.12	2386 Jefferson Street	69	71	73 [A/E]	69 [T]	4	68	5	67	6	66	7	**66** [R]	**7**	S827 / Feasible
R18.13	1100 Las Flores Drive	67	69	71 [A/E]	68 [T]	3	67	4	67	4	67	4	**66** [R]	**5**	S827 / Feasible
R18.14[K]	2415 Tuttle Street	62	64	66 [A/E]	64	2	64	2	64 [T]	2	63	3	63	3	Not Feasible
R18.15[K]	2435 Tuttle Street	63	65	67 [A/E]	64	3	64	3	63 [T]	4	**62** [R]	**5**	62	5	S821 / Feasible
R18.16[K]	2443 Tuttle Street	65	67	69 [A/E]	65 [T]	4	64	5	63	6	**63** [R]	**6**	62	7	S821 / Feasible
R18.17	2443 Tuttle Street	67	73	76 [A/E]	71 [T]	5	70	6	69	7	**69** [R]	**7**	67	9	S821 / Feasible
R18.18[D]	1111 Buena Vista Way	69	72	78 [A/E]	74 [T]	4	72	6	**70** [R]	**8**	69	9	68	10	S821 / Feasible
R18.19[D,K]	2501 Davis Avenue	63	66	71 [A/E]	68	3	67	4	**66** [R]	**5**	65	6	64	7	S821 / Feasible
R18.20[D]	2530 Davis Avenue	71	74	79 [A/E]	75 [T]	4	73	6	**72** [R]	**7**	72	7	69	10	S821 / Feasible
R18.21*[D,K]	2590 Davis Avenue	63	66	69 [A/E]	68	1	67	2	66	3	65	4	63	6	S821 / Feasible
R18.22[D]	1148 Knowles Avenue	70	73	82 [A/E]	75 [T]	7	73	9	**71** [R,T]	**11**	71	11	68	14	S821 / Feasible
R18.23*[D]	1088 Laguna Drive - Carlsbad Retirement Community - Pool Area	61	62	65 [N]	--	--	--	--	--	--	--	--	--	--	--
R18.24[D]	1088 Laguna Drive - Carlsbad Retirement Community	70	71	78 [A/E]	--	--	74	4	**73** [R,T]	**5**	71	7	73	5	S821 / Feasible
R18.25[D]	1088 Laguna Drive - Carlsbad Retirement Community	71	72	78 [A/E]	--	--	73 [T]	5	**72** [R]	**6**	70	8	69	9	S821 / Feasible
R18.26	Extended Stay America - Pool Area	58	63	64 [N]	--	--	--	--	--	--	--	--	--	--	--
R18.27	1022 Grand Avenue	64	69	71 [A/E]	71	0	71	0	70	1	70	1	69 [T]	2	Not Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[F] – The existing and future "No Build" noise levels at this location include benefits of an existing wooden fence.
[D] – Project "Build" without soundwall does not include the benefits of an existing wall, which would be demolished for the proposed project.
[K] – A shielding factor of 5 dB has been applied to these receptors to account for attenuation by first-row buildings.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
* – Non first-row receiver.

Table 3.15.38: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 18

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S818	R18.1	1 SFR	Shoulder /NB	16 ft / 2208 ft	$503,671	$48,000	Not Reasonable	Not Recommended
S821	R18.15-R18.20, R18.21, R18.22, R18.24, and R18.25	17 SFR and 34 MFR	R/W to Shoulder /SB	12 ft to 14 ft / 2218 ft	$989,690	$2,550,000	Reasonable	Recommended
S822	R18.1A – R18.3, R18.5 and R18.7	16 SFR, REC (5 Frontage Units)	R/W to Shoulder /NB	16 ft to 14 ft / 2211 ft	$1,100,582	$1,064,000	Not Reasonable	Recommended for SI[3]
S826	R18.7A	1 SFR	R/W / NB	10 ft / 433 ft	$336,866	$50,000	Not Reasonable	Recommended for SI[3]
S827	R18.11 – R18.13	3 SFR	R/W /SB	16 ft / 584 ft	$647,845	$168,000	Not Reasonable	Recommended for SI[3]
S829	R18.10	1 SFR	R/W /SB	16 ft / 220 ft	$260,478	$46,000	Not Reasonable	Not Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; REC – recreation facility/park
[2] – Estimated construction cost includes cost of easements
[3] – SI – Severely Impacted
R/W – right-of-way

SEGMENT 19 – Vista Way (SR-78) to Oceanside Boulevard

Areas with Noise Abatement

Table 3.15.39 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.40* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 19 are shown in *Figures 2-2.3, Sheets 56* through *60*. The following paragraphs describe the preliminary abatement decisions for Segment 19.

Soundwall S835: Soundwall S835 would be located on Caltrans right-of-way along the southbound side of I-5, between Vista Way and Cassidy Street. The soundwall would provide a feasible reduction in highway traffic noise for 16 single-family residences, represented by Receptors R19.41 through R19.47. Receptors R19.43, R19.44, and R19.45 are predicted to be severely impacted by the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.39*). Soundwall S835 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.40*). However, S835 would be recommended to abate for the severely impacted receptors (*Table 3.15.40*).

Soundwall S836: Soundwall S836 would be located on Caltrans right-of-way, along the northbound side of I-5 between Vista Way and Cassidy Street. The soundwall would provide a feasible reduction in highway traffic noise for three single-family residences represented by Receptors R19.1 through R19.3 (*Table 3.15.39*). Receptors R19.1 and R19.2 are predicted to be severely impacted by the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.39*). Soundwall S836 would replace an existing 7-ft-high soundwall at this location, and would be partially founded on a proposed retaining wall. There are no apparent easements that would need to be acquired in order to construct S836. Soundwall S836 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.40*). However, S836 would be recommended in order to abate for the severely impacted receptors (*Table 3.15.40*).

Soundwall S840: Soundwall S840 would be located on Caltrans right-of-way and along the northbound side of I-5, between Cassidy Street and California Street. The soundwall would provide a feasible reduction in highway traffic noise for 12 single-family residences represented by Receptors R19.6A through R19.8 (*Table 3.15.39*). Receptor R19.7 is predicted to be severely impacted by the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.39*). There is also an existing soundwall of varying heights that would be partially removed and replaced by the proposed project. The replacement of this wall would decrease the noise level for R19.7 to below the severely impacted level of 75 dBA. There are no apparent easements that would need to be acquired in order to construct S840. Soundwall S840 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance, and, therefore, would not be recommended (*Table 3.15.40*).

Soundwall S841: Soundwall S841 would be located on Caltrans right-of-way, along the southbound side of I-5, between Cassidy Street and California Street. The soundwall would provide a feasible reduction in highway traffic noise for 17 single-family residences represented by Receptors R19.30 through R19.33, R19.35, R19.36, R19.39, and R19.40, as well as the recreational facility represented by Receptor R19.37 (*Table 3.15.39*). Receptors R19.30, R19.31, R19.35 through R19.37 are predicted to be severely impacted by the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.39*). Soundwall S841 would be partially founded on a retaining wall, and would replace an existing 6-ft-high wooden fence. Soundwall S841, including all costs for easements, would not be reasonable to construct (*Table 3.15.40*). However, S841 would be recommended in order to abate for the severely impacted receptors (*Table 3.15.40*).

Soundwall S845: Soundwall S845 would be located on Caltrans right-of-way and private property, along the southbound side of I-5, north of California Street. Soundwall S845 would provide a feasible reduction in highway traffic noise for 10 single-family residences, represented by Receptors R19.25 through R19.28 (*Table 3.15.39*). Receptors R19.26 through R19.28 are predicted to be severely impacted by the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.39*). Soundwall S845 would replace an existing 6-ft-high soundwall at this location, and would be partially founded on a proposed retaining wall. The estimated construction cost of S845, including all easement costs, would be less that the reasonable cost allowance and so would be considered reasonable to construct *(Table 3.15.40*). Therefore, Soundwall S845 would be recommended (*Table 3.15.40*).

Soundwall S846: Soundwall S846 would be located on Caltrans right-of-way and private property, along the northbound side of I-5 between California Street and Oceanside Boulevard. The soundwall would provide a feasible reduction in highway traffic noise for 18 single-family residences, represented by Receptors R19.12 through R19.18. Receptors R19.12, R19.14 through R19.16, and R19.18 are predicted to be severely impacted by the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.39*). Cost of acquisition for right-of-way is assumed to be $391,340 for this wall, and when added to the construction cost, it exceeds the reasonable allowance. If the estimated construction cost could not be reduced to less than or equal to the reasonable allowance, the preliminary recommendation would be to construct S846 to abate highway traffic noise for the severely impacted residences (*Table 3.15.40*).

Soundwall S849: Soundwall S849 would be located on Caltrans right-of-way, along the southbound side of I-5, just south of Oceanside Boulevard. The soundwall would provide a feasible reduction in highway traffic noise for 20 mobile homes and a clubhouse, represented by Receptors R19.20 through R19.24 (*Table 3.15.39)*. Soundwall S849 would be reasonable to construct due to the estimated construction cost being lower than the reasonable allowance (*Table 3.15.40*). Therefore, S849 would be recommended (*Table 3.15-40*).

Areas without Noise Abatement

Receptors R19.19 and R19.19A: Receptors R19.19 and R19.19A represent 18 mobile homes. Lengthening Soundwall S849 across the I-5/Oceanside Boulevard overcrossing would not provide the required 5 dBA attenuation for the soundwall to be considered feasible.

Table 3.15.39: Predicted Future Noise Levels and Soundwall Feasibility for Segment 19

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]		Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)										Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Vista Way (SR-78) to Oceanside Boulevard – NB															
R19.1A	North Coast United Methodist Church	59	61	63[N]	--	--	--	--	--	--	--	--	--	--	--
R19.1[G]	1504 Kelly Street	68	70	75[A/E]	71[T]	4	71	4	70	5	**69[R]**	**6**	69	6	S836 / Feasible
R19.2[G]	1501 Krim Place	69	71	76[A/E]	72[T]	4	70	6	69	7	**68[R]**	**8**	68	8	S836 / Feasible
R19.3[W]	1506 Krim Place	68	70	73[A/E]	71[T]	2	70	3	69	4	**68[R]**	**5**	67	6	S836 / Feasible
R19.4*[W]	1510 Krim Place	67	69	71[A/E]	70	1	69	2	68	3	67	4	67	4	Not Feasible
R19.5[W]	1534 Cassidy Street	69	69	71[A/E]	70[T]	1	69	2	69	2	68	3	68	3	Not Feasible
R19.5A[W,K]	1734 Soto Street	62	62	65[N]	--	--	--	--	--	--	--	--	--	--	--
R19.6[W]	1734 Soto Street	70	70	72[A/E]	71[T]	1	69	3	68	4	67	5	66	6	Not Feasible
R19.6A[W]	1507 Whaley Street	72	72	73[A/E]	--	--	71	2	70	3	69	4	**68[R]**	**5**	S840 / Feasible
R19.7[G]	1613 Lopez Street	67	74	75[A/E]	--	--	75[T]	0	73	2	71	4	**70[R]**	**5**	S840 / Feasible
R19.8[G]	1601 Lopez Street	66	73	74[A/E]	--	--	--	--	72	2	70	4	**69[R]**	**5**	S840 / Feasible
R19.9[G]	1501 Valencia Street	70	69	71[A/E]	--	--	--	--	69	2	68	3	68	3	Not Feasible
R19.10[W]	1501 California Street	69	68	70[A/E]	--	--	--	--	69	1	68	2	68	2	Not Feasible
R19.11*[W,K]	1511 California Street	64	63	65[N]	--	--	--	--	--	--	--	--	--	--	--
R19.12[F]	1504 California Street	69	72	76[A/E]	73	3	71[T]	5	**69[R]**	**7**	68	8	66	10	S846 / Feasible
R19.13*[F,K]	1516 California Street	59	61	66[A/E]	63	3	62	4	**61[R]**	**5**	60	6	59	7	S846 / Feasible
R19.14[F]	1463 Belleare Street	68	71	75[A/E]	71	4	70	5	**68[R]**	**7**	67	8	66	9	S846 / Feasible
R19.15[F]	1431 Belleare Street	68	71	76[A/E]	71	5	**69[R]**	**7**	68	8	67	9	65	11	Private Property
R19.16[F]	1499 Grandville Drive	73	74	77[A/E]	74	3	**72[R,T]**	**5**	70	7	68	9	67	10	S846 / Feasible
R19.17	1326 Selma Drive	69	70	72[A/E]	**66[R,T]**	**6**	65	7	65	7	64	8	64	8	S846 / Feasible
R19.18	1508 Mountain View Avenue	73	75	77[A/E]	**72[R,T]**	**5**	71	6	69	8	68	9	67	10	S846 / Feasible
Vista Way (SR-78) to Oceanside Boulevard – SB															
R19.19	Cavalier Mobile Estates	69	72	70[A/E]	69	1	68[T]	2	68	2	68	2	67	3	Not Feasible
R19.19A*[K]	Cavalier Mobile Estates	64	65	66[A/E]	64[T]	2	63	3	62	4	62	4	62	4	Not Feasible
R19.20	Cavalier Mobile Estates	68	69	71[A/E]	68[T]	3	67	4	**65[R]**	**6**	65	6	65	6	S849 / Feasible
R19.21*	Cavalier Mobile Estates	69	70	69[A/E]	66[T]	3	66	3	65	4	**64[R]**	**5**	64	5	S849 / Feasible
R19.22*	Cavalier Mobile Estates	64	65	65[N]	62	3	61	4	60	5	**60[R]**	**5**	59	6	S849 / Feasible
R19.23*[K]	Cavalier Mobile Estates	62	63	65[N]	62	3	61	4	60	5	**60[R]**	**5**	59	6	S849 / Feasible
R19.24*	Cavalier Mobile Estates	68	69	69[A/E]	66[T]	3	65	4	64	5	**64[R]**	**5**	63	6	S849 / Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[D] – Project "Build" without soundwall does not include the benefits of an existing wall, which would be demolished for the proposed project.
[F] – The existing and future "No Build" noise levels at this location include benefits of an existing wooden fence.
[G] – The existing and future noise levels at this receiver include the benefits of a soundwall that would be demolished and rebuilt for highway construction.
[K] – A shielding factor of 5 dB has been applied to these receptors to account for attenuation by first-row buildings.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future noise levels at this receiver include the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.39 (cont): Predicted Future Noise Levels and Soundwall Feasibility for Segment 19

Receptor No.	Site Address	Existing Noise Levels[1] Leq(h), dBA	Future Peak Hour Noise Levels, Leq(h), dBA[1,2] Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.) 8 ft Leq(h)	8 ft I.L.	10 ft Leq(h)	10 ft I.L.	12 ft Leq(h)	12 ft I.L.	14 ft Leq(h)	14 ft I.L.	16 ft Leq(h)	16 ft I.L.	Soundwall No. / Feasibility
Vista Way (SR-78) to Oceanside Boulevard – SB															
R19.25[H]	1246 Laguna Street	66	67	73 [A/E]	**68**[R,T]	**5**	67	6	66	7	66	7	65	8	S845 / Feasible
R19.26[H]	1426 Moreno Street	69	70	77 [A/E]	**70**[R,T]	**7**	69	8	68	9	67	10	66	11	S845 / Feasible
R19.27[H]	1464 Moreno Street	70	70	78 [A/E]	**72**[R,T]	**6**	70	8	69	9	68	10	67	11	S845 / Feasible
R19.28[H]	1474 Moreno Street	68	69	75 [A/E]	**70**[R,T]	**5**	69	6	68	7	67	8	67	8	S845 / Feasible
R19.29*[H]	1482 Moreno Street	66	67	71 [A/E]	68	3	68	3	67	4	66	5	65	6	Not Feasible
R19.30[H]	1303 Moreno Street	73	74	79 [A/E]	74[T]	5	**72**[R]	**7**	71	8	69	10	68	11	S841 / Feasible
R19.31[H]	1309 Kerr Way	75	76	80 [A/E]	74[T]	6	**72**[R]	**8**	70	10	69	11	68	12	S841 / Feasible
R19.32[K]	1601 Griffin Street	67	67	70 [A/E]	68[T]	2	67	3	66	4	**65**[R]	**5**	64	6	S841 / Feasible
R19.33[H2]	1613 Griffin Street	60	61	64 [N]	63[T]	1	62	2	61	3	**59**[R]	**5**	58	6	S841 / Feasible
R19.34[K2]	1637 Griffin Street	60	61	64 [N]	63[T]	1	63	1	61	3	60	4	59	5	Not Feasible
R19.35	1637 Griffin Street	71	73	78 [A/E]	75[T]	3	74	4	72	6	**71**[R]	**7**	71	7	S841 / Feasible
R19.36[D]	1256 Alderney Court	69	71	76 [A/E]	75[T]	1	74	2	72	4	**71**[R]	**5**	70	6	S841 / Feasible
R19.37[D]	1230 Kirmar Place	73	74	80 [A/E]	78[T]	2	76	4	74	6	**72**[R]	**8**	70	10	S841 / Feasible
R19.38*	1252 St Helene Court	68	69	73 [A/E]	72	1	71	2	71	2	69	4	69	4	Not Feasible
R19.39[W]	1257 Chambord Court	66	68	72 [A/E]	71[T]	1	70	2	68	4	**67**[R]	**5**	66	6	S841 / Feasible
R19.40[W]	1241 Chambord Court	65	67	71 [A/E]	69[T]	2	68	3	67	4	**66**[R]	**5**	65	6	S841 / Feasible
R19.41[F]	1230 Kirmar Place	68	68	72 [A/E]	69[T]	3	**67**[R]	**5**	65	7	67	5	63	9	S835 / Feasible
R19.42[F]	1238 Kirmar Place	69	69	73 [A/E]	69	4	**68**[R,T]	**5**	66	7	68	5	64	9	S835 / Feasible
R19.43[H]	1250 Kirmar Place	73	73	81 [A/E]	74[T]	7	**71**[R]	**10**	70	11	71	10	67	14	S835 / Feasible
R19.44[H]	1250 Kirmar Place	73	73	82 [A/E]	74[T]	8	**72**[R]	**10**	70	12	69	13	68	14	S835 / Feasible
R19.45*[H]	1824 Moreno Street	70	70	77 [A/E]	71	6	**70**[R]	**7**	69	8	68	9	67	10	S835 / Feasible
R19.46[K]	1319 Kelly Street	67	67	70 [A/E]	65[T]	5	**63**[R]	**7**	63	7	62	8	61	9	S835 / Feasible
R19.47*[K]	1916 Moreno Street	63	63	66 [A/E]	63	3	62	4	**61**[R]	**5**	60	6	60	6	S835 / Feasible
R19.48	1224 Vista Way	67	67	70 [A/E]	68[T]	2	68	2	67	3	67	3	67	3	Not Feasible
R19.49*[K]	1220 Vista Way	66	61	64 [N]	--	--	--	--	--	--	--	--	--	--	--
R19.50*[K]	1214 Vista Way	65	60	63 [N]	--	--	--	--	--	--	--	--	--	--	--

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[D] – Project "Build" without soundwall does not include the benefits of an existing wall, which would be demolished for the proposed project.
[F] – The existing and future "No Build" noise levels at this location include benefits of an existing wooden fence.
[G] – The existing and future noise levels at this receiver include the benefits of a soundwall that was demolished and rebuilt for highway construction.
[H] – The future noise levels do not include the benefits of a fence that was demolished for highway construction.
[K] – A shielding factor of 5 dB has been applied to these receptors to account for attenuation by first-row buildings.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future noise levels at this receiver include the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.40: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 19

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S835	R19.41 – R19.47	16 SFR	R/W to Shoulder /SB	10 ft and 12 ft / 1430 ft	$991,044	$928,000	Not Reasonable	Recommended for SI[3]
S836	R19.1 – R19.3	3 SFR	R/W to Shoulder / NB	14 ft / 676 ft	$411,945	$156,000	Not Reasonable	Recommended for SI[3]
S840	R19.16A – R19.8	12 SFR	R/W to Shoulder / NB	16 ft / 1390 ft	$677,304	$624,000	Not Reasonable	Not Recommended
S841	R19.30 – R19.33, R19.35 – R19.37, R19.39 and R19.40	17 SFR and 1 REC (5 Frontage Units)	R/W to Shoulder / SB	10 ft and 14 ft / 2083 ft	$1,259,636	$1,188,000	Not Reasonable	Recommended for SI[3]
S845	R19.25 – R19.28	10 SFR	R/W to Private Property / SB	8 ft / 1194 ft	$393,342	$540,000	Reasonable	Recommended
S846	R19.12 – R19.18	18 SFR	R/W to Private Property / NB	8 ft to 12 ft / 1512 ft	$1,347,601	$972,000	Not Reasonable	Recommended for SI[3]
S849	R19.20 – R19.24	20 MH Clubhouse (1 Frontage Unit)	Shoulder / SB	12 ft and 14 ft / 1263 ft	$640,965	$1,050,000	Reasonable	Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; REC – recreation facility/*park*; MH – mobile home
[2] – Estimated construction cost includes cost of easements
[3] – SI – Severely Impacted
R/W – right-of-way

SEGMENT 20 – Oceanside Boulevard to Mission Avenue

Areas with Noise Abatement

Table 3.15.41 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.42* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 20 are shown in *Figures 2-2.3, Sheets 60* through *62*. The following paragraphs describe the preliminary abatement decisions for Segment 20.

Soundwall S855: Soundwall S855 would be located along the shoulder of the southbound side of I-5, north of Oceanside Boulevard. The soundwall would provide a feasible reduction in highway traffic noise for four multi-family residences represented by Receptor R20.23, and one recreational area represented by Receptor R20.25 (*Table 3.15.41*). Receptor R20.21 is predicted to be severely impacted by the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.41*). Soundwall S855 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.42*). Therefore, it would be recommended that S855 not be constructed, and the severely impacted receptor, R20.21, receive individual abatement (*Table 3.15.42*).

Soundwall S859: Soundwall S859 would be located on Caltrans right-of-way along the southbound side of I-5, south of Mission Avenue. The soundwall would provide a feasible reduction in highway traffic noise for one single-family residence represented by Receptor R20.15, as well as one recreational area represented by Receptor R20.13 (*Table 3.15.41*). Receptor R20.13 is predicted to be severely impacted by the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.41*). Soundwall S859 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.42*). It would be recommended that S859 not be constructed as proposed, and the severely impacted receptor, R20.13, receive individual abatement (*Table 3.15.42*).

Soundwall S862: Soundwall S862 would be located on Caltrans right-of-way along the northbound side of I-5, south of Mission Avenue. The soundwall would provide a feasible reduction in highway traffic noise for the Ron Ortega Recreational Park, represented by Receptors R20.1 through R20.3 (*Table 3.15.41*). Receptor R20.2 is predicted to be severely impacted by the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.41*). Soundwall S862 would be partially founded on a retaining wall. Soundwall S862 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.42*). However, S862 would be recommended to abate highway noise for the severely impacted receptor (*Table 3.15.42*).

Soundwall S863: Soundwall S863 would be located on Caltrans right-of-way and shoulder of southbound side of I-5, between Brooks Street and Mission Avenue. The soundwall would provide a feasible reduction in highway traffic noise for six single-family residences represented by Receptors R20.8 and R20.10; five multi-family residences represented by Receptors R20.11; and the Oceanside High School athletic fields represented by Receptors R20.5 through R20.7 (*Table 3.15.41*). Receptor R20.7 is predicted to be severely impacted under the No Build scenario, as well as with the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.41*). Soundwall S863 would be partially founded on a retaining wall, and would replace a portion of an existing 8-ft-high soundwall that would have to be demolished for the proposed improvements. Soundwall S863 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance *(Table 3.15.42*). Construction of S863 would be recommended, however, to provide feasible abatement for Oceanside High School athletic fields (*Table 3.15.42*).

Areas without Noise Abatement

Several areas in Segment 20 would be impacted by the proposed project, but would not be feasible to abate with standard noise abatement techniques. The receptor locations for these areas and the explanation for non-abatement are described in the following paragraphs.

Receptor R20.1A: This receptor is located on the northbound side of I-5 just north of Oceanside Boulevard on the grounds of the Oceanside Center City Golf Course. The results of traffic noise modeling indicate that a soundwall located on the right-of-way would not provide a 5 dB noise reduction for this receptor because the golf course is on top of a bluff overlooking I-5 (*Table 3.15.41*).

Receptor R20.4: This receptor represents the Econo Lodge pool area and is located on the northbound side of I-5, just south of Mission Avenue. The results of traffic noise modeling indicate that a soundwall located on the right-of-way would not provide a 5 dB noise reduction for this receptor because the receptor is shielded by existing commercial structures and the Mission Avenue Bridge abutment (*Table 3.15.41*).

Receptors R20.14 and R20.16: These receptors are located in parking lots and are not outdoor use areas, but were modeled to aide in estimating existing noise levels in this area.

Receptors R20.18 through R20.20 and R20.22: These single-family residences are located on the southbound side of I-5, just south of Missouri Avenue. The results of traffic noise modeling indicate that a soundwall located on the right-of-way would not provide a 5 dB noise reduction because the receptors in this area are located at the top of a bluff above the elevation of the highway. In addition, the front yards of Receptors R20.18 through R20.20 overlook I-5. Receptors R20.18 and R20.20 would also not qualify for noise abatement because the noise levels at these locations do not currently approach or exceed the NAC, nor are they predicted to do so with the proposed build alternatives (*Table 3.15.41*).

Receptor R20.26: This receptor represents the pool area for the Best Western Motel located on the southbound side of I-5, just north of Oceanside Boulevard. The receptor is located in a canyon adjacent to the southbound off-ramp to Oceanside Boulevard and is shielded by the Best Western Hotel. As a result of this shielding, noise levels do not approach or exceed the NAC, nor are they predicted to do so with the proposed build alternatives (*Table 3.15.41*).

Table 3.15.41: Predicted Future Noise Levels and Soundwall Feasibility for Segment 20

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					8 ft		10 ft		12 ft		14 ft		16 ft			
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.		
Oceanside Boulevard to Mission Avenue – NB																
R20.1	Ron Ortega Recreation Park	73	72	74[A/E]	71	3	71[T]	3	70	4	**69[R]**	**5**	69	5	S862 / Feasible
R20.1A	Oceanside Center City Golf Course	66	65	67[A/E]	65	2	65	2	64	3	64	3	63	4	Not Feasible
R20.2	Ron Ortega Recreation Park	76	75	77[A/E]	75	2	73	4	**71[R,T]**	**6**	70	7	69	8	S862 / Feasible
R20.3	Ron Ortega Recreation Park	72	71	73[A/E]	70	3	69[T]	4	**68[R]**	**5**	67	6	66	7	S862 / Feasible
R20.4	Econo Lodge - Pool Area	71	70	68[A/E]	67	1	66	2	65[T]	3	65	3	64	4	Not Feasible
Oceanside Boulevard to Mission Avenue – SB															
R20.5	Oceanside High School - Parking Lot	72	72	73[A/E]	70	3	69[T]	4	**67[R]**	**6**	66	7	65	8	S863 / Feasible
R20.6	Oceanside High School - Track Field	69	69	71[A/E]	69	2	68	3	67[T]	4	**66[R]**	**5**	64	7	S863 / Feasible
R20.7	Oceanside High School - Tennis Courts	75	75	77[A/E]	75	2	74[T]	3	72	5	**70[R]**	**7**	69	8	S863 / Feasible
R20.8[W]	302 Grant Street	73	73	74[A/E]	--	--	73[T]	1	71	3	70	4	**69[R]**	**5**	S863 / Feasible
R20.9[G,K]	310 Grant Street	66	66	67[A/E]	--	--	66	1	65	2	63	4	63	4	Not Feasible
R20.10[G,K]	309 Garfield Street	67	67	68[A/E]	--	--	67[T]	1	65	3	64	4	**63[R]**	**5**	S863 / Feasible
R20.11[W]	326 Garfield Street	73	73	74[A/E]	--	--	72	2	70	4	69	5	**67[R]**	**7**	S863 / Feasible
R20.12[W,K]	341 Brooks Street	65	65	66[A/E]	--	--	65	1	63	3	62	4	62	4	Not Feasible
R20.13	402 Brooks Street	73	73	75[A/E]	70[T]	5	70	5	**70[R]**	**5**	67	8	66	9	S859 / Feasible
R20.14	410 Brooks Street	72	72	74[A/E]	69[T]	5	68	6	68	6	67	7	66	8	Not Feasible
R20.15[K]	422 Brooks Street	65	65	67[A/E]	63[T]	4	63	4	**62[R]**	**5**	61	6	60	7	S859 / Feasible
R20.16	426 Brooks Street - Parking Lot	75	75	77[A/E]	71[T]	6	69	8	68	9	67	10	66	11	Not Feasible
R20.17*[K]	1516 Missouri Avenue	63	63	65[N]	62	3	61	4	61	4	60	5	60	5	Not Feasible
R20.18[K]	505 Vine Street	63	63	65[N]	--	--	--	--	--	--	--	--	--	--	--
R20.19[K]	519 Vine Street	64	64	66[A/E]	65	1	64	2	64	2	63	3	63[T]	3	Not Feasible
R20.20*[K]	533 Vine Street	63	63	65[N]	--	--	--	--	--	--	--	--	--	--	--
R20.21	524 Vine Street	73	74	76[A/E]	75	1	75	1	75	1	74	2	72[T]	4	Not Feasible
R20.22	534 Vine Street	71	72	74[A/E]	74	0	73	1	73	1	72	2	72[T]	2	Not Feasible
R20.23	Village North Apartments - Vine Street	69	70	69[A/E]	65[T]	4	65	4	64	5	**63[R]**	**6**	62	7	S855 / Feasible
R20.24	Village North Apartments - Vine Street	59	60	62[N]	--	--	--	--	--	--	--	--	--	--	--
R20.25	Ocean Breeze Senior Apartments	65	66	69[A/E]	65[T]	4	**64[R]**	**5**	64	5	62	7	61	8	S855 / Feasible
R20.26	Best Western - Pool Area	69	60	63[N]	--	--	--	--	--	--	--	--	--	--	--

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[G] – The existing and future noise levels at this receiver include the benefits of a soundwall that would be demolished and rebuilt for highway construction.
[K] – A shielding factor of 5 dB has been applied to these receptors to account for attenuation by first-row buildings.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future noise levels at this receiver include the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.42: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 20

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S855	R20.23 and R20.25	4 MFR and 1 REC (1 Frontage Unit)	Shoulder / SB	10 ft and 14 ft / 1389 ft	$720,150	$180,000	Not Reasonable	Not Recommended
S859	R20.13 and R20.15	1 SFR and 1 REC (1 Frontage Unit)	R/W / SB	12 ft / 814 ft	$618,046	$96,000	Not Reasonable	Not Recommended, Individual Abatement for SI[3]
S862	R20.1 – R20.3	REC (6 Frontage Units)	R/W / NB	12 ft and 14 ft / 807 ft	$506,051	$300,000	Not Reasonable	Recommended for SI[3]
S863	R20.5 – R20.8, R20.10 and R20.11	6 SFR, 5 MFR, and 1 SCH (15 Frontage Units)	R/W / SB	12 ft to 16 ft / 2189 ft	$1,989,486	$1,300,000	Not Reasonable	Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; SCH – school; REC – recreational
[2] – Estimated construction cost includes cost of easements
[3] – SI – Severely Impacted
R/W – right-of-way

SEGMENT 21 – Mission Avenue to SR-76

Areas with Noise Abatement

Table 3.15.43 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.44* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 21 are shown in *Figures 2-2.3, Sheets 62* through *64*. The following paragraphs describe the preliminary abatement decisions for Segment 21.

Soundwall S868: Soundwall S868 would be located on Caltrans right-of-way along the northbound side of I-5, between Mission Avenue and Civic Center Drive. The soundwall would provide a feasible reduction from highway traffic noise for eight single- and two multi-family residences, represented by Receptors R21.3 through R21.5 (*Table 3.15.43*). Soundwall S868 would be reasonable to construct due to the estimated construction cost being lower than the reasonable allowance; therefore, S868 would be recommended (*Table 3.15.44*).

Soundwall S871: Soundwall S871 would be located on Caltrans right-of-way, along the southbound side of I-5 between, between Mission Avenue and SR-76. The soundwall would provide a feasible reduction in highway traffic noise for 6 single- and 14 multi-family residences, represented by Receptors R21.12 through R21.17, and a community garden and playground represented by Receptors R21.18 and R21.20 (*Table 3.15.43*). Receptors R21.14, R21.18, and R21.20 are predicted to be severely impacted under the No Build scenario, as well as the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.43*). Soundwall S871 would be reasonable to construct due to the estimated construction cost being lower than the reasonable allowance; therefore, S871 would be recommended (*Table 3.15.44*).

Soundwall S875: Soundwall S875 would be located on Caltrans right-of-way along the southbound side of I-5, just south of the I-5 / SR-76 Interchange. The soundwall would provide a feasible reduction in highway traffic noise for four single-family residences represented by Receptors R21.10 and R21.11, and for the pool area at the Comfort Suites Hotel represented by Receptor R21.9 (*Table 3.15.43*). The proposed soundwall would be partially founded on a retaining wall. Soundwall S875 would not be reasonable to construct due to the estimated construction cost exceeding the reasonable allowance (*Table 3.15.44*). Therefore, S875 would not be recommended (*Table 3.15.44*).

Areas without Noise Abatement

Several areas in Segment 21 would be impacted by the proposed project, but would not be feasible to abate with standard noise abatement techniques. The receptor locations for these areas and the explanation for non-abatement are described in the following paragraphs.

Receptors R21.1 and R21.2: These receptors are located on the northbound side of I-5 just north of Mission Avenue. It would not be feasible to achieve a 5 dB benefit for Receptor R21.1 because of its distance from the highway (*Table 3.15.43*). A soundwall would not be considered on private property for Receptor R21.1, because constructing a soundwall on private property would not be considered practical for only one receptor.

Receptor R21.2 would not qualify for noise abatement because noise levels at this location do not approach or exceed the NAC (*Table 3.15.43*). This is due to the distance from the highway and from shielding by neighboring houses.

Receptors R21.6, R21.8, and R21.8A: These receptors are located on the northbound side of I-5 just north of Bush Street. A soundwall would not provide a feasible noise reduction in this area because the receptors are located on a bluff above the elevation of the highway, and the soundwall would divide two private properties (*Table 3.15.43*).

Table 3.15.43: Predicted Future Noise Levels and Soundwall Feasibility for Segment 21

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No. / Feasibility
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					8 ft		10 ft		12 ft		14 ft		16 ft		
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
Mission Avenue to SR-76 – NB																
R21.1	1402 Olive Street	67	67	68[A/E]	68	0	67[T]	1	67	1	67	1	66	2	Not Feasible
R21.2[K]	1348 Buena Street	62	61	63[N]	--	--	--	--	--	--	--	--	--	--	--
R21.3[K]	1330 Buena Street	65	64	66[A/E]	64	2	63[T]	3	63	3	62	4	**61[R]**	**5**	S868 / Feasible
R21.4[K]	1316 Buena Street	67	66	68[A/E]	66	2	65	3	64[T]	4	63	5	**63[R]**	**5**	S868 / Feasible
R21.5*	1307 Bush Street	78	73	74[A/E]	71[T]	3	70	4	69	5	68	6	**68[R]**	**6**	S868 / Feasible
R21.6	1304 Bush Street	70	70	71[A/E]	69	2	69	2	68	3	68	3	67[T]	4	Not Feasible
R21.7*[K]	1310 Bush Street	64	64	65[N]	64	1	63	2	63	2	62	3	62[T]	3	Not Feasible
R21.8	1305 Higgins Street	69	69	71[A/E]	69	2	69	2	68	3	67	4	67[T]	4	Not Feasible
R21.8A	1308 Higgins Street	67	67	69[A/E]	68	1	67	2	67	2	66	3	65[T]	4	Not Feasible
Mission Avenue to SR-76 – SB																
R21.9	Comfort Suites - Pool Area	65	68	71[A/E]	68	3	67	4	64[T]	7	**64[R]**	**7**	63	8	S875 / Feasible
R21.10[K]	708 Neptune Way	61	64	66[A/E]	65	1	64	2	63	3	62	4	**61[R]**	**5**	S875 / Feasible
R21.11	712 Neptune Way	68	71	73[A/E]	71	2	70	3	69	4	67[T]	6	**66[R]**	**7**	S875 / Feasible
R21.12*[K]	715 N Clementine Street	64	64	66[A/E]	62	4	**61[R]**	**5**	60	6	59	7	58	8	S871 / Feasible
R21.13[K]	908 Windward Way	68	68	70[A/E]	65[T]	5	**64[R]**	**6**	63	7	61	9	60	10	S871 / Feasible
R21.14	710 N Clementine Street	76	75	78[A/E]	73[T]	5	**71[R]**	**7**	69	9	68	10	67	11	S871 / Feasible
R21.15*[K]	613 North Horne Street	63	73	65[N]	61	4	**60[R]**	**5**	**60[R]**	5	59	6	58	7	S871 / Feasible
R21.16[K]	621 North Horne Street	66	66	67[A/E]	63[T]	4	**62[R]**	**5**	**62[R]**	**5**	60	7	60	7	S871 / Feasible
R21.17	606 North Horne Street	71	71	73[A/E]	68[T]	5	**67[R]**	**6**	67	6	66	7	65	8	S871 / Feasible
R21.18	1100 Sportfisher Drive - Playground	76	76	77[A/E]	74[T]	3	**72[R]**	**5**	71	6	70	7	68	9	S871 / Feasible
R21.19*	1100 25C Civic Center Drive	63	63	65[N]	63	2	62	3	62	3	61	4	61	4	Not Feasible
R21.20	Community Garden - Bush Street	75	75	76[A/E]	**71[R,T]**	**5**	69	7	68	8	68	8	67	9	S871 / Feasible

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[K] – A shielding factor of 5 dB has been applied to these receptors to account for attenuation by first-row buildings.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future noise levels at this receiver include the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.44: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 21

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S868	R21.3 – R21.5	8 SFR and 2 MFR	R/W / NB	16 ft / 731 ft	$457,327	$480,000	Reasonable	Recommended
S871	R21.12 – R21.18, and R21.20	6 SFR, 14 MFR and 1 REC (6 Frontage Units)	R/W / SB	8 ft, 10 ft / 1726 ft	$939,468	$1,350,000	Reasonable	Recommended
S875	R21.9 – R21.11	4 SFR and 1 HM	R/W / SB	14 ft, 16 ft / 722 ft	$810,867	$250,000	Not Reasonable	Not Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence; REC – recreation facility/park; HM – hotel/motel
[2] – Estimated construction cost includes cost of easements
R/W – right-of-way

SEGMENT 22 – SR-76 to Wire Mountain Road

Areas with Noise Abatement

Table 3.15.45 includes the existing and future noise levels for each receptor, the site address for each receptor location, and the soundwall feasibility analysis based on the required minimum 5 dB I.L. *Table 3.15.46* includes each feasible soundwall location, height, and length, the number of benefited residences, cost reasonableness, and the preliminary decision to build. Receptor locations for Segment 22 are shown in *Figures 2-2.3, Sheets 64* through *66*. The following paragraphs describe the preliminary abatement decisions for Segment 22.

Soundwall S882: Soundwall S882 would be located along Caltrans right-of-way along the northbound side of I-5, between SR-76 and Capistrano Drive. The soundwall would provide a feasible reduction in highway traffic noise for 11 single-family residences represented by Receptors R22.2 through R22.5 (*Table 3.15.45*). Receptors R22.2, R22.4, R22.4A, and R22.5 are predicted to be severely impacted under the No Build scenario, as well as the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.45*). Soundwall S882 would be reasonable to construct due to the estimated construction cost being lower than the reasonable allowance; therefore, S882 would be recommended (*Table 3.15.46*).

Soundwall S884: Soundwall S884 would be located on Caltrans right-of-way along the northbound side of I-5, between Capistrano Drive and Harbor Drive. The soundwall would provide a feasible reduction in highway traffic noise for nine single-family residences, represented by Receptors R22.6 through R22.8A. Receptors R22.6, R22.7, and R22.8 are predicted to be severely impacted under the No Build scenario, as well as the proposed build alternatives, with noise levels at or higher than 75 dBA (*Table 3.15.45).* Soundwall S884 would be reasonable to construct due to the estimated construction cost being lower than the reasonable allowance; therefore, S884 would be recommended (T*able 3.15.46*).

Areas without Noise Abatement

One area would be impacted by the proposed project, but would not be feasible to abate with standard noise abatement techniques. The receptor location for this area and the explanation for non-abatement are described in the following paragraph.

Receptor R22.12: This receptor represents the second-floor deck area for the Travelodge Motel, just north of Monterey Drive on the southbound side of I-5. It would not be feasible to abate highway traffic noise in this area because the receptor is on a second-floor area overlooking the I-5 (*Table 3.15.45*). The Worldmark Oceanside Harbor Timeshare is located south of Receptor R22.12. This complex has no sensitive outdoor use areas exposed to I-5 traffic noise.

Table 3.15.45: Predicted Future Noise Levels and Soundwall Analysis for Segment 22

Receptor No.	Site Address	Existing Noise Levels[1] L_{eq}(h), dBA	Future Peak Hour Noise Levels, L_{eq}(h), dBA[1,2]													Soundwall No. / Feasible
			Future "No Build"	Project "Build" without Soundwall	Noise Prediction with Soundwall and Soundwall Insertion Loss (I.L.)											
					8 ft		10 ft		12 ft		14 ft		16 ft			
					L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	L_{eq}(h)	I.L.	
SR-76 to Wire Mountain Road – NB																
R22.1*	507 San Luis Rey Drive	72	73	74 [A/E]	73	1	72	2	72	2	71	3	71	3	Not Feasible
R22.2	501 San Luis Rey Drive	80	81	82 [A/E]	76[T]	6	72	10	**69[R]**	**13**	67	15	66	16	S882 / Feasible
R22.3*[K]	514 San Luis Rey Drive	68	69	70 [A/E]	67	3	66	4	**65[R]**	**5**	65	5	64	6	S882 / Feasible
R22.4	512 San Luis Rey Drive	76	76	78 [A/E]	74	4	72	6	**71[R]**	**7**	70	8	69	9	S882 / Feasible
R22.4A	519 Monterey Drive	80	80	81 [A/E]	74	7	73	8	**71[R]**	**10**	70	11	69	12	S882 / Feasible
R22.5	518 Capistrano Drive	75	75	76 [A/E]	72[T]	4	71	5	**70[R]**	**6**	69	7	68	8	S882 / Feasible
R22.6	514 Capistrano Drive	75	75	76 [A/E]	74[T]	2	72	4	**71[R]**	**5**	70	6	69	7	S884 / Feasible
R22.7	510 Sunset Drive	76	76	78 [A/E]	73[T]	5	71	7	**69[R]**	**9**	67	11	66	12	S884 / Feasible
R22.8	512 Sunset Drive	75	75	76 [A/E]	72[T]	4	71	5	**69[R]**	**7**	68	8	67	9	S884 / Feasible
R22.8A*	516 Sunset Drive	72	72	73 [A/E]	70[T]	3	69	4	**68[R]**	**5**	67	6	66	7	S884 / Feasible
SR-76 to Wire Mountain Road – SB																
R22.9[W]	451 Koelper Street	59	58	59 [N]	--	--	--	--	--	--	--	--	--	--	--
R22.10*[K2]	Sandy Shores Mobile Home Park - North Coast	62	64	65 [N]	--	--	--	--	--	--	--	--	--	--	--
R22.11*[K2]	Sandy Shores Mobile Home Park - North Coast	58	60	61 [N]	--	--	--	--	--	--	--	--	--	--	Not Feasible
R22.12	1401 North Coast Highway - Travelodge -	68	70	71 [A/E]	71	0	70	1	69	2	69[T]	2	68	3	Not Feasible
R22.13	1103 North Coast Highway - Guest House Hotel -	57	59	60 [N]	--	--	--	--	--	--	--	--	--	--	--

[1] – L_{eq}(h) is A-weighted, peak hour noise levels in decibels.
[2] – Traffic noise from the freeway only; other local noise sources are not included.
[A/E] – Approaches or Exceeds the NAC of 67 dBA for Activity Category B receptors.
[K] – A shielding factor of 5 dB has been applied to these receptors to account for attenuation by first-row buildings.
[N] – No noise impact.
[R] – Recommended height to meet feasibility requirements of Caltrans Noise Abatement Protocol.
[T] – Minimum height required to block the line-of-sight from the receptor to truck exhaust stacks.
[W] – The existing and future noise levels at this receiver include the benefits of an existing property wall.
* – Non first-row receiver.

Table 3.15.46: Summary of Feasible Soundwalls and Preliminary Abatement Decision for Segment 22

Soundwall No.	Receptor No.	Type[1] and No. of Benefited Residences	Soundwall Location / Hwy Side	Soundwall Height / Total Length	Estimated Construction Cost[2]	Reasonable Total Allowance	Reasonableness	Preliminary Abatement Decision
S882	R22.2 – R22.5	11 SFR	R/W / NB	12 ft / 620 ft	$469,023	$616,000	Reasonable	Recommended
S884	R22.6 – R22.8A	9 SFR	R/W /NB	12 ft / 741 ft	$318,116	$468,000	Reasonable	Recommended

[1] – Land Use: SFR – single-family residence; MFR – multi-family residence
[2] – Estimated construction cost includes cost of easements

Based on the analyses completed to date, Caltrans and FHWA intend to incorporate noise abatement in the form of soundwalls at the above-recommended locations, with varying lengths and heights. Calculations based on preliminary design data indicate the proposed soundwalls would reduce noise levels by at least 5 dBA for approximately 984 residences. If, during final design, it is found that conditions have substantially changed, noise abatement may not be necessary at some locations. The final decision of the noise abatement would be made upon completion of the project design and the public involvement processes.

Also, as noted in this Final EIR/EIS *Executive Summary* several soundwalls for secondary consideration have been identified in *Table ES.18b*. If, following project approval, these walls become "reasonable" to construct (as described above in this section), a conformity analysis would be completed to ensure that the footprints and environmental effects associated with these soundwalls fall within the existing analysis. If the soundwall is not adequately covered under existing analysis, new evaluation would occur under both CEQA and NEPA.

Measures to Minimize Construction Noise

Build Alternatives

Long-term noise exposure descriptors are difficult to quantify due to the intermittent nature of construction noise. Highway construction would be accomplished in several different phases. Information on noise levels for typical construction activities that would be expected in the project area can be found at the following website:
http://www.fhwa.dot.gov/environment/noise/handbook/09.htm.

During the construction period, sensitive receptors close to I-5 may be exposed to high noise levels. Effective noise control during the construction of a project means minimizing noise disturbances to the surrounding community. Construction activities, including utility relocations, would likely generate a temporary, short-term increase in noise. This increase would be temporary and limited to the immediate area surrounding construction and utility relocation activities.

Construction noise would be generated by diesel engine-driven construction equipment used for site preparation and grading; removal of existing pavement; loading, unloading, and placing materials; and paving. Diesel engine-driven trucks also would bring materials to the site and remove the spoils from excavation. Under load conditions, diesel engine noise levels may be 74 to 89 dBA at a distance of 50 ft from the equipment. Occasional pile driving would be performed, which would generate noise levels of 88 to 101 dBA at 50 ft from the equipment (FHWA 2006b). Construction equipment noise is considered a "point source" and is attenuated over distance at a rate of 6 dBA for each doubling of distance. Thus, a noise level of 85 dBA at 50 ft would be 79 dBA at 100 ft and 73 dBA at 200 ft from the source.

During excavating, grading, and paving operations, equipment moves to different locations and goes through varying load cycles. Additionally, there are breaks for the operators and for non-equipment tasks, such as measurement. Although maximum noise levels may be 85 to 90 dBA at a distance of 50 ft during most construction activities, hourly average noise levels near the edge of the project site at locations where the excavation, grading, and paving occur would be anticipated to be 65 to 75 dBA L_{eq}. Maximum noise levels during pavement breaking would be about 88 dBA L_{max}. Noise at the construction sites would be intermittent and the intensity of it would vary. The degree of construction noise may vary for different areas of the project site and also vary depending on the construction activities. *Table 3.15.47* summarizes noise levels produced by construction equipment commonly used on roadway construction projects.

Table 3.15.47: Construction Operation Noise Level

Equipment	Maximum Noise Level (dBA at 50 feet)
Auger Drill Rig	86
Asphalt Paver	89
Asphalt Roller	78
Backhoe	75
Compactor	76
Concrete Pump	81
Crane	85
Dozer	85
Excavator	83
Front End Loader	74
Grader	75
Heavy Duty Dump Trucks	77
Vibratory Roller	78
Pavement Breaker	88
Pile Driver, Impact	101
Pile Driver, Vibratory	96

For construction and funding purposes, the *I-5 NCC Project* would be broken into three stages and sub-stages to allow construction phasing flexibility, as described in *Section 2.4, Phased Construction.* During construction, detours would be required for nighttime work, bridge work, and where there are closed ramps and structures in order to maintain access for vehicles, bicycles, and pedestrians. Construction for the bridges over the freeway would occur in steps. Noise activity, such as demolition and pile driving, would be followed by more quiet activity providing a rest between types of construction activity. In addition, a combination of attenuation techniques with equipment noise control and administrative measures would be selected to provide the most effective means to minimize effects of construction activity noise.

The following control measures would be implemented in order to minimize noise disturbances at sensitive receptors during periods of construction.

<u>Equipment Noise Control</u>

- Ensure that all equipment items have manufacturers' recommended noise abatement measures, such as mufflers, engine enclosures, and engine vibration isolators intact and operational. All construction equipment would be inspected at periodic intervals to ensure proper maintenance and presence of noise control devices.

- Turn off idling equipment.

Administrative Measures

- Implement a construction noise-monitoring program to limit impacts.
- Plan noisier operations during times least sensitive to receptors.
- Keep noise levels relatively uniform and minimize impulsive noises.
- Plan rests between construction activities so that noisy activities are followed by more quiet activities.
- Maintain good public relations with the community to minimize objections to the unavoidable construction impacts. Provide frequent activity updates of all construction activities.

Application of these attenuation measures would reduce the construction noise at the sensitive receptors; however, a temporary increase in noise would occur. Ongoing communication would occur between the Caltrans Resident Engineer, the Oceanside Unified School District, and Oceanside High School.

No Build Alternative

No highway construction would be planned and no improvements beyond routine maintenance would be provided for this alternative. Therefore, there would be no project-related construction noise.

3.16 Energy

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.16.1 Regulatory Setting

The CEQA Guidelines, Appendix F, Energy Conservation, state that EIRs are required to include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

NEPA (42 USC Part 4332) requires the identification of all potentially significant impacts to the environment, including energy impacts.

In 2011, more than 70 percent of the petroleum category of energy sources was consumed by the U.S. transportation sector, according to the Energy Information Agencies Annual Energy Review (http://www.eia.gov/totalenergy/data/annual/pecss_diagram.cfm). While State and federal policies, such as the California Low-Emission Vehicle Program and the Federal Energy Policy Act of 1992, are increasing the use of alternative-fuel and low-emission vehicles, the consumption of non-renewable resources, such as fossil fuels, remains high and points to the need to conserve such energy resources.

The development of energy efficient projects is also highlighted in Caltrans' Director's Policy on Energy Efficiency and Conservation (DP-23), which states:

> Caltrans incorporates energy efficiency and conservation measures into transportation plans, products, and services to minimize the use of fuel supplies and energy sources. Caltrans also emphasizes energy efficiency in the design, construction, operation, and maintenance of its facilities. Building on current efforts, Caltrans implements strategies to reduce demand; improve performance of transportation systems, operations, and facilities; and promote clean fuel sources and fleet efficiency.

DP-17 provides guidance for recycling of roadway materials, specifically asphalt and concrete.

DP-105 provides the wraparound guidance for reduction, reuse, and recycling in strategic planning of projects:

> Caltrans manages resources efficiently and effectively. The principles of Reduce, Reuse, and Recycle are consistent with Caltrans' Stewardship Goal to preserve and enhance California's resources and assets.

3.16.2 Affected Environment

Energy consumption can be measured in direct and indirect energy use. Direct energy use is the energy consumed in the actual propulsion of a vehicle using the facility. It can be measured in terms of the thermal value of the fuel (usually measured in British thermal units [BTUs] or Joules), the costs of the fuel, or the quantity of electricity used in the engine or motor. Indirect energy is defined as all the remaining energy consumed to run a transportation system, including construction energy, maintenance energy, and any substantial impacts to energy consumption related to project induced land use changes and mode shifts, and any substantial changes in energy associated with vehicle operation, manufacturing, or maintenance due to increased automobile use.

Direct Energy Consumption

The majority of existing energy consumption is traffic related. As indicated in *Section 3.6, Traffic and Transportation/Pedestrian and Bicycle Facilities*, existing traffic is operating at mostly LOS F during peak periods within the proposed project limits. These stop-and-go traffic conditions decrease fuel efficiency, thus increasing fuel consumption. As vehicles require more fuel, there is an increase in fuel shipments (via tanker trucks) on I-5 to the many gas stations along the corridor. Some of the existing energy consumption, albeit a small amount, may be attributed to the facility itself. At several interchanges, the existing under- and overcrossings lack sidewalks and bike lanes for pedestrian and bicycle use. As a result, it is conceivable that some people may be discouraged from walking or riding since the perception may be that sidewalks and bike lanes provide an element of safety. As a result, people may divert away from a non-motorized mode to a motorized mode of travel, adding to traffic and, in turn, increasing fuel consumption.

Indirect Energy Consumption

The indirect consumption of energy for transportation system materials and processes competes with other important energy needs. One such use includes the routine wear and replacement of vehicles and vehicle parts, especially during periods of traffic congestion. Driving during peak traffic conditions increases the “wear and tear” on vehicles, which then require more maintenance (such as oil changes, tire and brake pad replacement, etc.).

Another competing energy use includes maintenance. I-5 within the project limits is over 40 years old and is heavily used. To maintain safe and efficient traffic operations, the existing pavement requires periodic maintenance. Pavement grinding operations, for example, include the use of water to grind existing pavement, which is then exported to an approved facility, such as a slurry pit, so the grindings can then be properly disposed. Heavy equipment is needed to perform this work, as well as setting up lane closures and detours, which can negatively affect traffic conditions. Caltrans Maintenance Division also performs routine litter clean-up and graffiti abatement. These activities expose highway workers to dangerous conditions when work is next to live traffic. This work often requires lane closures for worker safety, which could also negatively affect traffic conditions.

3.16.3 Environmental Consequences

As discussed below, when balancing energy used during construction and operation against energy saved by relieving congestion and other transportation efficiencies, the project would not have substantial energy impacts.

Impacts Common to All Build Alternatives

Construction activities, such as the use of heavy machinery, detours, lane closures, the import and export of materials and equipment, etc., could substantially increase energy consumption, and is an unavoidable impact. However, post-construction and operational requirements of the facility should be less with the build alternatives as opposed to the No Build alternative. The savings in operation energy requirements would offset construction energy requirements and thus, in the long term, result in a net savings in energy usage.

Overall, the build alternatives would likely cause no net increase in energy consumption since the energy used during construction and operation would be balanced against energy saved by relieving congestion and reducing out of direction travel.

Additional auxiliary and HOV/Managed Lanes, new and expanded park and ride facilities, improved bike lane and sidewalk features, ramp metering, and an improved transit-highway interface may likely improve traffic conditions, and thus reduce energy consumption, as more people carpool or choose other modal options.

10+4 Barrier and 8+4 Barrier Alternatives

The Barrier alternatives may require a slightly higher indirect consumption of energy with increased maintenance activities. Trash would likely collect at barriers separating the HOV/Managed Lanes from the general purpose lanes and would therefore require routine sweeping.

No Build Alternative

The energy requirements of the No Build alternative, such as fuel consumption, and routine wear and replacement, may be somewhat greater than the requirements of the proposed project, and may even require larger quantities of energy in the future as traffic conditions worsen. The No Build alternative would contribute to continued traffic congestion and inefficient energy use by vehicles idling along I-5 and on local roadways, as traffic associated with latent demand would not be pulled off local streets and to I-5. These impacts would be expected to increase over time without implementation of the proposed project.

3.16.4 Avoidance, Minimization, and/or Mitigation Measures

Efforts to minimize energy consumption during construction include:

- Public awareness campaigns to encourage carpooling and commuting during non-peak traffic hours
- The recycling of materials, such as damaged metal beams/guardrails and used rebar salvaged as metal scrap
- The use of recycled materials, such as asphalt and concrete roadway materials through creation of road-base materials after crushing and grinding
- Reuse of soil and vegetation where practicable

- The salvage of material such as roadside sign posts, and sign structures, chain link fence fabric, lighting standards, and/or traffic signal standards and appurtenances
- The use of energy-efficient construction vehicles

The following measures relevant to energy use during operations are consistent with other discussions in this Final EIR/EIS:

- Incorporate bicycle-friendly intersections at interchange ramps, in coordination with the responsible local jurisdictions
- Incorporate low water use landscaping
- Develop and implement a comprehensive TMP to increase driver awareness, ease congestion, and minimize delay during construction

BIOLOGICAL ENVIRONMENT

The Biological Environment section is broken into the following subsections:

- Natural Communities (*Section 3.17*)
- Wetlands and Other Waters (*Section 3.18*)
- Plant Species (*Section 3.19*)
- Animal Species (*Section 3.20*)
- Threatened and Endangered Species (*Section 3.21*)
- Invasive Species (*Section 3.22*)

3.17 Natural Communities

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

This section of the document discusses natural communities of concern. The focus of this section is on biological communities, not individual plant or animal species. This section also includes information on wildlife corridors and habitat fragmentation. Wildlife corridors are areas of habitat used by wildlife for seasonal or daily migration. Habitat fragmentation involves the potential for dividing sensitive habitat and thereby lessening its biological value. To provide a comprehensive understanding of resources, information regarding wetlands and other waters at each lagoon also is included in this section. Wetlands and other waters are also discussed in *Section 3.18*. Habitat areas that have been designated as critical habitat under the Federal Endangered Species Act (FESA) are discussed in *Section 3.21, Threatened and Endangered Species*.

3.17.1 Affected Environment

The following technical reports were completed in support of this section of the document and are incorporated by reference: the Interstate 5 North Coast Corridor Project Natural Environment Study (NES) (June 2008); Manchester Avenue/Interstate 5 Interchange Project NES Report (January 2004); I-5 Lagoons Marine Resource Investigation (June 2006), San Elijo Lagoon Bridge Optimization Study, Final Report (April 2012). Batiquitos Lagoon Bridge Optimization Study (Final Report April 2012), and I-5 Bridge Study at Buena Vista Lagoon, Fluvial Hydraulics and Residence Time Analysis (Final Report, May 2012).

The Biological Study Area (BSA) for the project extended from I-5/La Jolla Village Drive at the southern end to Vandegrift Boulevard at the northern end, and extended out 500 ft from the edge of pavement on average. A total of 30 plant communities, with 8 occurring in both disturbed and undisturbed condition, were identified within the BSA. In addition to the plant communities, there were several communities with little or no vegetation; including mud flat, salt flat, open water, and unvegetated or other waters of the U.S. Subtidal habitats for aquatic species are also discussed in this section. A general description of each community and its occurrence within the BSA is provided below. Maps of the vegetation communities overlaid on 2012 aerial photographs are provided in *Figures 3-17.1a* through *3-17.1n.* Because proposed improvements would be located along an existing major transportation facility, the four build alternatives are very similar in footprint. Only the permanent impact alternative footprint of the refined 8+4 Buffer alternative is shown for the entire project.

Upland Communities

Diegan Coastal Sage Scrub

This vegetation type, once widespread in coastal southern California, occurs in patches from Los Angeles to Baja California. This plant community is composed of a variety of low, soft aromatic shrubs dominated by drought-deciduous species such as California sagebrush (*Artemisia californica*), flat-top buckwheat (*Eriogonum fasciculatum* var. *fasciculatum*), white sage (*Salvia apiana*), and black sage (*Salvia mellifera*). Typically, there are also scattered evergreen shrubs, including lemonadeberry (*Rhus integrifolia*), laurel sumac (*Malosma laurina*), and toyon (*Heteromeles arbutifolia*). The understory is diverse and includes a rich variety of annual forbs, and both annual and perennial grasses. Coastal sage scrub (CSS) habitat supports a variety of rare plant and animal species (e.g., coastal California gnatcatcher [*Polioptila californica californica*]).

CSS habitat occurs on cut and fill slopes primarily in the southern half of the BSA around most of the lagoons and rivers. CSS within the BSA is generally dominated by California sagebrush, flat-topped buckwheat, and California sunflower (*Encelia californica*), with lemonadeberry and laurel sumac shrubs.

The disturbed form of this habitat within the BSA is comprised of the same dominant species listed above with non-native annual grasses, and non-native broadleaf species such as Russian thistle (*Salsola tragus*), acacia (*Acacia* spp.), mustard (*Brassica* spp.), and horseweed (*Conyza canadensis*). Disturbed CSS generally has less overall cover than undisturbed CSS. The additional openings are due to the weedy species in this community.

Baccharis Scrub

Baccharis scrub is a form of sage scrub dominated by coyote brush (*Baccharis pilularis*). This habitat is found in low lying areas, often adjacent to drainages. This community is found adjacent to the drainage north of Genesee Avenue. Disturbed Baccharis scrub is also found along this drainage and is dominated by coyote brush and pampas grass (*Cortaderia* sp.) above the channel at the southern end of this drainage.

Maritime Succulent Scrub

This community occurs on dry, south-facing slopes and coastal bluffs from Torrey Pines to El Rosario, Baja California. Maritime succulent scrub is dominated by a combination of CSS dominants mixed with succulents and cacti and some endemic species (e.g., Del Mar manzanita). Typical species found in this community include California sagebrush, Shaw's agave (*Agave shawii*), California sunflower, coast barrel cactus (*Ferocactus viridescens*), coastal prickly pear (*Opuntia littoralis*), and coastal cholla (*Cylindropuntia prolifera*).

Maritime succulent scrub occurs primarily on the west side of I-5 near Batiquitos Lagoon. The slopes are dominated by California sagebrush, coastal cholla, coast barrel cactus, fishhook cactus (*Mammillaria dioica*), and California sunflower.

Coastal Bluff Scrub

Coastal bluff scrub is a plant community made up primarily of low, prostrate plants that are wind pruned by sea breezes. Dominant plants in this community are primarily woody and/or succulent. Species commonly found in this community include sea dahlia (*Coreopsis maritima*), live forevers (*Dudleya* spp.), lemonadeberry, and prickly pear. Coastal bluff scrub occurs in a few locations on the slopes adjacent to I-5 north of San Elijo Lagoon.

Southern Maritime Chaparral

This community is dominated by wart-stemmed ceanothus (*Ceanothus verrucosus*) and thick-leaved Eastwood's manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*). Other species found in this community include: chamise (*Adenostoma fasciculata*), spicebush (*Cneordium dumosum*), summer holly (*Comarostaphylos diversifolia*), sea dahlia, Del Mar sand aster (*Coreothrogyne filaginifolia* var. *linifolia*), toyon, Torrey pine (*Pinus torreyana*), Nuttall's scrub oak (*Quercus dumosa*), and laurel sumac. Elements of Diegan CSS may be interspersed within this community. Southern maritime chaparral occurs in small patches within the BSA. It mostly occurs outside of Caltrans right-of-way. Its distribution within the project limits is patchy, it is found on the northbound and southbound freeway slopes at Del Mar Heights Road, on some areas outside the right-of-way on the southbound slopes south of San Elijo Lagoon, and on some smaller patches on the northbound slopes north of Manchester Avenue along northbound I-5.

Some areas of southern maritime chaparral are disturbed and have large openings that are bare or vegetated with non-native species. Many of the disturbed areas occur along trails or near development. Non-native species found in disturbed southern maritime chaparral include African fountain grass (*Pennisetum setaceum*), Australian saltbush (*Atriplex semibaccata*), crystalline ice plant (*Mesembryanthemum* spp.), and ice plant (*Carpobrotus edulis*).

Coastal Sage – Chaparral Scrub

Coastal sage – chaparral scrub is a mixture of the dominant species in CSS and chaparral communities. Dominant plant species observed include chamise, coastal sagebrush, lilac (*Ceanothus* spp.), black sage, and poison oak (*Toxicodendron diversilobum*). Coastal sage – chaparral scrub occurs on a slope east of Marine View Avenue and south of the Lomas Santa Fe exit and east of I-5.

Coast Live Oak Woodland

Coast live oak woodland consists primarily of coast live oak (*Quercus agrifolia*) and Engelmann oak (*Quercus englemannii*) with several associated understory species; including poison oak, skunk brush (*Rhus trilobata*), scrub oak, and toyon. The herbaceous layer consists of western ragweed (*Ambrosia psilostachya*), Douglas mugwort (*Artemisia douglasiana*), foxtail chess (*Bromus madritensis* ssp. *rubens*), soft chess (*Bromus hordeaceus*), ripgut grass (*Bromus diandrus*), and slender wild oat (*Avena barbata*).

Coast live oak woodland only occurs on the slopes above Jefferson Street south of Buena Vista Lagoon. The habitat is comprised of coast live oaks with non-native grasses in the understory.

Native Grassland

Native grassland in southern California is characterized by a moderate cover of native bunchgrasses with native forbs and usually a smaller component of non-native grasses and broadleaf species. Native grassland in the BSA is dominated by purple needlegrass (*Nassella pulchra*) with giant wild rye (*Leymus condensatus*) and blue wild rye (*Elymus glaucus*), with non-native grasses and forbs within the community. Native grassland occurs on both the northbound and southbound slopes of I-5 north of Genesee Avenue.

Non-native Grassland

Non-native grassland consists of dense-to-sparse cover of non-native annual grasses, often associated with species of showy-flowered, native annual forbs, especially in years of high rainfall. This vegetation community is a disturbance-related community most often found in old fields or openings in native scrub habitats that occur on fine-textured, usually clay, soils. These soils are moist or even waterlogged during the winter rainy season and very dry during the summer and fall. Typical grasses found within the BSA include wild oat (*Avena* sp.), soft chess, African fountain grass, veldt grass (*Ehrharta calycina*), red brome (*Bromus madritensis* ssp. *rubens*), and ripgut grass. Invasive species such as fennel (*Foeniculum vulgare*) and mustard are often associated with this vegetative community as a lesser component. Non-native grassland occurs in various locations along the cut slopes throughout the corridor. Non-native grassland is often found where ornamental vegetation has been degraded or grasses such as African fountain grass were planted as ornamental vegetation.

Non-native Woodland

Non-native woodland is a community comprised of non-native trees including Eucalyptus (*Eucalyptus* spp.), pine trees (*Pinus* spp.), pepper trees (*Schinus* spp.), and others. This community is dominated by trees and does not include areas with a few trees interspersed with other herbaceous and shrubby plants. This habitat is generally dominated with Eucalyptus groves along I-5. Non-native woodland is found on the fringes around the lagoons and in various areas throughout the corridor.

Bare Ground

The bare ground designation is either bare, or sparsely vegetated areas with weedy invasive species and a few native shrubs due to disturbance or shading. Many of these areas are utility easement roads and/or hiking trails. Plant species commonly found in these sparse areas include foxtail chess, mustard, slender wild oat, and horseweed.

Disturbed Habitat

These areas are any lands where agricultural practices, construction, or other land-clearing activities have altered the native vegetation; and species composition and site conditions are not characteristic of the disturbed phase of one of the plant associations. Such habitat, which is dominated by non-native annuals and perennial broadleaf species, is typically found in vacant lots, roadsides, construction staging areas, and abandoned fields. Typical species found in this community include mustards, filaree (*Erodium* spp.), Russian thistle, tumbleweed (*Amaranthus albus*), sweet fennel, horseweed, crown daisy (*Chysanthemum coronarium*), and often degraded broadleaf ornamental plants such as ice plant, acacia, and myoporum (*Myoporum laetum*).

Agriculture

Agriculture within the BSA encompasses active and fallow fruit and avocado groves, flower fields, and crop fields. These areas are disturbed and do not usually contain any native vegetation. Some non-native grassland was associated with fallow agricultural fields in the BSA.

Ornamental

Ornamental habitat is dominated by non-native ornamental species. Ornamental species commonly found in this habitat along I-5 include ice plant, acacia, oleander (*Nerium oleander*), bougainvillea (*Bougainvillea* sp.), and scattered non-native trees. This community is found within Caltrans right-of-way, particularly within interchanges and narrow slopes of the freeway.

Developed

Developed areas are lands that have been permanently altered by human activities. These areas include roads, buildings, and other areas where the land has been altered to such a state that natural vegetation cannot become reestablished. Developed areas occur adjacent to the right-of-way along most of the project alignment.

Wetland Communities

Wetland communities are shown in *Figures 3-17.1a* through *3-17.1n*. USACE jurisdictional wetlands are discussed in *Section 3.18*.

Southern Willow Scrub

This community consists of dense, broadleaf, winter-deciduous riparian thickets dominated by willows (*Salix* spp.) and mulefat (*Baccharis salicifolia*) with scattered emergent cottonwood (*Populus fremonti*) and western sycamore (*Platanus racemosa*). Southern willow scrub occurs along Carmel Creek, the San Luis Rey River, and some of the drainages upstream of the lagoons.

Disturbed southern willow scrub occurs in many of the small drainages and on the edges of larger expanses of habitat within the BSA. Disturbed southern willow scrub is dominated by willows; however, there are several other weedy species that are also prominent in the habitat. Weedy species often found in disturbed southern willow scrub in the BSA include giant reed (*Arundo donax*), tamarisk (*Tamarix* spp.), fan palms (*Washingtonia robusta*), castor bean (*Ricinius communis*), cocklebur (*Xanthium strumarium*), and fennel.

Mulefat Scrub

This vegetation type is completely dominated by mulefat, which is a tall (6.5 to 13.1 ft), perennial shrub. Very few other species are associated with this vegetation community. Mulefat scrub is an early successional community following periodic disturbance. Repeated flooding of water channels allows the survival of this habitat type. Mulefat scrub occurs along the perimeter of San Elijo and San Dieguito Lagoons.

Disturbed mulefat scrub occurs in some of the small creeks and drainages and around the edges of larger expanses of undisturbed habitat. Disturbed mulefat scrub is primarily mulefat with weedy species such as Brazilian pepper tree (*Schinus terebinthifolius*), ice plant, eucalyptus, acacia, and castor bean.

Freshwater Marsh

Freshwater marsh is dominated by perennial, emergent monocots at 4.3 to 6.6 ft. Uniform stands of bulrushes (*Scirpus* spp.) or cattails (*Typha* spp.) often characterize this habitat. The soil in freshwater marshes is permanently saturated year-round with water and can support a high diversity of native and non-native plant species. Freshwater marsh is found sporadically throughout the wetlands within the BSA, with the largest expanses in Buena Vista Lagoon.

Disturbed freshwater marshes are areas that have been invaded by non-native weedy species that have become a prominent portion of the community. Non-native species found in this habitat include myoporum, eucalyptus, Brazilian pepper tree, and small patches of giant reed. Disturbed freshwater marsh is found primarily in small drainages adjacent to I-5.

Southern Willow Scrub/Freshwater Marsh

Southern willow scrub/freshwater marsh is a mosaic of freshwater marsh species and willows. This habitat is found along Carmel Creek at the western end of the Carmel Valley Restoration Enhancement Project (CVREP).

Southern Arroyo Willow Woodland

Southern arroyo willow woodland is composed of larger willows than southern willow scrub. Arroyo willows (*Salix lasiolepis*) are the dominant species in this community with mulefat, desert wild grape (*Vitus girdiana*), and goldenbush (*Isocoma menzieii*) in the understory. This habitat occurs around the margins of San Elijo Lagoon where there is an influx of fresh water.

Disturbed southern arroyo woodland is found along the western portion of Manchester Avenue at the boundary of San Elijo Lagoon. Non-native invasive species found in this habitat include ice plant, date palm (*Phoenix dactylifera*), giant reed, and castor bean.

Coastal Brackish Marsh

Coastal brackish marsh is characterized by salt-tolerant species such as pickleweed (*Salicornia virginica*), saltgrass (*Distichlis spicata*), alkali heath (*Frankenia salina*), and freshwater species such as cattail and bulrushes. Many species depend on this community for nesting and foraging habitat. This community occurs at the Los Peñasquitos, San Dieguito, San Elijo, Batiquitos, and Buena Vista Lagoons as well as Encinas Creek.

Disturbed coastal brackish marsh is found around the margins of the lagoons where the marsh has been disturbed by human activities or natural phenomena. Non-native species found in disturbed coastal brackish marsh include myoporum, Brazilian pepper tree, ice plant, and acacia.

Southern Coastal Salt Marsh

These areas are typically flooded during high tides or strong winter storms. Most plants in this community are low-growing, salt-tolerant succulents called halophytes. Among the common dominant species are pickleweed, alkali heath, and saltgrass, with cordgrass (*Spartina foliosa*), salty susan (*Jaumea carnosa*), and estuary sea-blite (*Suaeda esteroa*). Coastal salt marsh vegetation is very important for wildlife. Several rare and endangered species of birds (e.g., light-footed clapper rail [*Rallus longirostris levipes*], Belding's savannah sparrow [*Passerculus sandwichensis beldingi*]) and plants are dependent upon it for survival. The remaining areas of this community represent only a small remnant of what originally existed in San Diego County. Coastal salt marsh is found in and around the coastal lagoons; including Los Peñasquitos, San Dieguito, San Elijo, Batiquitos, and Agua Hedionda.

Disturbed salt marsh/brackish marsh is present along the eastern right-of-way edge at the toe of fill slope in the San Dieguito River Valley and along the margins of salt marsh habitat in the other lagoons. The disturbed salt marsh north of Del Mar Heights Road is found along the drainage ditch at the toe of the slope and is interspersed with weedy species and some more brackish water species. Disturbed salt marsh/brackish marsh within the BSA is dominated by alkali heath, pickleweed, bull tule (*Scirpus robustus*), saltgrass, tamarisk, and cocklebur. This habitat occurs at the edge of the right-of-way where erosion from drainage structures has washed sediment down the slope.

Salt Marsh Transition

Although salt marsh transition community is not described in the literature, there is no community type that fits those areas between the southern coastal salt marsh and CSS communities where there is no tidal influence, but plants are salt tolerant. Salt marsh transition along I-5 is dominated by a combination of species, including pickleweed, goldenbush, four-wing saltbush (*Atriplex canescens)*, alkali heath, and coyote brush. Vegetation in this community is often sparsely distributed with salt pan areas in between plants. Salt marsh transition is found primarily around San Dieguito and Batiquitos Lagoons where the land begins to slope up away from the lagoon.

Arundo Scrub

Arundo scrub is a monotypic stand of giant reed. Giant reed is an invasive weed that grows in large thickets. Arundo scrub is found in scattered clumps along the I-5 and occurs in extensive stands at Buena Vista Lagoon and the San Luis Rey River.

Drainage Ditch

Drainage ditch habitat has small patches of distributed freshwater marsh and weedy species found in either lined or earthen drainage ditches along I-5. These are all human-made ditches, some of which are jurisdictional wetlands and some of which just convey runoff to storm drains. The drainage ditches are primarily unvegetated with patches of cattails, sedges (*Carex spp.*), rushes (*Juncus spp*.), or weedy species such as castor bean and cocklebur.

Disturbed Wetland

Disturbed wetlands are communities that exhibit hydrology, soils, and vegetation; however, the species found within the BSA are a combination of weedy, non-native and native species that do not resemble the other wetland habitats. Species commonly found in disturbed wetlands along the I-5 include fan palm, water cress (*Rorripa nasturtium-aquaticum*), willow herb (*Epilobium* spp.), curly dock (*Rumex crispus*), evening primrose (*Oenothera elata hookeri*), and sedges. Disturbed wetland is found in several drainages parallel to I-5 including the east side of I-5 south of the San Dieguito River, east of I-5 and north of Santa Fe, east of I-5 south of Palomar Airport Road, and at Loma Alta Creek.

Mud Flat

Mud flat habitat is unvegetated and occurs in the low to mid intertidal areas around each of the tidal lagoons. Although mudflat is unvegetated, it is important habitat for many invertebrates and is foraging habitat for many shorebirds.

Salt Flat

Salt flat is similar to mud flat habitat in that it is primarily unvegetated; however, this habitat is found usually at or above the high tide level. Salt flats or pannes form a hard crust that does not allow plants to grow. These areas can provide habitat for ground nesting birds such as California least terns (*Sterna antillarum browni*), western snowy plovers, and killdeer (*Charadrius vociferus*).

Open Water

Open water habitat is deeper water that is unvegetated or may have subtidal vegetation such as eelgrass (*Zostera marina*). Open water habitat is considered jurisdictional waters of the U.S., but is not considered a wetland because it does not support a plant community. Eelgrass beds, if present, are considered special aquatic sites. Open water habitats are important foraging and resting areas for many bird species and also provide important fish and invertebrate habitat. Open water can be found in all the coastal lagoons and in the larger rivers flowing under I-5.

Subtidal Communities

Subtidal communities are generally a subset of open water communities in the lagoons. Eelgrass beds grow subtidally and are important habitats for aquatic species and have specific regulations concerning impacts and mitigation. Subtidal portions of the lagoons within the BSA were surveyed in 2006 for current eelgrass and possible toxic algae (*Caulerpa taxifolia*) distributions for purposes of identifying potential impacts. However, due to the variability in eelgrass distributions pre-construction/post-construction surveys are required by the regulatory agencies to make the final determination of impact to eelgrass. Pre- and post-construction surveys and construction monitoring would likely be required in the lagoons to monitor for toxic algae.

San Dieguito Lagoon

San Dieguito Lagoon was thoroughly studied for the large restoration project that began in late 2006. No eelgrass was found during these studies, and none is expected to occur in the future due to lack of tidal flushing and scour in the main channel of the San Dieguito River.

San Elijo Lagoon

At present, no eelgrass occurs within the San Elijo Lagoon I-5 BSA. Salinities within the sampling area of San Elijo Lagoon are currently, and typically, well below the range suitable to support eelgrass. If future restoration efforts are implemented, circulation and bathymetry may be altered such that the sampling area could support eelgrass. However, at the present time, the conditions at the site are not expected to support eelgrass.

Batiquitos Lagoon

Eelgrass was mapped within the Batiquitos Lagoon sampling area in April 2006 (*Figure 3-17.2a*). To the west of the I-5 bridge, extensive eelgrass occurred on the north shore of the lagoon, with a more narrow fringing bed occurring on the south shore. To the east of the bridge, a small bed occurred immediately north of the bridge, but did not extend farther north due to the elevation of that area. The eelgrass mapped on the southern shore was the western edge of a continuous bed that extended 0.9 mi farther east in the lagoon. The eelgrass appeared healthy, of tall stature, and generally free from epiphytes. The mean leaf shoot density in the eelgrass beds was approximately 368 + 101 shoots/10.8 square ft. Eelgrass does not grow in the channel leading up to, under, or past the bridge due to depth and high current velocities. However, eelgrass beds fringing the shoals surrounding the deeper channels are extremely dense compared to beds found in most systems of southern California. This high density is believed to be related to higher current velocities and ideal light environments.

The distribution of eelgrass mapped during the April 2006 survey is typical of this area of Batiquitos Lagoon, although in prior years eelgrass has been more extensive to the west of the bridge in the central basin. Eelgrass distribution patterns within Batiquitos Lagoon are influenced by a number of factors, including maintenance dredging near the lagoon mouth; sedimentation in the lagoon; and variable fluvial and oceanic influences including storm-derived sediments and turbidity, nutrient influx, and red tide. In addition, eelgrass within Batiquitos Lagoon was introduced through habitat restoration in October 1997.

Figure 3-17.2a: 8+4 Buffer Alternative (Preferred Alternative) Eelgrass Coverage in the City of Encinitas

Figure 3-17.2b: 8+4 Buffer Alternative (Preferred Alternative) Eelgrass Coverage in the City of Carlsbad

During the course of the eelgrass surveys, no occurrences of the non-native, invasive seaweed *C.taxifolia* were detected within the sampling area. There is no record of this seaweed occurring at Batiquitos Lagoon in the past, although the lagoon is considered to be “at-risk” due to its proximity to residential areas, the input of storm drains, and the presence of eelgrass.

Agua Hedionda Lagoon

Eelgrass was detected within the Agua Hedionda Lagoon sampling area in May 2006 (*Figure 3-17.2b*). The eelgrass was primarily restricted to fringing shoreline beds along the shore of both the east and central basin of the lagoon. The eelgrass appeared healthy, of moderate stature, and generally free from epiphytes. The mean leaf shoot density in the eelgrass beds was approximately 243 + 103 shoots/10.8 square ft.

The 2006 distribution of eelgrass covered approximately 10 percent of the area that has been known to support eelgrass during surveys conducted in recent years. In September 2003, the area investigated in the present survey supported a total of 8.31 ac of eelgrass. There was a large-scale dieback of eelgrass that occurred in 2005 in Agua Hedionda Lagoon, and the eelgrass has not yet recovered to the distribution of prior years. Therefore, it should be assumed that the present distribution of eelgrass is considerably more restricted than it would likely be in coming years.

A large infestation of the toxic algae *C.taxifolia* was discovered growing in Agua Hedionda Lagoon in 2000. A portion of the infestation occurred within the sampling area of the present study. Successful eradication efforts have been under way since 2000 and the toxic algae is now eradicated from Agua Hedionda Lagoon (M&A 2006b).

Buena Vista Lagoon

Buena Vista Lagoon is currently freshwater on both sides of I-5 with no eelgrass habitat present. Toxic algae is not anticipated in this habitat.

Focused Lagoon Communities Summary

The lagoons discussed above comprise some of the most rare and important habitats in coastal southern California. They provided a primary focus of the Supplemental Draft EIR/EIS prepared for the project in August 2012, which included updated and more detailed information on the lagoons based on technical studies completed after public circulation of the 2010 Draft EIR/EIS. For the convenience of the reader, the text below summarizes important lagoon habitat information provided in the Supplemental Draft EIR/EIS. Information on species located at the lagoons is provided in *Sections 3.19* through *3.21* of this EIR/EIS.

The lagoons and their tributaries crossed by the proposed project are individual elements of a regional coastal drainage system. Lagoon water movement (with eastward flow of salty sea water, western flow of fresh water, and ability of the lagoons to accommodate tides and storm events) is individual to each lagoon, but also forms one part of the overall drainage system along this portion of the coast. The “health” of each lagoon is based on the extent to which waters are free flowing or stagnant. This health directly affects the quality of habitat provided for lagoon-dependent wildlife. The sum total of how well these lagoon systems operate also results in regional benefit.

Los Peñasquitos Lagoon

Los Peñasquitos Lagoon is a salt marsh system encompassing both freshwater and saltwater flows. It currently suffers from restriction of water flow; i.e., freshwater exiting, and saltwater entering, the lagoon. The constrained flow into and from the ocean has resulted in a higher than normal amount of freshwater being retained in the lagoon. In the past, high salinity conditions have also occurred, when sand deposition from storms cuts off flows between the lagoon and ocean, and evaporation within the lagoon exceeds freshwater runoff into the lagoon. Urban and landscape runoff from upslope surrounding uses also drains into the lagoon, with an associated influx of pollutants.

San Dieguito Lagoon

San Dieguito Lagoon is located at the mouth of the San Dieguito River. Existing north-south transportation facilities (Coast Highway, the railroad, Jimmy Durante Boulevard, and I-5) cross the river and lagoon system; resulting in constriction points on flood flows and sediment transport. The north bank of the San Dieguito River channel and southern abutment of the I-5 bridge are protected by riprap. The wide expanse south of the channel and beneath the bridge (approximately 400 ft) is used by wildlife moving up- and downstream. A large San Dieguito Lagoon restoration project, the Southern California Edison (SCE) San Onofre Nuclear Generating Station (SONGS) project, is under way. SONGS restoration began in 2006, with the goal to restore approximately 115 ac of tidal wetland, as well as to develop native upland habitat and bird nesting areas within the lagoon. In addition, the lagoon inlet was opened and SCE will continue to dredge the inlet to keep it open permanently.[1] Urban and landscape runoff from upslope and surrounding uses also drain into the lagoon, with an associated influx of pollutants. Of particular concern are the discharge of sediment and related siltation effects, which can adversely impact water quality (and have related potential effects on eelgrass, which is not currently present).

With regard to the large area available under the existing bridge on the south side, it is noted that existing support walls produce a tunnel-like effect, which may discourage some wildlife from using this area.

San Elijo Lagoon

San Elijo Lagoon is a coastal wetland that contains significant biological and ecological resources. San Elijo Lagoon contains primarily coastal salt marsh and mud flat west of I-5, and coastal brackish marsh and freshwater marsh east of I-5. Concurrent with the *I-5 NCC Project*, the San Elijo Lagoon Restoration Project (SELRP) is in the planning stage, with the objective of restoring the lagoon's functions and habitat values to the extent feasible, given the constraints presented by surrounding existing/current development. The overarching goal of the SELRP is to protect, restore, and maintain, via adaptive management, the San Elijo Lagoon ecosystem.

Batiquitos Lagoon

A large-scale restoration project was completed by the Los Angeles Port District in Batiquitos Lagoon in 1997. A new inlet was constructed concurrent with a new Coast Highway bridge, and stabilized with jetties. The lagoon was dredged and several nesting islands for least terns were constructed. Additional dredging occurs periodically to maintain tidal flow. Habitats within or in the vicinity of Batiquitos Lagoon primarily include open water that supports eelgrass; with mud

[1] The SCE project was granted 35 acres of mitigation credit due to environmental benefits associated with keeping the mouth of the estuary open.

flats, coastal salt marsh, brackish emergent marsh, riparian, and coastal sage scrub habitats at its perimeter. The large, open-water lagoon provides important habitat for fish, waterfowl, and shorebirds; including special-status wildlife species. The slopes of the lagoon are also important wildlife corridors for both large and small mammals.

There is an existing unpermitted trail along the northeastern side of Batiquitos Lagoon, across the wetland from the Gabbiano Lane cul-de-sac, with an unpermitted bridge over an inundated area east of I-5 and north of the lagoon open water. Use of this unpermitted trail along the edge of the marsh has resulted in trampling of existing vegetation. Although the use of this trail is categorized as “regular” as opposed to “high” volume, use has resulted in erosion and impacts to the wetland/native upland vegetation.

Agua Hedionda Lagoon

Agua Hedionda Lagoon is a relatively deep, open water system with three basins. The intake of the power plant, located in the west basin, has been determined to have an “iron lung effect” on the lagoon (i.e., it artificially forces water flow from east to west), resulting in effective draining of the eastern basin. The Encina Power Plant also regularly dredges the lagoon every two years to maintain a clear inlet to the ocean. The Poseidon Desalination Plant plans to continue similar maintenance dredging and will use the lagoon water intake for their operations (Coastal Development Permit [CDP] E-06-013).

The open water areas at Agua Hedionda Lagoon support eelgrass habitat, although there is minimal fringing wetland habitat adjacent to open water areas and no fringing marsh habitat is present near I-5; only intertidal sandy bottom occurs in these locations. The existing steep slopes north of the Agua Hedionda I-5 bridge are eroded and support non-native vegetation. There is little or no upland or wetland habitat, except open water, on the east side of the lagoon.

Buena Vista Lagoon

Buena Vista Lagoon is segmented into four basins and has developed into a primarily freshwater system, due to the presence of a sand berm that is naturally deposited along the beach and acts as a physical barrier to fresh and salt water interaction. The elevation of this berm is variable with conditions including tidal and wave action. A feasibility study and some restoration concepts were completed several years ago as part of a regional planning effort that focused on restoration of Buena Vista Lagoon. Those studies identified several options for Buena Vista Lagoon restoration plan, including a saltwater alternative restoring tidal flow to the entire lagoon, a modified saltwater alternative, and two freshwater alternatives (refer to the discussion in the I-5 Bridge Study at Buena Vista Lagoon 2012).[2]

Wildlife Corridors

Wildlife corridors connect large patches of natural open space that allow for the immigration and emigration of wildlife. Such movement assures the continual sharing of genetic information that helps maintain genetic diversity and reduces the probability of extinction through random events. Animals such as mule deer (*Odocoileus hemionus*), coyotes (*Canis latrans*), and mountain lions (*Felis concolor*) require large expanses of land. For these species, corridors provide a link between habitat patches increasing the area available for dispersal, foraging, and

[2] The western basin and mouth of the lagoon are privately owned, which has made restoration planning for future improvements to the lagoon difficult.

breeding. For smaller animals, the corridor itself may provide the habitat needed to sustain viable populations.

Within the BSA, the lagoons and habitats surrounding the lagoons are considered important linkages for wildlife movement. In addition to the lagoons, the San Luis Rey River is also a major wildlife corridor. The MSCP names Los Peñasquitos Lagoon and San Dieguito Lagoon as key Biological Core and Linkage Areas and they are identified in regional conservation plans as either preserved or an area targeted for conservation. I-5 itself is a barrier to wildlife movement. However, the existing bridges over the lagoons do provide limited crossings on the abutments. During I-5 surveys, mule deer and their sign were primarily observed west of I-5 near Genesee, in Los Peñasquitos Creek under I-5, and along Carmel Creek leading to Los Peñasquitos Lagoon. Coyote scat was observed near all lagoons and in CSS throughout the corridor. Although no mountain lion or bobcat (*Lynx rufus*) scat or tracks were observed, they are known to occur in habitats around the lagoons. Small mammal tracks were observed on the bridge abutments at each of the lagoons and at the San Luis Rey River Bridge.

Small mammal signs have been observed at some of the larger culverts that cross under the freeway. Due to the current width of I-5, only larger culverts are used with any frequency. Large culverts at Encinas Creek and north of Manchester are used by small mammals to cross under the freeway. Development on either side of I-5 between the lagoons limits wildlife use in these areas.

3.17.2 Environmental Consequences

The 8+4 and 10+4 Barrier alternatives have larger footprints than the Buffer alternatives. In general, the 8+4 Buffer paved area is 226.3 ft wide, 10+4 Buffer is 250 ft wide, 8+4 Barrier is 253.9 ft wide, and the 10+4 Barrier is 273.6 ft wide. The impacts to all habitats associated with the four alternatives are described below and summarized on *Tables 3.17.1* through *3.17.3*.

Table 3.17.1: Permanent Impacts to Habitats for the Four Build Alternatives

	10+4 Barrier	10+4 Buffer	8+4 Barrier	8+4 Buffer (Preferred Alternative)
	Ac	Ac	Ac	Ac
Upland Communities				
Agriculture	12.52	12.07	12.19	11.93
Baccharis Scrub	0.45	0.45	0.45	0.45
Baccharis Scrub (D)	1.02	1.02	1.02	1.02
Bare Ground	3.88	3.94	4.00	3.20
CSS	12.77	12.43	12.62	11.24
CSS (D)	51.83	50.65	50.93	47.94
CSS (D) Already mitigated[1]	11.81	11.00	11.07	10.55
Developed	732.08	713.65	723.94	707.90
Disturbed Habitat	71.99	69.27	69.27	67.78
Genesee Project	108.21	108.21	108.21	108.21
Maritime Succulent Scrub	0.30	0.29	0.29	0.19

Table 3.17.1 (cont.): Permanent Impacts to Habitats for the Four Build Alternatives

	10+4 Barrier	10+4 Buffer	8+4 Barrier	8+4 Buffer (Preferred Alternative)
	Ac	Ac	Ac	Ac
Upland Communities (cont.)				
Native Grassland	0.01	0.01	0.01	0.01
Non-native Grassland	38.55	38.41	39.42	36.63
Non-native Woodland	11.69	10.89	11.48	10.63
Ornamental	235.00	233.86	233.86	224.37
So. Maritime Chaparral	1.98	1.87	1.98	1.82
So. Maritime Chaparral (D)	1.07	1.05	1.05	1.05
Wetland Communities				
Arundo Scrub	0.20	0.15	0.16	0.17
Coastal Brackish Marsh	1.47	1.34	1.43	1.17
Coastal Brackish Marsh (D)	4.33	3.66	4.16	3.53
Drainage Ditch	1.29	1.24	1.25	1.24
Disturbed Wetland	2.41	1.91	2.02	1.76
Freshwater Marsh	0.70	0.64	0.68	0.61
Freshwater Marsh (D)	0.62	0.55	0.57	0.54
Mud Flat	2.68	2.49	2.61	2.32
Mulefat Scrub	0.21	0.21	0.21	0.21
Open Water	2.81	2.14	2.37	1.49
Salt Flat	0.03	0.03	0.03	0
So. Coastal Salt Marsh	5.90	4.56	4.74	2.89
Salt Marsh Transition	0.19	0.12	0.15	0.06
Southern Willow Scrub	0.26	0.26	0.26	0.26
Southern Willow Scrub (D)	1.54	1.31	1.36	1.25
So. Willow Scrub/FWM	0.35	0.35	0.35	0.35
Other Waters of the U.S.	0.34	0.33	0.33	0.32
Tidal Riprap	0.22	0.22	0.22	0.26

(D) = Disturbed, So. = Southern, Chap = Chaparral, FWM = Freshwater Marsh

[1] CSS already mitigated by the Del Mar Auxiliary Lane Project

[2] Open Water already shaded and impacted with columns of the existing freeway bridge

Table 3.17.2: Temporary Impacts to Habitats for the Four Build Alternatives

	10+4 Barrier	10+4 Buffer	8+4 Barrier	8+4 Buffer (Preferred Alternative)
	Ac	Ac	Ac	Ac
Upland Communities				
Agriculture	2.69	2.53	2.64	2.49
Baccharis Scrub	0.14	0.14	0.14	0.14
Baccharis Scrub (D)	1.01	1.01	1.01	1.01
Bare Ground	2.14	1.88	2.08	1.99
CSS	4.23	4.17	4.19	4.15
CSS (D)	10.26	9.54	10.03	8.91
CSS (D) Already mitigated[1]	5.51	5.26	5.39	5.22
Developed	80.35	77.90	79.11	77.71
Disturbed Habitat	28.50	24.57	27.34	23.59
Maritime Succulent Scrub	0.72	0.49	0.63	0.10
Native Grassland	0.15	0.15	0.15	0.15
Non-native Grassland	14.59	13.76	14.16	13.68
Non-native Woodland	4.65	4.54	4.92	4.58
Ornamental	63.74	59.88	62.31	56.94
So. Maritime Chaparral	0.49	0.46	0.48	0.47
So. Maritime Chaparral (D)	1.45	1.38	1.41	1.37
Wetland Communities				
Arundo Scrub	0.33	0.33	0.33	0.32
Coastal Brackish Marsh	0.91	0.79	0.83	0.77
Coastal Brackish Marsh (D)	2.03	1.61	1.84	1.54
Drainage Ditch	0.70	0.67	0.69	0.66
Disturbed Wetland	0.84	0.82	0.82	0.78
Freshwater Marsh	2.56	2.27	2.42	1.79
Freshwater Marsh (D)	1.02	0.91	0.91	0.69
Mud Flat	0.53	0.46	0.49	0.37
Mulefat Scrub	0.02	0.02	0.02	0.02
Open Water	5.48	5.40	5.33	4.69
Salt Flat	0.04	0.04	0.04	0.01
So. Coastal Salt Marsh	2.88	2.63	2.74	2.67
Salt Marsh Transition	0.60	0.54	0.57	0.53
Southern Willow Scrub	0.18	0.22	0.19	0.15
So. Willow Scrub (D)	2.51	2.17	2.34	2.09
Southern Willow Scrub/FWM	0.82	0.82	0.82	0.82
Other Waters of the U.S.	0.15	0.15	0.15	0.15
Tidal Riprap at bridge abutments	0.35	0.35	0.35	0.34

(D) = Disturbed, So. = Southern, Chap = Chaparral, FWM = Freshwater Marsh
[1] CSS already mitigated by the Del Mar Auxiliary Lane Project

Table 3.17.3: Permanent and Temporary Impacts to Eelgrass by Alternative

	10+4 Barrier	10+4 Buffer	8+4 Barrier	8+4 Buffer
	Ac	Ac	Ac	Ac
Permanent Impacts				
Agua Hedionda	0.22	0.07	0.20	0.07
Batiquitos	0.02	0.02	0.02	0.01
TOTAL	0.24	0.09	0.22	0.08
Temporary Impacts				
Agua Hedionda	0.15	0.13	0.14	0.13
Batiquitos	0.22	0.20	0.22	0.09
TOTAL	0.37	0.33	0.36	0.22

Permanent impacts to biological resources for each of the build alternatives were determined to be those within the boundary of the cut and fill slopes, retaining walls, and/or paved areas. Although the cut and fill slopes would be revegetated, the length of time for construction and large areas to be graded were determined to qualify as a permanent impact to biological resources. The majority of the bridges within the project would be replaced. Permanent impacts due to the bridge columns are not available at this time; therefore, the entire new structure was used as a conservative estimate. Temporary construction impacts were identified as those areas of impact outside of the permanent impact areas required for equipment access and staging to complete construction. Temporary impact areas would generally be in use for up to three years.

Proposed impacts to natural communities are separated into upland and wetland habitats. All four build alternatives impact the same types of habitats with slight differences in total impacts depending on the alternative. Areas of impact were calculated in acres (ac) and then rounded to the nearest hundredth. A summary of biological consequences for each lagoon system also is presented.

Upland/Wetland/Subtidal Communities

Of the proposed impacts to upland communities, less than 20 percent is sensitive habitat or habitat used for nesting and foraging by sensitive species. Agriculture, bare ground, developed, disturbed habitat, and ornamental habitats have all been altered to a great extent by human activities so that they provide low quality wildlife habitat. Non-native woodland is a low-medium quality habitat, but can be used by raptors, songbirds, and other species for nesting and foraging.

The I-5 northbound fill slope between Del Mar Heights Road and the San Dieguito River was impacted in 2001 during construction of an auxiliary lane. Impacts to the CSS on the slope were mitigated off site. Permits and the consultation for this project were granted with the agreement that the slope would be temporarily revegetated with CSS until the final *I-5 NCC Project* construction was completed. After construction of the *I-5 NCC Project*, this slope would be permanently revegetated with CSS; therefore, impacts to CSS on this slope have been anticipated and previously planned for mitigation and new impacts are not identified (*Table 3.17.1*). In addition, since the draft document was completed, the I-5 / Genesee Interchange Project environmental evaluation was completed and all permits and mitigation for the impacts have been obtained. Therefore, impacts in that same area have been eliminated from the *I-5 NCC Project* footprint.

Wetland habitat impacts associated with each of the alternatives would include impacts at the lagoons, as well as the San Luis Rey River, Loma Alta Creek, Encinas Creek, Cottonwood Creek, and numerous small lined and unlined drainage ditches that extend parallel to I-5 *(Figures 3-17.1a* through *3-17.1n*). Subtidal effects would occur in areas with eelgrass. All drainage ditches, arundo scrub, and salt marsh transition habitats are included in the wetland habitats of the State. Impacts to USACE jurisdictional habitat are discussed in the next section. The majority of the impacts to wetland habitats are associated with widening at the lagoons. The majority of the temporary impacts for each of these alternatives is to the open water area under the existing and proposed lagoon bridges during construction, since the only permanent impacts within these areas would be from columns or footings and any riprap on the abutments. No riprap would be used to line the bottom of the channels or to protect bridge columns/footings within the channels.

All build alternatives would have the same footprint south of SR 56. The minimal widening of the current I-5 bridge (built in 1998) over Carmel Creek would result in negligible impacts to wetlands (i.e., ranging from no new impacts to fewer than 100 square ft of new impacts), depending on final design. Impacts to wetland habitats would be partially offset by wetland habitat established as a result of lengthening bridges at San Elijo, Batiquitos, and Buena Vista Lagoons, and replacing the culverts with a new bike bridge at Old Sorrento Valley Road at Carmel Creek. All support columns for the HOV connector/flyover bridge over Los Peñasquitos and Soledad Canyon Creeks would be located entirely outside of the creek channels; and no impacts to wetlands, waters of the U.S., or sensitive upland habitats would occur (see *Table 3.17.5,* below). The minimal impacts associated with widening of the Carmel Creek Bridge, plus replacement of the box culverts on Sorrento Valley Road would result in some fill removal and establishment of 0.44 ac of waters of the U.S./State wetland, with associated establishment of new, partially shaded open water of 0.44 ac.

Specific effects related to each of the build alternatives are discussed below.

10+4 Barrier

The 10+4 Barrier alternative has the largest permanent impact footprint of the four build alternatives. Therefore, it has the most impacts to sensitive upland and wetland habitats. The 10+4 Barrier alternative would permanently impact sensitive upland habitats including 0.45 ac of Baccharis scrub, 1.02 ac of disturbed Baccharis scrub, 12.77 ac of CSS, 51.83 ac of disturbed CSS, 0.30 ac of maritime succulent scrub, 0.01 ac of native grassland, 1.98 ac of southern maritime chaparral, and 1.07 ac of disturbed southern maritime chaparral habitat (*Table 3.17.1* and *Figures 3-17.1a* through *3-17.1n*). The majority of the sensitive habitat impacted would be disturbed CSS on the cut slopes of I-5.

Permanent impacts proposed for the 10+4 Barrier alternative in wetland habitats at the lagoons would be 5.90 ac of southern coastal salt marsh, 1.47 ac of coastal brackish marsh, 4.33 ac of disturbed coastal brackish marsh, 2.68 ac of mud flat, and 2.81 ac of open water (*Table 3.17.1*). The 10+4 Barrier alternative would permanently impact a total of 25.55 ac of wetland habitats (*Table 3.17.1*).

Temporary construction impacts to sensitive upland communities would be 0.14 ac of Baccharis scrub, 1.01 ac of disturbed Baccharis scrub, 4.23 ac of CSS, 10.26 ac of disturbed CSS, 0.72 ac of maritime succulent scrub, 0.15 ac native grassland, 0.49 ac of southern maritime chaparral, and 1.45 ac of disturbed southern maritime chaparral habitat (*Table 3.17.2*). Temporary impacts proposed for the 10+4 Barrier include 5.48 ac of open water and 2.88 ac of southern coastal salt marsh (*Table 3.17.2*).

Eelgrass is considered a special aquatic site and is found in the open water areas of Batiquitos and Agua Hedionda Lagoons. The values in *Table 3.17.3* and *Figures 3-17.2a* and *3-17.2b* represent the eelgrass identified during surveys completed in 2006 and provide an indication to the relative amounts of eelgrass that are likely to be encountered during construction. Permanent impacts to eelgrass resulting from the 10+4 Barrier alternative would be approximately 0.24 ac at Batiquitos and Agua Hedionda Lagoons (*Figures 3-17.2a* and *3-17.2b*). Approximately 0.37 ac of eelgrass would be temporarily impacted by the 10+4 Barrier alternative (*Table 3.17.3*).

10+4 Buffer

The 10+4 Buffer alternative would permanently impact several sensitive upland habitats; including 0.45 ac of Baccharis scrub, 1.02 ac of disturbed Baccharis scrub, 12.43 ac of CSS, 50.65 ac of disturbed CSS, 0.29 ac of maritime succulent scrub, 0.01 ac of native grassland, 1.87 ac of southern maritime chaparral, and 1.05 ac of disturbed southern maritime chaparral habitat (*Table 3.17.1* and *Figures 3-17.1a* through *3-17.1n*). The majority of the sensitive habitat impacted would be disturbed CSS on the cut slopes of I-5 in the southern half of the BSA.

Permanent impacts to 4.56 ac of southern coastal salt marsh, 1.34 ac of coastal brackish marsh, 3.66 ac of coastal brackish marsh (disturbed), 2.49 ac of mud flat, and 2.14 ac of open water would be primarily related to construction at the lagoons (*Table 3.17.1*). The 10+4 Buffer alternative would permanently impact a total of 21.49 ac of wetland habitats (*Table 3.17.1*).

Temporary construction impacts to sensitive upland communities would be 0.14 ac of Baccharis scrub, 1.01 ac of disturbed Baccharis scrub, 4.17 ac of CSS, 9.54 ac of disturbed CSS, 0.49 ac of maritime succulent scrub, 0.15 ac of native grassland, 0.46 ac of southern maritime chaparral, and 1.38 ac of disturbed southern maritime chaparral habitat (*Table 3.17.2*).

The majority of the temporary impacts to wetlands would occur at the lagoons. Temporary impacts to 5.4 ac of open water and 2.63 ac of southern coastal salt marsh would be the largest temporary wetland impacts (*Table 3.17.2*).

Permanent impacts to eelgrass resulting from the 10+4 Buffer alternative would be approximately 0.09 ac at Batiquitos and Agua Hedionda Lagoons (*Table 3.17.3*). Approximately 0.33 ac of eelgrass would be temporarily impacted by the 10+4 Buffer.

8+4 Barrier

The 8+4 Barrier alternative would permanently impact several sensitive upland habitats including 0.45 ac of Baccharis scrub, 1.02 ac of disturbed Baccharis scrub, 12.62 ac of CSS, 50.93 ac of disturbed CSS, 0.29 ac of maritime succulent scrub, 0.01 ac of native grassland, 1.98 ac of southern maritime chaparral, and 1.05 ac of disturbed southern maritime chaparral habitat (*Table 3.17.1* and *Figures 3-17.1a* through *3-17.1n*). The majority of the sensitive habitat impacted would be disturbed CSS on the cut slopes of I-5 in the southern half of the project.

Permanent impacts proposed for the 8+4 Barrier alternative in wetland habitats at the lagoons would consist of 4.74 ac of southern coastal salt marsh, 1.43 ac of coastal brackish marsh, 4.16 ac of disturbed coastal brackish marsh, 2.61 ac of mud flat, and 2.37 ac of open water (*Table 3.17.1*). The 8+4 Buffer alternative would permanently impact a total of 22.91 ac of wetland habitats (*Table 3.17.1*).

Temporary construction impacts to sensitive upland communities would consist of 0.14 ac of Baccharis scrub, 1.01 ac of disturbed Baccharis scrub, 4.19 ac of CSS, 10.03 ac of disturbed CSS, 0.63 ac of maritime succulent scrub, 0.15 ac of native grassland, 0.48 ac of southern maritime chaparral, and 1.41 ac of disturbed southern maritime chaparral habitat (*Table 3.17.2*). Temporary impacts proposed to sensitive wetland communities for the 8+4 Barrier alternative include 1.84 ac of disturbed coastal brackish marsh, 5.33ac of open water, and 2.74 ac of southern coastal salt marsh (*Table 3.17.2*).

Permanent impacts to eelgrass resulting from the 8+4 Barrier alternative would be approximately 0.22 ac at Batiquitos and Agua Hedionda Lagoons (*Figures 3-17.2a* and *3.17-2b*). Approximately 0.36 ac of eelgrass would be temporarily impacted by the 8+4 Barrier alternative (*Table 3.17.3*).

8+4 Buffer (Preferred Alternative)

The refined 8+4 Buffer alternative (Preferred Alternative) would have the fewest permanent impacts of the four build alternatives. The majority of the sensitive upland communities occur around the lagoons and on the slopes of I-5 south of Birmingham Drive. The refined 8+4 Buffer alternative would permanently impact several sensitive upland habitats; including 0.45 ac of Baccharis scrub, 1.02 ac of disturbed Baccharis scrub, 11.24 ac of CSS, 47.94 ac of disturbed CSS, 0.19 ac of maritime succulent scrub, 0.01 ac of native grassland,1.82 ac of southern maritime chaparral, and 1.05 ac of disturbed southern maritime chaparral habitat (*Table 3.17.1* and *Figures 3-17.1a* through *3-17.1n*).

Impacts to southern coastal salt marsh, coastal brackish marsh, coastal brackish marsh (disturbed), mud flat, and open water would be primarily related to impacts at the lagoons (*Table 3.17.1*). The largest permanent impacts associated with this alternative are 2.89 ac of coastal salt marsh and 2.32 ac of mudflat. The refined 8+4 Buffer alternative would impact a total of 18.44 ac of these habitats (*Table 3.17.1*).

The identified temporary impact areas are based on general access needs and right-of-way available. The final construction access areas would be refined as the construction details are known. Temporary construction impacts to sensitive upland communities would be 0.14 ac of Baccharis scrub, 1.01 ac of disturbed Baccharis scrub, 4.15 ac of CSS, 8.91 ac of disturbed CSS, 0.10 ac of maritime succulent scrub, 0.15 ac of native grassland, 0.47 ac of southern maritime chaparral, and 1.37 ac of disturbed southern maritime chaparral habitat (*Table 3.17.2*).

Temporary impacts to wetland communities would result from access through wetlands for construction of new bridges, work platforms, and demolition of old bridges. The majority of the temporary impacts to wetlands would occur at the lagoons. Temporary impacts to 4.69 ac of open water and 2.67 ac of southern coastal salt marsh would be the largest temporary wetland impacts (*Table 3.17.2*).

There is more open water and less fringing marsh near the I-5 at Agua Hedionda; therefore, there is more eelgrass likely to be impacted. There would be approximately 0.08 ac of eelgrass permanently impacted by the 8+4 Buffer alternative at Batiquitos and Agua Hedionda Lagoons. Approximately 0.22 ac of eelgrass would be temporarily impacted by the 8+4 Buffer alternative at Batiquitos and Agua Hedionda Lagoons.

No Build

There would be no impacts to sensitive upland habitats, wetlands, or eelgrass from the No Build alternative. The No Build alternative would not change any of the existing structures; therefore, there would be no change to the current wildlife corridors. However, as there would be no change in the abutment configuration, wildlife would continue to have to move along the narrow, steep abutments to cross under I-5 at the lagoons.

Focused Lagoon Communities Summary

As noted throughout this document, following circulation of the Draft EIR/EIS in 2010, project refinement continued, as did ongoing technical evaluation of North Coast Corridor lagoons. In August 2012, the Supplemental Draft EIR/EIS was circulated, which identified the refined 8+4 Buffer alternative as a locally preferred alternative, and focused on the design refinement for that alternative. Since then, the Section 404(b)(1) LEDPA analysis has been completed (see discussion in *Section 3.18*), and the refined 8+4 Buffer alternative has been identified as the Preferred Alternative. The following information pertains to environmental consequences in lagoon communities from implementation of the refined 8+4 Buffer alternative. *Table 3.17.4* contains a summary of permanent impacts by construction phase and time period; *Tables 3.17.5* through *3.17.10* contain summary information regarding the analysis of bridge options for each of the lagoons.

Table 3.17.4: Permanent Construction Impacts for the 8+4 Buffer Alternative by Phase and Estimated Construction Time Period

Phase	Construction	Estimated construction time period	Impacts (Permanent cut/fill in acres)
1A	Ultimate widening from just north of Lomas Santa Fe Drive to Union Street (includes Manchester DAR, bike paths, trails and new bridge at San Elijo Lagoon)	2015-2018	Sens. upland = 22.08, Wetland* = 0.53
1B	1 NB/SB HOV in median, from Union Street to SR-78 interchange	2015-2018	Sens. upland = 1.06, Wetland* = 0.79
1C	Ultimate widening from La Jolla Village Drive to I-5 / I-805 Merge (includes Voigt DAR and flyover over Peñasquitos Creek; not braided ramps at Genesee Avenue)	2015-2020	Sens. upland = 0.57, Wetland*= 0.13
1D	Batiquitos Bridge Replacement	2015-2020	Sens. upland = 8.80, Wetland* = 3.62
2A	Ultimate widening from I-5 / I-805 merge to SR-56 (includes new Sorrento Valley Road bike/maintenance vehicle bridge, trails under I-5 at Carmel Creek, widening of I-5 at Carmel Creek, and trail under merge	2020-2022	Sens. upland = 0.99, Wetland established = 0.41
2B	Ultimate widening from SR-56 to Lomas Santa Fe Drive (includes San Dieguito Lagoon bridge widening and bike paths/trails)	2020-2025	Sens. upland = 20.60, Wetland* = 3.59
2C	Ultimate widening from Union to Palomar Airport Road	2025-2030	Sens. upland = 3.28, Wetland* = 1.33

Table 3.17.4 (cont.): Permanent Construction Impacts for the 8+4 Buffer Alternative by Phase and Estimated Construction Time Period

Phase	Construction	Estimated construction time period	Impacts (Permanent cut/fill in acres)
3A	Ultimate widening from just north of Palomar Airport Road to SR-76 (includes Agua Hedionda and Buena Vista Lagoon Bridges listed separately below.)	2030-2035	Sens. upland = 0.09, Wetland* = 0.85
3B	Agua Hedionda Lagoon Bridge	2030-2035	Sens. upland = 0.68, Wetland* = 3.77
3C	Buena Vista Lagoon Bridge	2030-2035	Sens. upland = 0.0, Wetland* = 1.14
3D	Roselle to Genesee Braided Ramps	2030-2035	Sens. upland = 5.57, Wetland* = 1.11
	TOTAL		Sens. Upland = 64.83 Wetland* = 17.6

*Wetland identifies wetland habitats that are State jurisdiction, not only USACE jurisdiction

Los Peñasquitos Lagoon

Although the I-5 bridge over Carmel Creek would not be replaced, improvements to the lagoon/creek system would be feasible, including removal of some of the sediment under the bridge to match sediment elevations in both upstream and downstream areas. The amount of sediment that potentially could be removed would be determined following completion of additional surveys and bridge designs. Any impacts to waters of the U.S./State wetlands would be mitigated using a corridor-wide approach, as described in *Section 3.17.3* of this document.

The 10-foot wide bench encompassing the proposed bike/pedestrian trail on the southern abutment of the Carmel Creek Bridge would not result in any impacts to existing wetlands or other sensitive resources. The northern abutment under I-5 would be left in its existing condition, with an eight-foot wide bench for wildlife movement. No new indirect impacts to habitats or wildlife are anticipated.

San Dieguito Lagoon

Impacts resulting from the freeway bridge widening improvements would be limited to open water and salt marsh habitat. Currently, there is no eelgrass habitat near the I-5 bridge crossing (although this habitat could potentially extend upstream as a result of the SONGS restoration project dredging to keep the lagoon inlet open and the associated changes in hydrology). Eelgrass surveys would be completed prior to construction of the bridge (see *Section 3.17.3*).

The widening of the I-5 bridge would result in an additional 2.99 ac of permanent impacts to USACE jurisdictional waters of the U.S. and 3.59 ac of State wetlands as a result of additional road bed fill and columns required to support the widened freeway span (*Table 3.17.6*). The existing bridge shades approximately 0.75 ac of waters of the U.S./open water. The proposed bridge widening would result in shading of an additional 0.42 ac of waters of the U.S. and 0.75 ac State wetland. Impacts to waters of the U.S./State wetlands would be addressed as stated in *Section 3.17.3*.

As noted, a bike/pedestrian trail is proposed on the western freeway slopes across San Dieguito Lagoon. The slopes south of the San Dieguito River Bridge are relatively large and do not have wetlands at the base; therefore, the bike/pedestrian trail would be cut into a large fill slope in this area. North of the San Dieguito River, the right-of-way is very limited and the earthen channel drainage that flows from Via de la Valle to the river would be routed into a pipe for the majority of the length due to roadbed fill. A small portion of the fill would be a result of the bike/pedestrian trail, rather than the freeway. An additional 0.36 ac and 0.5 ac of USACE (included in the impact totals) jurisdictional waters of the U.S. and waters of the State would be impacted, respectively. The bike/pedestrian trail would be located toward the top of the slope. The slopes of the San Dieguito watershed are generally higher than other lagoons, and the bike/pedestrian trail would be located as far from sensitive habitats as feasible. The bike/pedestrian trail would be fenced and signed to keep users on the trail and no turn outs would be provided for users to stop beside the lagoon. Although a new facility, indirect impacts from bicycle movement and proximity of people to the marsh are anticipated to be minimal due to the upslope location and the lack of opportunities to leave or stop along the trail.

Adjacent to the east side of I-5 as it crosses the San Dieguito River Valley is the City of San Diego W6 Site. Owned by the City Wastewater Department, this approximately 14-ac site is reserved for City mitigation needs. Wetland habitat east of and along the base of the I-5 slope would be wholly avoided through use of a short retaining wall. As a result, no impacts to the wetland would occur and the connection to the river would remain intact.

Caltrans is requiring SCE to place culverts within their proposed permanent access road under I-5 that would connect and drain this wetland to the river.

San Elijo Lagoon

Proposed I-5 bridge construction across San Elijo Lagoon with a 261-foot channel bottom width would result in establishment of 1.1 ac of new wetland. The project would require placement of 0.60 ac of additional roadbed fill within USACE jurisdictional waters of the U.S. and 1.01 ac of additional fill within State wetlands. The net result would be establishment of 0.50 ac of USACE jurisdictional waters of the U.S. and 0.09 ac of State wetlands. In addition, the project would result in additional shading impacts to 1.79 ac of waters of the U.S. and State wetlands due to the wider and longer span of the bridge over the existing and newly established wetland (*Table 3.17.7*). Construction of the longer optimized bridge would also allow for a wider range of restoration alternatives for SELRP (although specific benefits of the longer bridge on lagoon habitats would be dependent on the restoration alternative selected).

If the existing 130-foot channel width were retained, bridge construction would result in net permanent impacts to 0.63 and 0.99 ac of waters of the U.S. and State wetlands, respectively (*Table 3.17.7*).

Connections to the suspended section of the bike/pedestrian trail would occur within area already disturbed for bridge improvements. A 6-foot high retaining wall would support a 12-foot wide bike/pedestrian trail within the same slope footprint, without an increase in direct impacts. All paths would be fenced and signed to keep pedestrians on the improved areas and out of the sensitive lagoon habitats and wildlife corridors. The new bike/pedestrian trail connections would be designed to prevent bicycle access (using bollards or a U-shaped design) to the pedestrian trails that directly access the ecological reserve.

Although the proposed pedestrian crossing from Manchester Avenue would be likely to increase use of the San Elijo Lagoon trails, the new bike/pedestrian trail and pedestrian paths would be fenced and signed to minimize off-path activity. Bike/pedestrian trails and paths would be signed to allow or restrict pet presence consistent with current allowed uses. Due to the bike/pedestrian trails being fenced, as well as maintained in accordance with a formal maintenance agreement with the City of Solana Beach, increased indirect impacts to the lagoon are not expected. In the vicinity of the lagoon, the bike/pedestrian trail would be placed closer to I-5 to minimize indirect effects to sensitive saltmarsh species. This section of the bike/pedestrian trail would be a through route across the lagoon without access to existing pedestrian-only trails in the lagoon and no turn outs would be provided for users to stop beside the lagoon. Indirect impacts resulting from the proposed pedestrian paths and bike/pedestrian trail are therefore also likely to be low.

Batiquitos Lagoon

Under currently anticipated phasing with the Batiquitos Bridge being widened during the first phase, widening of I-5 and replacement of the bridge would result in permanent project-related impacts at Batiquitos Lagoon to native habitats (including 3.13 ac of USACE jurisdictional habitat and 3.62 ac of State wetland, shading of an additional 0.44 ac of open water) as well as to sensitive species (*Table 3.17.8*). Eelgrass is located in proximity to I-5, and could be impacted.

The existing unpermitted trail and bridge have resulted in trampling of existing vegetation, as well as indirect edge effects along the trail, which is unrestricted by fences and signs. The proposed pedestrian path would cross the high marsh on a boardwalk where the existing trail cuts across to the freeway slope from the cul-de-sac. On slope, the pedestrian path would be fenced and signed to keep pedestrians on the trail and no pets would be allowed. Although use of this path would be likely to be more frequent than existing trail use, the path would be further upslope away from the marsh and fenced to keep pedestrians from moving off the improved area. This should minimize indirect impacts and eliminate the trampling of vegetation and associated erosion that are occurring on the unpermitted trail. The bike/pedestrian trail would extend across the lagoon on the west side of I-5 and would be located near the top of the freeway slope in order to minimize indirect impacts to the adjacent wetlands. The bike/pedestrian trail also would be fenced and signed to keep bikes on the bike/pedestrian trail and off pedestrian-only paths and trails. No turn outs would be provided for users to stop beside the lagoon. The trail location proposed in the Draft EIR/EIS (to the south across the channel and connecting to the La Costa park and ride) has been eliminated due to potential impacts to sensitive species in the lagoon and associated least tern nesting area.

Indirect effects such as increased dust, lighting, invasive species, and noise would be minimized through the conservation measures identified in *Section 3.17.3*.

Agua Hedionda Lagoon

Permanent project-related impacts to Agua Hedionda Lagoon from replacement and widening of the bridge would be associated with additional roadbed fill for widening the freeway, removal of existing columns and replacement with new columns, and placement of riprap on the abutments. Riprap on the abutments would come down the slope, but would not be placed in the bottom of the channel. Impacted habitats would consist primarily of open water and mudflat, with some eelgrass beds also affected. Specifically, the project would permanently impact approximately 3.56 ac of USACE jurisdictional waters of the U.S. and 3.77 ac of State jurisdiction wetland (*Table 3.17.9*).

Calculations for temporary impacts for access and staging during construction would be determined as design proceeds. An additional 0.37 ac of shaded waters of the U.S. (i.e., beyond those shaded by the existing bridge) would occur with the widened replacement bridge. Eelgrass impacts are anticipated and surveys would be conducted prior to, during, and after I-5 construction, as described below in *Section 3.17.3*.

With regard to the proposed north/south bike/pedestrian trail on the east side of Agua Hedionda Lagoon, some CSS is located downslope from the proposed bike/pedestrian trail on the southeastern slope. No direct impacts to this area are anticipated. A short retaining wall would allow for bike/pedestrian trail construction without additional impacts to the waters of the U.S./State wetland. While the proposed bike/pedestrian trail could increase public use in this area, no associated indirect impacts are anticipated based on existing high levels of human use of the area by boaters, jet skiers, paddlers, and the like, as well as the general absence of sensitive habitats and species.

Buena Vista Lagoon

The original proposed crossing would place 1.12 ac of additional roadbed fill into USACE waters of the U.S. and 1.39 ac of fill into State wetland. Approximately 0.15 ac of additional shaded waters of the U.S./State wetland would occur (*Table 3.17.10*). Widening of I-5 and replacement of the bridge under currently anticipated project phasing would result in permanent project-related impacts at Buena Vista Lagoon including 0.81 ac of USACE jurisdictional habitat and 1.0 to 1.14 ac of State wetland, as well as shading of an additional 0.48 ac of open water.

Wildlife Corridors

I-5 currently acts as a wildlife barrier to east-west movement. Each of the lagoons, rivers, and creeks and the surrounding upland habitat are potential corridors for wildlife to cross from east to west. Widening the freeway would not necessarily cut off these corridors; however, they may make existing crossings less attractive for use by wildlife. Studies have found that wildlife, especially large mammals, use wildlife crossings/corridors that are wider as the length of travel increases. Most of the existing lagoon bridges have steep, narrow abutments that are used by wildlife. The new bridges at the lagoons are being designed with a bench at the abutment to facilitate wildlife movement as well as use by hikers. Although wildlife avoid people, the wildlife generally would be using the trails under the bridges at night and the hikers generally would be using the trails during the day. Corridors at locations where bridges would not be replaced, San Dieguito and San Luis Rey, should not be further constrained due to large areas for movement and minimal increases to bridge width. The slight change in the width of the bridges of the four build alternatives would have an incremental effect on wildlife using these bridges for crossings. Corridor elements specific to each lagoon are described below.

Los Peñasquitos Lagoon

Wildlife would be free to move under the bridge. A 10-foot wide bench would be provided on the southern abutment of the Carmel Creek Bridge. The northern abutment under I-5 would be left in its existing condition, with an eight-foot wide bench for wildlife movement. Wildlife currently use a sloped abutment for movement in the vicinity of the I-5 bridge at Carmel Creek. Wildlife would be able to move from the lagoon under the bike/pedestrian bridge and the I-5 bridge and continue up Carmel Creek into the CVREP area. The northern abutment of the bike bridge would have an eight-foot bench (earthen pathway) that would connect to the bench under I-5. The northern abutment would be maintained for wildlife movement.

San Dieguito Lagoon
The large area south of the channel that is under the existing bridge has over 400 ft available for wildlife movement, although the existing bridge is supported by bent wall bridge supports that can produce a "tunnel effect." The widened portion of the bridge also would be placed on bent walls for structural stability. Caltrans is reviewing the possibility of cutting holes into the existing, as well as the widened, support walls to allow light to pass through, thereby creating a more open feel.

Agua Hedionda Lagoon
A 16-foot-wide bench for wildlife crossing would be placed on both the northern and southern bridge abutments.

San Elijo Lagoon
Wildlife movement was considered for both northern and southern abutment areas. Because the I-5 bridge extends over Manchester Avenue on the north, the existing intervening traffic and physical constraints eliminate the possibility for the northern abutment to accommodate a wildlife corridor. A 12-foot-wide bench to facilitate wildlife movement would be provided on the I-5 southern abutment, below a proposed 12-foot-wide fenced pedestrian path. The wildlife bench would be physically separated from the pedestrian path and located at a lower elevation (closer to the channel water line).

Batiquitos Lagoon
New abutments would be built with 16-foot benches (for wildlife movement on the southern abutment, and for use as a pedestrian path and a wildlife corridor on the northern abutment). This bench on the southern abutment would be located at an elevation a few feet above the high tide line to allow for wildlife to travel along the edge of the channel. This northern abutment pedestrian path/wildlife corridor could be fenced with a split rail fence for both wildlife and pedestrian use or divided with a fence to separate a 10-foot wide pedestrian path from 6 ft used by wildlife. Due to limitations in clearance, the northern abutment bench cannot be split into two levels to provide for wildlife movement wholly separated from pedestrians. While both human and animal populations would use the same footprint, the majority of wildlife movement is expected to occur at night, when pedestrians would not be expected to be present.

Buena Vista Lagoon
Sixteen-foot benches for wildlife crossings would be built at both north and south I-5 abutments to accommodate use by small- and medium-sized mammals.

3.17.3 Avoidance, Minimization, and/or Mitigation Measures

3.17.3.1 Avoidance and Minimization through Project Design

All of the project build alternatives incorporate design features to minimize impacts. With identification of the Preferred Alternative, if the project is approved, the smallest possible footprint would be implemented, the refined 8+4 Buffer alternative. This alternative would result in the fewest footprint impacts, as detailed on tables within this section.

Permanent impacts to CSS have been minimized where possible along the right-of-way by construction of retaining walls and minimizing the grading behind the walls. There may be temporary impacts due to construction access in these areas; however, the CSS would be restored when construction is completed.

Due to the fact that I-5 already crosses six coastal lagoons and/or their tributaries, wetland impacts could not be completely avoided. To minimize impacts to all sensitive habitats, the slopes of the freeway were designed at a steeper 2:1 grade versus the standard 4:1 grade. Several design alternatives were examined to minimize fill placed in the lagoons, including using retaining walls and steeper fills than 2:1. However, the sandy soils within the vicinity of the lagoons would not support steeper fill slopes. As a result of these geotechnical concerns, 2:1 horizontal to vertical grade is the steepest grade anticipated during construction for fill slopes. To further minimize impacts, retaining walls were also included in the project design on cut slopes, but could not be used on fill slopes. Through analysis of lagoon sediment data from geotechnical borings, it was determined that lagoon soil liquefaction would prevent the use of retaining walls to minimize the roadbed fill in the lagoon. Soil liquefaction requires that any structures taller than approximately six ft have support piles that are driven to bedrock, which is located at a depth of over 100 ft. All pilings for the bridge supports would be driven to this depth, but this would not be practical for retaining walls. Riprap is used to protect the existing abutments and would also be used to protect the abutments of the proposed bridges. Due to the depth of bridge pilings, riprap is not required to armor the channel bottoms.

Potential impacts from auxiliary lanes have been minimized where possible, especially in the vicinity of the lagoons. Auxiliary lanes were only included in the project design where required to relieve traffic congestion and weaving issues between on- and off-ramps. For instance, potential impacts associated with a proposed auxiliary lane between La Costa Avenue and Poinsettia Avenue across Batiquitos Lagoon were avoided, based on elimination of this potential auxiliary lane when traffic analysis determined that it would not be required.

To avoid impacts to wetlands from fill associated with creation of 12-foot-wide bike/pedestrian trails, short retaining walls (six ft or lower in height) would be used.

Another impact minimization option being examined at Batiquitos Lagoon and Buena Vista Lagoon would involve obtaining funds to replace these bridges in the first phase of construction (prior to construction of a proposed HOV lane in the median), instead of later in the construction process. This would reduce the overall bridge widths required for staging the bridge replacements, thus reducing wetland impacts by more than an ac at each lagoon. Funds have been secured to move the Batiquitos Bridge forward to the first phase of construction, reducing impacts by almost 1.7 ac to wetland and over 1.0 ac of sensitive upland. Widening of I-5 and replacement of the bridge under currently anticipated project phasing at Buena Vista Lagoon would result in permanent project-related impacts; including 0.18 ac of USACE jurisdictional habitat and 1.0 to 1.14 ac of State wetland, as well as shading of an additional 0.48 ac of open water. If replacement of the bridge at Buena Vista Lagoon occurs during the HOV extension instead, it would permanently impact 0.73 ac of USACE jurisdictional habitat and 1.0 ac of State wetland (calculated as impacts from new roadbed fill minus the established habitat from the widened channel) and would result in 0.39 ac of additional shaded open water. This option would therefore minimize the direct wetland impacts by 0.08 and 0.14 ac, respectively, for federal and State jurisdictions compared to the currently proposed phasing plan, and would result in less shaded water at 0.08 ac. Additional funding to move the replacement of the Buena Vista Lagoon Bridge forward is not available at this time. Proposed work on the interchange at I-5 and SR-78 may, however, require the wider bridge.

Further information on the I-5 / SR-78 interchange and proposed restoration of this lagoon will be gathered before any funding would be released.

3.17.3.2 Conservation Measures

In addition to the impact minimization design features discussed above, the following conservation measures are proposed to avoid or minimize project-related impacts to habitats and species.

- All removal of native vegetation or non-native shrubs and trees located within the impact areas would be completed outside of the bird breeding season (February 15 to August 31), if possible, to avoid impacts to nesting birds. Otherwise, a qualified biologist would thoroughly survey all vegetation prior to removal to ensure there are no nesting birds on site. If nesting birds are identified on site, vegetation removal would be delayed until the chicks have fledged or the nest has failed.

- Eelgrass surveys would be completed at all lagoons with the exception of Buena Vista prior to bridge construction. In lagoons where eelgrass is identified in proximity to I-5 improvements, eelgrass surveys would continue during and after construction, and mitigation would be implemented in accordance with the Resource Enhancement and Mitigation Program (REMP; referred to as the Resource Enhancement Program [REP] in the Supplemental Draft EIR/EIS; included as Appendix P).

- Impacts to native upland habitats would be mitigated on a corridor-wide basis through the proposed North Coast Corridor REMP.

- Any seeding of native upland habitats would be completed between October and February to ensure that the seed has proper conditions for germination.

- Project work within open water habitat in the San Luis Rey River in occupied goby critical habitat would be minimized to approximately 500 square ft of permanent impacts from bridge pilings, 0.3 ac of bridge shading, and 0.2 ac of temporary impacts. Cofferdams at bridge footings would be used such that project construction would not require diversion or relocation of the active channel. The project would not conduct actions resulting in the breach of seasonal San Luis Rey River estuary berms. Construction berms would not be used within the San Luis Rey River or lagoons in order to minimize impacts on the active channel and avoid sedimentation impacts.

- Permanent project lighting would be of the lowest illumination necessary for safety and directed toward the roadway, park and rides, and other project facilities, and away from sensitive habitats. Light glare shields would be used to reduce the extent of illumination into sensitive habitats. Lighting adjacent to lagoons would be fitted with bird control spikes to ensure that raptors would not be able to perch on project lighting to prey on listed bird species. With the exception of pathway lighting for the NC Bike Trail, there would be no night lighting of trails within lagoons, wildlife corridors, and sensitive habitat areas. Pathway lighting for the NC Bike Trail would be of the lowest illumination necessary for safety and designed to avoid light spill into adjacent sensitive habitats and wildlife movement areas. Caltrans would coordinate with the USFWS regarding the design of pathway lighting for the NC Bike Trail to ensure that the lighting would not negatively affect wildlife movement in the project area. Caltrans would review the permanent lighting plans and then submit them to the USFWS for review and approval.

- All pedestrian and bike trails would be fenced in a manner to encourage users to remain on the trails and paths. In areas where wildlife movement is expected, such as along river and lagoon bridge benches, fencing would be designed in a manner to encourage users to remain on the trails and paths but which would not preclude wildlife from moving through habitat areas and accessing pedestrian benches during flood events (e.g., spilt three rail fencing). Signage would be posted and maintained at conspicuous locations to inform users about adjacent sensitive habitats and species as well as access restrictions. Plans for fencing and signage for each phase of project construction would be submitted to the USFWS for approval at least five days prior to initiating project impacts in each phase. Fencing and signage would be installed prior to completion of each phase of project construction.

- The following wildlife connectivity features would be constructed to ensure that ecosystem functions are maintained for the benefit of listed species:
    - Wildlife crossings identified at each lagoon above would be constructed.
    - Bridges where wildlife movement is expected would use columns rather than pier walls to improve visibility and openness and encourage wildlife use, including Carmel Creek, Los Peñasquitos and Soledad Canyon Creeks, and all lagoons (with the exception of San Dieguito Lagoon and the San Luis Rey River where pier walls may be required for stability).
    - To the maximum extent feasible, rock slope protection would be avoided at wildlife benches. If rock slope protection is required, modifications (e.g., small pebble, dirt, soil-covered rip rap, or grouted movement pathways) would be made such that animals of all sizes can use the wildlife benches.
    - Monitoring would be conducted on the effectiveness of the wildlife connectivity features such that the effectiveness of wildlife connectivity features can be improved and to inform decision-making for future projects. This monitoring would include research on the degree to which various undercrossings are used by target species. Remote cameras would be used to document use of wildlife undercrossings. Monitoring would be conducted over a minimum of five years following construction of each wildlife connectivity feature to allow wildlife to become accustomed to the wildlife connectivity features. Annual monitoring reports, including photographs, modifications made to wildlife connectivity features to improve their functionality, and recommendations, would be provided to the USFWS each year for the duration of the five-year monitoring period following each phase of project construction.
    - Wildlife benches would be maintained in perpetuity to ensure that wildlife connectivity in the project area is not lost over time. The wildlife connectivity plan would include a detailed explanation of how wildlife benches would be maintained and how maintenance would be funded.

- Caltrans would submit final project design plans to the USFWS for review and approval, based on the draft plans dated August 22, 2012, with the following revisions: (1) gateway undercrossings and overcrossings adjacent to lagoons would not include decorative night lighting or vertical features that may be used as a perch by raptors to prey upon listed species; (2) the design and elevation of suspended pedestrian bridges would not impede access by maintenance dredges at lagoons; (3) plans would clearly show that areas of temporary impact to native habitats would be revegetated with native plant species; and (4) plans would specify that the height of vegetation planted near coastal lagoons would be limited (e.g., coastal sage and chaparral species up to approximately eight ft in height) to prevent perching and predation by raptors on listed species.

- Appropriate best management practices (BMPs) would be used to control erosion and sedimentation and to capture debris and contaminants from bridge demolition and construction to prevent their deposition in coastal lagoons and waterways. No project-related sediment or debris would be allowed to enter lagoons, creeks, rivers, or other drainages. All debris from the demolition and construction of bridges would be contained so that it does not fall into channels. Appropriate BMPs would be used during construction to limit the spread of resuspended sediment and contain debris; and may include cofferdams, blasting mats, silt curtains, turbidity curtains and/or other barriers. Water within cofferdams would not be returned to the San Luis Rey River or lagoons until it is clear and clean. This may be accomplished through the use of desiltation tanks or other appropriate measures. Collected sediments would be removed from the site and disposed of properly. BMPs (e.g., gravel bags) would be used at the discharge point to avoid erosion.

- All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other such activities would be restricted to designated areas that are a minimum of 100 ft from drainages/lagoons and associated plant communities, to preclude adverse water quality impacts. Fuel cans and fueling of tools would not be allowed inside the drainages.

- Impacts from fugitive dust would be avoided and minimized through watering and other appropriate BMPs.

- Bioswales and detention basins would be placed to avoid impacts to wetlands (e.g., these features would not be located at the base of slope within lagoons).

- The project site would be kept as clear of debris as possible. All food-related trash items would be enclosed in sealed containers and regularly removed from the site. All spoils and material disposal would be disposed of properly.

- If fill must be borrowed from or disposed of offsite, the construction contractor would identify any necessary borrow and disposal sites and provide this information to Caltrans for review. Caltrans would review borrow and disposal site information and submit the information to the USFWS. If borrow or disposal activities may affect a listed species or critical habitat, FHWA/Caltrans would reinitiate Section 7 consultation.

- Contractors and construction personnel would strictly limit their activities, vehicles, equipment, and construction materials to the fenced project footprint.

- All native or sensitive habitats outside and adjacent to the permanent and temporary construction limits would be designated as Environmentally Sensitive Areas (ESAs) on project maps. ESAs would be temporarily fenced during construction with orange plastic snow fence, orange silt fencing, or in areas of flowing water, with stakes and flagging. No personnel, equipment or debris would be allowed within the ESAs. Fencing and flagging would be installed in a manner that does not impact habitats to be avoided and such that it is clearly visible to personnel on foot and operating heavy equipment. Excepting plans for clearing to install temporary fencing, Caltrans would submit to the USFWS for approval, at least five days prior to initiating project impacts, the final plans for initial clearing and grubbing of habitat and project construction.

- During project construction all invasive species included on National Invasive Species Management Plan, the State of California Noxious Weed List, and the California Invasive Plant Council's (Cal-IPC) Invasive Plant Inventory list found growing within the project right-of-way would be removed. Weed removal would be conducted within the project disturbed area at least once per year during the construction period. Special care would be taken during transport, use, and disposal of soils containing invasive weed seeds and all weedy vegetation removed during construction would be properly disposed of to prevent spread into areas outside of the construction area.

- Caltrans would submit draft San Dieguito Lagoon W19, Hallmark, Dean, San Elijo Uplands, Deer Canyon, Laser, and La Costa wetland and upland establishment / restoration / enhancement plans to the resource agencies for review and approval prior to initiating project impacts. Caltrans would provide the final plans to the resource agencies.

- Perpetual biological conservation easements or other conservation mechanisms acceptable to the USFWS would be recorded over the areas established, restored, and/or preserved / enhanced by the project at the San Dieguito Lagoon W19, Hallmark, Dean, San Elijo Uplands, Deer Canyon, Laser, and La Costa properties.

- Caltrans would prepare and implement perpetual management, maintenance, and monitoring plans for the San Dieguito Lagoon W19, Hallmark, Dean, San Elijo Uplands, Deer Canyon, Laser, and La Costa properties. Caltrans also would establish non-wasting endowments for amounts approved by the USFWS based on Property Analysis Records (PAR) (Center for Natural Lands Management ©1998) or similar cost estimation methods, to secure the ongoing funding for the perpetual management, maintenance and monitoring of these properties.

- Caltrans would establish a non-wasting endowment for an amount approved by the resource agencies, based on reliable and current estimates of maintenance costs, for long-term maintenance of Batiquitos and Los Peñasquitos Lagoons, including lagoon inlet maintenance and dredging. Caltrans would submit the estimates and information to demonstrate that the endowment would be non-wasting, and would adequately cover the costs of maintenance, to the resource agencies for review and approval. Caltrans would make the endowment available for use within one year of establishment of the endowment, which would be established no later than December 1, 2015. Any delay in availability of funds would be reviewed and approved by the resource agencies.

- Caltrans would establish non-wasting endowments for amounts approved by the USFWS, based on reliable and current estimates of maintenance costs, for long-term maintenance of the large-scale lagoon restoration at San Elijo Lagoon and/or Buena Vista Lagoon. Caltrans would submit the endowment estimates to the resource agencies for review and approval. The endowments are anticipated to be established during the year in which the large-scale lagoon restoration work is completed and no later than December 1, 2019, unless a written extension is requested by Caltrans showing good faith efforts to establish the endowment and the extension request is granted by the USFWS. Funds would be available for use within one year of establishment of the endowments.

- All areas of temporary impact would be revegetated and restored with native species. These areas are outside of the cut and fill areas of the project and would be returned to the original contours and then restored, as feasible, after work is completed. Prior to initiating project impacts, a restoration plan would be developed for the temporary impact areas. The plan would be submitted to the resource agencies for review and approval. This plan would include a detailed description of restoration methods, slope stabilization, and erosion control, criteria for restoration to be considered successful, and monitoring protocol(s). Following the completion of construction activities within each area of impact, the restoration plan would be implemented for a minimum of five years, unless success criteria are met earlier and all artificial water (irrigation) has been off for at least two years. Temporary impact areas would be planted as soon as possible following re-grading after completion of construction to prevent encroachment by non-native plants.

- Cut and fill slopes adjacent to native plant habitats would be revegetated with native plant species similar to those within the project study area as feasible, including over 86 ac of slopes near lagoons and other open space that would be revegetated with coastal sage scrub. Duff and rare plants from areas with coastal sage scrub, maritime succulent scrub, and maritime chaparral may be salvaged from the project impact footprint to the extent practicable to aid in revegetating slopes with native plant species (excluding areas with invasive non-native species such as African veldt grass and onion weed). The revegetated areas would have temporary irrigation and would be planted with native container plants and seeds selected in coordination with the Caltrans Project Biologist. At least three years of plant establishment/maintenance on these slopes would be conducted to control non-native plants. Bioswales and detention basins would be planted with appropriate species as determined in coordination with the Caltrans Project Biologist and storm water pollution prevention professional. These areas would be planted as soon as possible following completed construction to prevent encroachment by non-native plants. Slopes and interchanges located adjacent to developed urban areas would be planted with native and drought tolerant non-invasive species selected by the biologist and landscape architect.

3.17.3.3 Compensatory Mitigation

REMP

The North Coast Corridor includes approximately 30 miles of coastline that is recognized for a number of unique and important marine and environmentally sensitive habitat areas. The Public Works Plan/Transportation and Resource Enhancement Program (PWP/TREP, Appendix R) being developed under the Coastal Act identifies and coordinates the included construction projects and mitigation under one umbrella; supporting permitting by the CCC and federal consistency with the Coastal Act. The *I-5 NCC Project,* the proposed I-5 / SR-78 Interchange Project, and LOSSAN double-tracking projects, as well as some other enhancements (trails, train stations, etc.) would be mitigated through the Resource Enhancement and Mitigation

Program (REMP). The coastal watersheds, lagoons, and upland areas in the corridor provide a range of diverse habitats and ecosystems that support a variety of plant and wildlife species. Due to the location of the proposed PWP/TREP improvements, the sensitive habitats traversed by the planned corridor improvements, and the sensitive species living along the corridors, all impacts to coastal resources cannot be avoided. SANDAG and Caltrans have coordinated with the regulatory and resource agencies for many years through the *I-5 NCC Project* environmental review processes, as well as applicable permit processes for each agency with jurisdictional oversight over resources within the PWP/TREP planning area. The PWP/TREP REMP has been developed to identify compensatory mitigation opportunities to address these unavoidable impacts, and to implement projects that benefit existing natural resources, which exceed standard ratio-based compensatory mitigation programs. The PWP/TREP planning area has been defined as the Service Area for compensatory mitigation opportunities needed to offset impacts associated with approved PWP/TREP transportation infrastructure and community enhancement projects. Although the REMP covers all corridor impacts as part of the PWP/TREP, this Final EIR/EIS addresses mitigation relevant and specific to impacts identified for the *I-5 NCC Project*. This section summarizes the requirements of the approved REMP, a copy of the entire REMP is included as Appendix P.

The proposed REMP employs a combination of measures to mitigate for coastal resource impacts resulting from implementation of the PWP/TREP transportation infrastructure and community enhancement projects. The constrained, primarily built-out condition of the North Coast Corridor leaves few opportunities for land acquisition typically necessary to implement traditional, ratio-based compensatory mitigation. However, the North Coast Corridor is home to six major lagoon systems that represent some of southern California's most significant natural resource areas. These lagoon systems, associated upland habitat, and riparian wetland interface and their contributing watersheds provide large, contiguous areas that support sensitive habitats for a variety of plant and wildlife species, and provide water quality, flood control, groundwater recharge, and recreational benefits. The North Coast Corridor's lagoon systems and their habitats are biologically unique and cannot be replicated elsewhere. As such, the REMP focuses on opportunities to protect these lagoon systems from potential future degradation and to expand, restore, and/or enhance, habitat within these systems. This approach requires comprehensive solutions with efforts focused on ecosystem-wide enhancements, including preservation, restoration, and long-term management. The REMP approach to: (1) evaluating and implementing compensatory mitigation projects at a regional scale and in advance of PWP/TREP project impacts, and (2) designing lagoon bridges to avoid and minimize project impacts, results in greater benefits to coastal resources throughout the corridor than if only ratio-based, project-level and site-specific compensatory mitigation were employed.

The REMP includes options for allocating funds from SANDAG's Environmental Mitigation Program (EMP) for a variety of regionally significant mitigation opportunities; including the establishment, restoration (re-establishment or rehabilitation), enhancement, preservation, and long-term management of coastal wetlands and adjacent riparian areas, other transitional habitats, and upland habitat areas. These mitigation activities include: (1) acquisition of habitat parcels for the REMP because of the sites' contribution to protecting and enhancing North Coast Corridor lagoon system and watershed functions and services, and meeting no net loss through establishment and restoration, (2) acquisition, preservation, and if necessary, enhancement, of parcels that contribute to regionally significant resources, including upland habitat areas, (3) planning and implementation of regionally significant lagoon restoration projects, (4) providing long-term non-wasting endowments for two regionally significant lagoons to fill funding gaps for maintenance and management activities, and (5) funding a Scientific Advisory Committee to provide technical support for the design, implementation, and monitoring of the suite of mitigation activities described in the REMP (see Figure 1 of Appendix P).

The designs of bridges that cross lagoons have been evaluated through intensive hydraulic and sediment transport analyses to allow for full tidal exchange, restore/improve wildlife movement, and to maximize the avoidance and minimization of direct and indirect impacts of the *I-5 NCC Project* as required by the resource and regulatory agencies. These optimized bridges and increased lagoon channel cross sectional areas protect existing tidal lagoon system functions and services and do not constrain future options for restoring tidal flows to lagoons that are currently restricted. The optimized bridge lengths and channel configurations are included in the REMP; however, funding for these enhancements would be provided through capital expenditures.

REMP Overview and Goals

For the Coastal Commission, the REMP provides for mitigation planning and implementation through the North Coast Corridor PWP/TREP process to effectively mitigate *I-5 NCC Project* impacts in a manner that addresses regionally significant resource needs. For the USACE, the REMP is being utilized as a Planning Level Compensatory Mitigation Plan for permitting individual projects within the North Coast Corridor that are authorized to use one of the described compensatory mitigation sites. In addition, the REMP would guide the development of detailed site-specific Habitat Mitigation and Monitoring Plans (HMMPs) for each of the compensatory mitigation sites in order to support permittee-responsible advance mitigation. For the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW; previously California Department of Fish and Game), National Marine Fisheries Service (NMFS), and the San Diego Regional Water Quality Control Board (RWQCB), the REMP is being utilized as the overall compensatory mitigation package for the covered projects. However, pursuant to each agency's jurisdictional authority and purview, agency-specific permits or consultations may result in additional requirements or procedures to be followed for project impacts and mitigation sites. Overall, the REMP provides the planning and implementation framework to ensure that the most valuable, high quality compensatory mitigation opportunities in the North Coast Corridor are identified, secured, and prioritized for implementation in a manner that cost-effectively utilizes available mitigation funding to maximize benefits to the natural resources with the North Coast Corridor.

The overall goal of the REMP is to enhance and restore the biodiversity and habitat functions and services of critical ecological coastal resources within the North Coast Corridor as compensatory mitigation in advance of unavoidable impacts associated with planned PWP/TREP transportation projects and community enhancement projects. This goal is being achieved through (1) the acquisition of habitat mitigation parcels in consideration of the sites' contributions to protecting and enhancing North Coast Corridor lagoon system and watershed functions and services and meeting no net loss through establishment and restoration, in accordance with mitigation activities 2 through 5 of the REMP described above. All compensatory mitigation sites include long-term non-wasting endowments to fund management in perpetuity. Funding for projects included within the REMP is directed to those sites identified as addressing the most critical ecological needs in the North Coast Corridor while respecting project phasing, mitigation needs identified in the PWP/TREP, anticipated compensatory mitigation requirements by regulatory agencies, and the voter-adopted TransNet Expenditure

Plan's EMP budget for the North Coast Corridor. The resource mitigation program is intended to be flexible and adapt to future changes in opportunities, while promoting mitigation in advance of impacts.

The opportunities identified within this REMP, including early acquisition of sites containing high-value habitat for long-term preservation, will be phased ahead of or concurrent with unavoidable impacts from planned PWP/TREP transportation infrastructure and community enhancement projects. Implementing REMP and individual compensatory mitigation sites in advance of unavoidable impacts would serve to reduce typically required mitigation ratios by reducing the uncertainty of location, type, and quantity of mitigation and reducing temporal loss of habitat acreage, functions, and services, from construction-related impacts. In addition, phasing transportation facility infrastructure at sensitive locations has been specifically designed to avoid and minimize impacts, protect existing lagoon system functions and services, and allow for future large-scale lagoon restoration projects.

REMP Funding

The *TransNet* Extension Ordinance approved by the San Diego voters in November 2004 established SANDAG's EMP for the advancement of mitigation for resource impacts associated with regional and local transportation projects. The REMP is structured to support the region's efforts to develop a comprehensive regional mitigation strategy utilizing the *TransNet* EMP, as an integrated element of the PWP/TREP Implementation Plan. The REMP prioritizes expenditure of EMP funds on a corridor-wide level, with an emphasis on advanced habitat establishment, restoration, enhancement, and preservation; improvement of the ecological health of sensitive habitats through funding of system-wide restoration; and establishment of endowments designed to enhance lagoon system function and values.

Resource Impacts and Mitigation Opportunities

Table *3.17.11,* below, includes the total anticipated permanent impacts resulting from the North Coast Corridor transportation infrastructure and community enhancement projects to be authorized by the PWP/TREP under the Coastal Act and other regulatory permit mechanisms, such as Clean Water Act Sections 401 and 404 and/or Rivers and Harbors Act Section 10 permit authorization. This table also includes a summary of the compensatory mitigation opportunities (and cost estimates) by type and acreage to satisfy regulatory agency permitting requirements. To ensure impacts can be adequately mitigated in advance and to provide contingency mitigation, the mitigation opportunities have been categorized into three "pools." Combined, these compensatory mitigation opportunities are expected to enhance regionally significant resources beyond traditional project-by-project ratio-based mitigation requirements. In addition, the REMP includes funding for formation of an independent Scientific Advisory Committee; made up of scientists charged with providing scientific technical support through the design, implementation, and monitoring of the suite of compensatory mitigation activities described in the REMP.

Temporary Impacts

Temporary impacts to natural resources (e.g., resulting from vegetation clearing, access road construction, staging, diversions, etc.) will occur to enable access during construction at PWP/TREP transportation infrastructure and community enhancement project sites. For purposes of adequately addressing potential temporary impacts, disturbances resulting in impacts to natural resources lasting more than 12 months have been defined as long-term temporary impacts and must be mitigated with more than same-site restoration. An estimate of long-term temporary impacts associated with implementation of the North Coast Corridor infrastructure projects is provided in *Table 3.17.12* below.

Long-term temporary impact areas will be returned to pre-construction elevations and contours and re-vegetated with appropriate native species. Unless restricted due to weather, re-establishing elevations and contours would occur within one month following construction. Re-vegetation with native species will commence within three months after restoration of pre-construction elevations and contours and be completed within one growing season. If re-vegetation cannot start due to seasonal considerations, exposed earth surfaces will be stabilized immediately with jute-netting, straw matting, or other applicable best management practice to minimize any interim erosion. Restoration plans for all long-term temporary impact areas over 0.5 ac will be prepared for approval by resource and regulatory agencies.

Compensatory mitigation for these long-term temporary impacts to uplands would include either revegetation with native species of other non-native habitat temporary impact areas (at a 1:1 ratio of replacement to impacts) or the preservation of high quality native habitat under the threat of development (a 2:1 ratio of preservation to impacts). The suite of activities proposed in the "enhancement pool" listed in *Table 3.17.11*and described below, would be used to mitigate any additional compensatory mitigation requirements for long-term temporary impacts to wetlands and other aquatic habitats. Nearly all construction activities will require access and staging for greater than 12 months; therefore, most temporary impacts addressed through this REMP will be long-term temporary impacts. Short-term temporary impacts, or impacts lasting less than 12 months in duration that do not have significant impacts to native habitats or wildlife, will be restored to pre-existing conditions (contours and vegetated condition) immediately following construction.

The "enhancement pool" of opportunities includes large-scale habitat restoration and enhancement projects, as well as preservation of high quality upland habitats. The "enhancement pool" will mitigate for long-term temporary impacts by ensuring long-term protection of natural resources in advance of construction impacts at the regional (North Coast Corridor project area) scale. See additional discussion in the Credit Establishment and Accounting section, below.

Table 3.17.12: Long-term Temporary Impacts for the 8+4 Buffer Alternative

Habitat Type	Long-term Temporary Impacts* (acres)
Sensitive Upland Habitats	
Baccharis scrub	0.14
Baccharis scrub (disturbed)	1.01
Coastal sage scrub	4.06
Coastal sage scrub (disturbed)	9.20
Maritime succulent scrub	0.22
Native grassland	0.15
Southern maritime chaparral	0.47
Southern maritime chaparral (disturbed)	1.37
Total Temporary Upland Impacts	**16.62**

Table 3.17.12 (cont.): Long-term Temporary Impacts for the8+4 Buffer Alternative

Habitat Type	Long-term Temporary Impacts* (acres)
Wetland and Riparian Habitats	
Arundo scrub	0.21
Coastal brackish marsh	0.58
Coastal brackish marsh (disturbed)	1.54
Drainage ditch	0.66
Disturbed wetland	0.73
Freshwater marsh	1.36
Freshwater marsh (disturbed)	0.38
Mudflat	0.44
Mulefat scrub	0.00
Open water	2.69
Salt flat	0.04
Coastal salt marsh	2.33
Salt marsh transition	0.21
Southern willow scrub	0.15
Southern willow scrub (disturbed)	1.38
Southern willow scrub/freshwater marsh	0.80
Tidal riprap at bridge abutments	0.03
Waters of the US. (unvegetated channel)	0.08
Total Temporary Impacts to Aquatic Habitats	**13.59**

* All temporary impacts likely to be longer than 12 months, impacts to open water may consist of a barge anchored in area

"No Net Loss Pool" – Establishment and Restoration (Re-establishment and Rehabilitation)
The no net loss pool of opportunities includes compensatory mitigation sites that have significant establishment and/or restoration components, and would generally result in a net gain in habitat area and/or functions and services. These sites would directly offset permanent wetland and/or upland ESHA impacts at a 1:1 ratio, provided that the subject mitigation plans are implemented and performed to identified standards. Mitigation plans would be implemented before any construction impacts associated with PWP/TREP transportation infrastructure and community enhancement projects.

For waters of the U.S., waters of the State, or other aquatic habitats, establishment is the manipulation of the physical, chemical, or biological characteristics to create an aquatic resource that did not previously exist at an upland site, resulting in a gain in aquatic resource area and functions. For both wetland and upland habitats, restoration involves the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded resource. Restoration efforts result in a gain in habitat function and habitat area. For the purpose of tracking net gains in aquatic resource area, the USACE and USEPA divide restoration activities into two categories: re-establishment and rehabilitation.

Each establishment or restoration opportunity included in the REMP has a detailed Mitigation Site Assessment (MSA) that describes existing site conditions and potential opportunities for establishment or significant restoration available on the site. MSAs can be located in Appendix B of Appendix P.

"Enhancement Pool" - Restoration, Enhancement, and Preservation

The preservation and enhancement pool of compensatory mitigation opportunities includes sites where permanent preservation of existing and/or potentially enhanced habitat can be achieved. It also includes large-scale lagoon restoration activities intended to improve corridor-wide lagoon system function and services and would serve to mitigate indirect impacts, temporal, and long-term temporary impacts resulting from PWP/TREP transportation infrastructure project and community enhancement project impacts, given the resulting benefits to wetland and other aquatic habitats and upland resources, water quality, tidal range, flood control, groundwater recharge, plant and wildlife habitat, and recreation.

Habitat Preservation

Additional PWP/TREP project impact mitigation will be fulfilled by acquisition of parcels containing high quality upland ESHA, wetland or other aquatic resources, or parcels where enhancement of habitat can occur within the North Coast Corridor Coastal Zone area which can be permanently preserved. Habitat preservation would serve to mitigate for temporal resource losses and long-term temporary impacts resulting from PWP/TREP project impacts by ensuring long-term preservation of upland ESHA, wetland, or other aquatic resources in advance of construction impacts.

Lagoon Restoration

In recognition of the unique opportunities and value of comprehensive lagoon restoration activities for corridor lagoons, the REMP includes large-scale lagoon ecosystem restoration and enhancement mitigation opportunities, which will result in significant ecological lift to the San Elijo Lagoon and/or Buena Vista Lagoon systems. The mitigation opportunity includes funding a large-scale lagoon restoration program in full for either San Elijo or Buena Vista Lagoons, which would be in addition to funds already contributed to previous and ongoing planning and technical evaluation activities necessary to facilitate and implement these lagoon restoration programs. Large-scale lagoon restoration in either San Elijo or Buena Vista Lagoons may include, but is not limited to, enhancement and restoration (both types) of wetland and other aquatic resources in the associated Lagoons.

In the context of the regional lagoon systems of the North Coast Corridor and their proximity to the ocean, the intent of the large-scale lagoon restoration funding is to improve the ecological health and hydrological connectivity and to enhance critical coastal resources and habitats. Potential San Elijo and Buena Vista Lagoons restoration will be eligible for inclusion in the REMP, provided it results in a restored coastal wetland ecosystem that is in alignment with regulatory agency and resource needs in the North Coast Corridor (and impacts caused by the PWP/TREP transportation project improvements). REMP measures that contribute to large-scale lagoon restoration opportunities, including funding and critical transportation infrastructure improvements, shall be considered a substantial mitigation element for all PWP/TREP project impacts (including temporary long-term impacts) given the resulting wide range of benefits to sensitive habitat for plant and wildlife species, tidal range, water quality, flood control, groundwater recharge, and recreation.

"Contingency Pool" – Endowments and Restoration Infrastructure

The contingency pool of opportunities is provided to ensure there are no mitigation (no net loss) deficits that could not be adequately addressed in advance of project impacts. Ideally, the contingency pool would not be required because impacts would be avoided by careful site planning, implementation, monitoring and management of the sites in the "No Net Loss Pool" and "Enhancement Pool." However, the contingency pool could be used for no net loss purposes to address any unforeseen circumstance, such as delays in achieving ecological performance standards at mitigation sites within the "No Net Loss Pool" or PWP/TREP project impacts occurring prior to release of adequate compensatory mitigation credits.

Lagoon Management Endowments

The REMP includes an endowment component that is intended to increase the capacity for long-term management of the Batiquitos and Los Peñasquitos Lagoons and support stewardship of these resources in perpetuity. This includes, but may not be limited to, funding for maintenance of lagoon inlets and channels deemed necessary to sustain tidal and fluvial flows and reduce sedimentation within these lagoon systems. To ensure that endowment funding is effectively managed, a Long Term Management Plan (LTMP) indicating the ecological priorities and associated endowment contributions would be created, reviewed, and approved by the resource agencies, and the lagoon manager. The LTMP would be created in association with the lagoon manager and be a living document, reflecting current conditions and needs of the lagoon ecosystem. Development of a LTMP for use of the funds at Batiquitos and Los Peñasquitos Lagoons would identify specific tasks covered by the proposed endowment, and would support establishment of long-term goals to ensure appropriate triggers (e.g., likely annually for Los Peñasquitos, every three years for Batiquitos, or imminent closure of the lagoon mouth) for when dredging activities would occur and funds would be released. Performance evaluation of the endowment would be evaluated at the end of the first phase of the PWP/TREP Implementation Phasing Plan (approximately 10 years) to ensure that adequate financial resources are in place to cover activities in perpetuity.

Absent the need for financial supplementation to ensure stability, the lagoon management endowments are to be considered supplemental to the enhancement component of the REMP. This endowment would not be applied to the other no net loss mitigation, enhancement, and preservation projects included in this REMP, as funding for those sites already reflect a separate, site-specific long-term management endowment in their project costs.

Ten million dollars has been determined to be adequate to maintain these lagoon mouths in perpetuity if set aside in a non-wasting endowment with a reasonable rate of return (approximately 5 percent annually). A performance evaluation of the endowment would also occur at the end of the first phase of the PWP/TREP Implementation Phasing Plan (approximately 10 years) to ensure adequate financial contingencies are in place to cover activities in perpetuity. It is anticipated that the $10 million endowment would need to accrue interest for at least one year prior to use of funds. Additional information on the identification of credits identified for the lagoon endowments can be found in the REMP (Appendix P).

Lagoon Restoration

As discussed previously, REMP measures that contribute to large-scale lagoon restoration opportunities are considered a substantial mitigation element for all PWP/TREP project impacts. Enhancement efforts within San Elijo and/or Buena Vista Lagoons that may result in a change from current upland or freshwater dominated conditions to tidally influenced habitats may also be used for contingency mitigation, as necessary. Design alternatives for the environmental review of these large-scale lagoon restorations are ongoing so specific acreage amounts are not presently available. The determination of acreage amounts for these potential future habitat changes that would qualify for contingency mitigation credit, as well as performance standards to measure and monitor the success of the restoration efforts, would occur pursuant to future Notice of Impending Development (NOIDs) or CDP submittals and in discussions with the REMP Working Group.

Other Contingency Opportunities

Modifications to Coast Highway, possibly including replacement of the culverts with a bridge or larger culverts, or other North Coast Corridor transportation infrastructure currently representing a significant constraint to a lagoon system, could be considered by the Working Group in the future to offset potential no net loss deficits, as needed. These facilities, however, are not within the LOSSAN or I-5 right-of-way and are therefore not included in the scope of PWP/TREP improvements.

Bridge Optimization

Bridge optimization projects are specifically funded through capital expenditures and designed to avoid and minimize project impacts and protect existing lagoon system functions and services. At several crossings, the optimized bridges would also allow for large-scale lagoon restoration projects that are needed as compensatory mitigation within the "Enhancement Pool." Bridge optimization projects involve lengthening lagoon bridges and expanding lagoon channel dimensions along the I-5 and LOSSAN rail corridors to improve existing tidal and fluvial flows, and to enhance wetland habitats, water quality within the lagoons, and wildlife movement.

Lagoon Management Technical Support (Scientific Advisory Committee)

The REMP provides funding for a Scientific Advisory Committee (Committee) made up of independent scientists. The Committee will provide technical advice, as necessary, regarding the design, implementation, and monitoring of mitigation projects described in this REMP. Funding for the Committee would cover the time, expenses, and materials needed by scientists to complete their tasks. The Committee will be directed by the REMP Working Group; will oversee the development or modification of ecological performance standards, monitoring methodology (techniques and timing), and actual monitoring of site performance; will recommend adaptive management measures to ensure site success; and review monitoring reports, as necessary.

REMP Project Mitigation and Phasing

Advanced resource enhancement activities are assigned specific mitigation credits based on the type of habitat establishment, restoration, enhancement, and/or preservation resulting from individual REMP projects, and/or for endowment of maintenance activities that sustain lagoon functions and values. Once established, mitigation credits would be available to mitigate any PWP/TREP transportation and/or community enhancement project impacts included in an active phase of the PWP/TREP Phasing Plan (i.e., 2010-2020, 2021-2030, 2031-2040, or 2041-2050 [with all *I-5 NCC Project* improvements completed by 2035]). Where habitat mitigation credit exceeds the cumulative project impacts of any particular project phase, habitat mitigation credit would be made available to mitigate impacts associated with project implementation of the following phases.

Advanced resource enhancement activities also include projects that provide enhancement and/or preservation of sensitive coastal resources, and facilitate and achieve ecological lift of corridor lagoon systems, specifically options for large-scale restoration plans for San Elijo Lagoon and Buena Vista Lagoon and hydraulic lift associated with bridge optimization projects for San Elijo Lagoon, Batiquitos Lagoon, and Buena Vista Lagoon. The San Elijo and Buena Vista Lagoon Restoration Plans will potentially establish a specific amount of wetland/other aquatic habitat mitigation credits dependent on the final alternative design selected. REMP projects that would facilitate and achieve ecological/hydraulic lift of corridor lagoon systems through large-scale restoration plans are generally not subject to a specific credit calculation by the Coastal Commission, but nevertheless would result in significant enhancement of corridor resources and are considered appropriate for mitigating PWP/TREP project impacts. The USACE will determine specific compensatory mitigation credits based on acreage and functional lift for San Elijo and Buena Vista Lagoon Restoration Projects if the final restoration alternatives chosen by the REMP Working Group meet the standards set forth by the USACE and USEPA in the Mitigation Rule (2008).

I-5 NCC Project Phasing and Impacts

To achieve the REMP goal that mitigation would occur at the same time or before impacts and comply with CA SB 468, the *I-5 NCC Project* has been broken down into different phases for construction based on funding and interim projects that would result in congestion relief (*Table 3.17.4*). *Table 3.17.4* includes the *I-5 NCC Project* impacts included in the REMP. The first phase of construction between 2010 and 2020 is broken into four different subprojects. Phase 1A would begin in 2015 and would include the ultimate widening of I-5 from just north of the Lomas Santa Fe interchange to the Union Street overcrossing in Encinitas. This phase would include replacement and lengthening of the new bridge over San Elijo Lagoon. The establishment of wetland from lengthening of the lagoon bridge would result in a net establishment of 0.21 ac of State jurisdictional wetland; however, there are some impacts to Cottonwood and Moonlight Creeks between Santa Fe and Union Street as a result of the widening of the freeway placement of bioswales and impacts from trails resulting in a net impact of 0.53 ac of wetland in Phase 1A. The disturbed drainage of Cottonwood Creek, southeast of I-5 and Encinitas Boulevard, would have impacts from the new trails and the bioswales northwest of Encinitas Boulevard and would result in a few sliver impacts to wetlands. There would also be impacts to 19.82 ac of sensitive upland habitat. The majority of the upland impacted would be along San Elijo Lagoon and between Manchester and Birmingham. Other projects in the first phase include extending one HOV lane in the median in each direction from the Union Overcrossing to SR-78 and completion of the ultimate widening of I-5 between La Jolla Village Drive and the I-5 / I-805 flyover. The braided ramps between Roselle and Genesee are not part of Phase 1C. The median widening would have minimal impacts to the outside of I-5 and would not impact the lagoon wetlands. Finally, the replacement of the Batiquitos Bridge has received funding for construction during the first phase to reduce staging impacts for bridge construction.

Phase 2 is broken into three projects. Ultimate widening from the I-5 / I-805 merge to SR-56, from SR-56 to Lomas Santa Fe Drive, and from Union Street to Palomar Airport Road. Phase 3 would have the remainder of the widening projects to complete the corridor. Sensitive upland and net wetland impacts are identified for each subphase and the proposed timing of each subphase is identified.

No Net Loss Mitigation Sites and Timing

Habitat establishment, or substantial restoration where determined appropriate, would occur within the coastal zone to achieve no net loss for all wetland and sensitive upland habitat impacts at a minimum of one ac of establishment/significant restoration for one ac of impact. Seven potential mitigation sites have already been identified for mitigation within the North Coast Corridor (*Figures 3-17.3a* and *3-17.3b*, and *3-17.4a* through *3-17.4f*). Six of these sites have either already been purchased, are being purchased, or the rights to complete the proposed mitigation on site have been purchased. The mitigation sites occur in five of the six lagoon watersheds crossed by I-5. Proposed timing of the mitigation is identified in *Table 3.17.13*. Wetland establishment would be completed at the San Dieguito W19 Restoration Site and at the Hallmark Mitigation Site at Agua Hedionda. As identified on *Table 3.17.4,* Caltrans proposes to complete the majority of the mitigation in advance of project impacts to minimize temporal loss and enhance upland habitat through the corridor, where feasible, and as approved by the resource agencies.

Table 3.17.4 summarizes the acreages of anticipated *I-5 NCC-Project*-only permanent impacts to wetlands and uplands by phase. *Table 3.17.13* summarizes the corresponding acreages and locations proposed for no net loss mitigation and enhancements, with additional detail related to mitigation type (establishment, restoration, preservation) and timing, as included in the REMP (Appendix P).

Wetlands

The REMP would provide mitigation for corridor-wide impacts, including impacts from construction of I-5 facilities, LOSSAN double tracking, and associated community enhancements. To achieve no net loss of wetlands for all corridor impacts, wetland establishment is proposed to occur at the San Dieguito Lagoon W19 Site and at the Hallmark Sites located at Agua Hedionda Lagoon (*Figures 3-17.3a, 3-17.3b, 3-17.4a*, and *3-17.4b*). A straight ratio approach is not proposed for wetland impacts associated with this project and other corridor projects due to the types of impacts, the opportunities for wetland establishment, and opportunities to combine no net loss mitigation with other projects in the coastal corridor. The resulting package would ensure replacement of impacted habitat on an acre-for-acre basis, with corridor-wide enhancements of biodiversity and habitat value.

San Dieguito Lagoon Restoration

A feasibility study was completed for establishment of at least 50 ac of coastal wetland at the W19 plot in the San Dieguito River Planning Area (*Figure 3-17.4a*). Of the 50 ac, at least 47.26 would be available for REMP projects. A total of 2.74 ac are set aside for use by the San Dieguito Joint Powers Authority for prior mitigation requirements. Hydrodynamic and fluvial modeling were completed on several options that would establish the minimum 50 ac of coastal wetland, up to 14 ac of brackish marsh, and would not adversely impact the existing SCE SONGS Restoration Project, or downstream sediment transport. As noted, approximately 47.26 ac of established/reestablished coastal wetland would be used at a 1:1 ratio for no net loss of wetlands for the *I-5 NCC Project* as well as the LOSSAN double tracking project. The newly established brackish marsh would likely be used to mitigate for local streets and roads, including the City of San Diego's El Camino Real bridge replacement project. In addition to wetland establishment, approximately 9.6 ac of sensitive upland would be created on the slopes of the wetland and 19.8 ac of upland would be restored on site. This restoration project is currently in the design and environmental review stage and additional options are being developed in conjunction with the resource agencies. The San Dieguito W19 Lagoon Restoration Site would have its own environmental documents and permits based on the restoration plan that is being developed. Based on the current schedule, this site is projected to begin construction in fall of 2016.

Hallmark Mitigation Sites

The Hallmark Mitigation Sites were purchased by Caltrans in late 2008 with preliminary agreement from the resource agencies that they would be reviewed and considered for habitat mitigation for the *I-5 NCC Project* (*Figure 3-17.4b*). Establishment of approximately 4.2 ac of coastal wetlands is proposed to occur on the Hallmark West sites. Approximately 1.3 ac of the property and 2.9 ac of an adjacent CDFW property would be graded to remove fill and establish new wetland habitat. The grading on CDFW property is needed to create tidal channels from the lagoon to the mitigation area. An additional 0.97 ac of brackish and riparian wetland would be restored on the Hallmark East site and 0.44 ac of wetland would be preserved on site. This wetland establishment and restoration acreage would also be used as part of the no net loss wetland mitigation for the *I-5 NCC Project*. A plan for the mitigation activities on site is under development. Construction on both the west and east parcel of wetland and upland mitigation is projected to begin in fall of 2014.

Figure 3-17.3a: Mitigation Parcels within the Los Peñasquitos, San Dieguito, and San Elijo Watersheds

Figure 3-17.3b: Mitigation Parcels within the Batiquitos and Agua Hedionda Watersheds

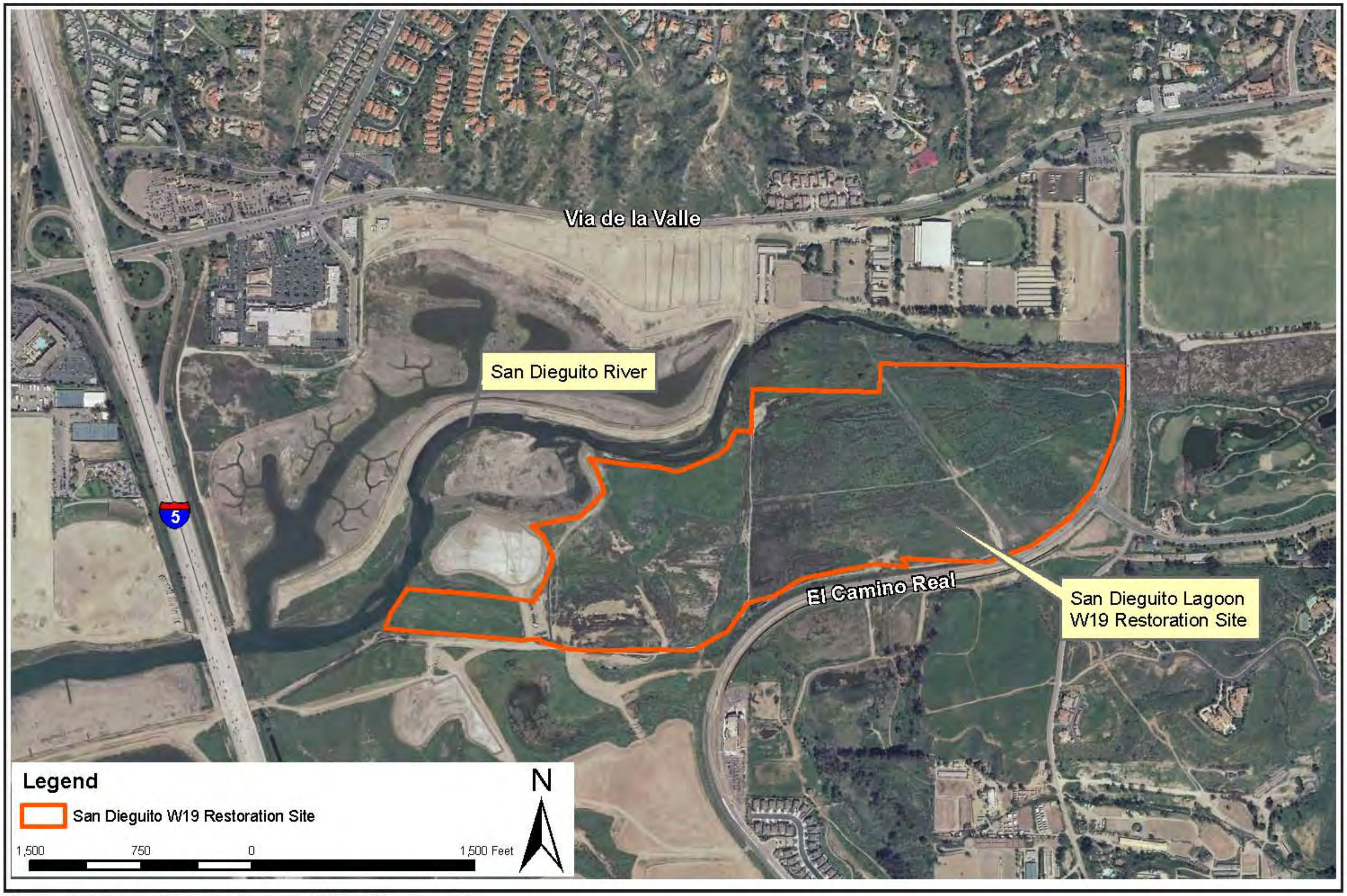


Figure 3-17.4a: San Dieguito Lagoon W19 Mitigation Site

Figure 3-17.4b: Hallmark Mitigation Sites

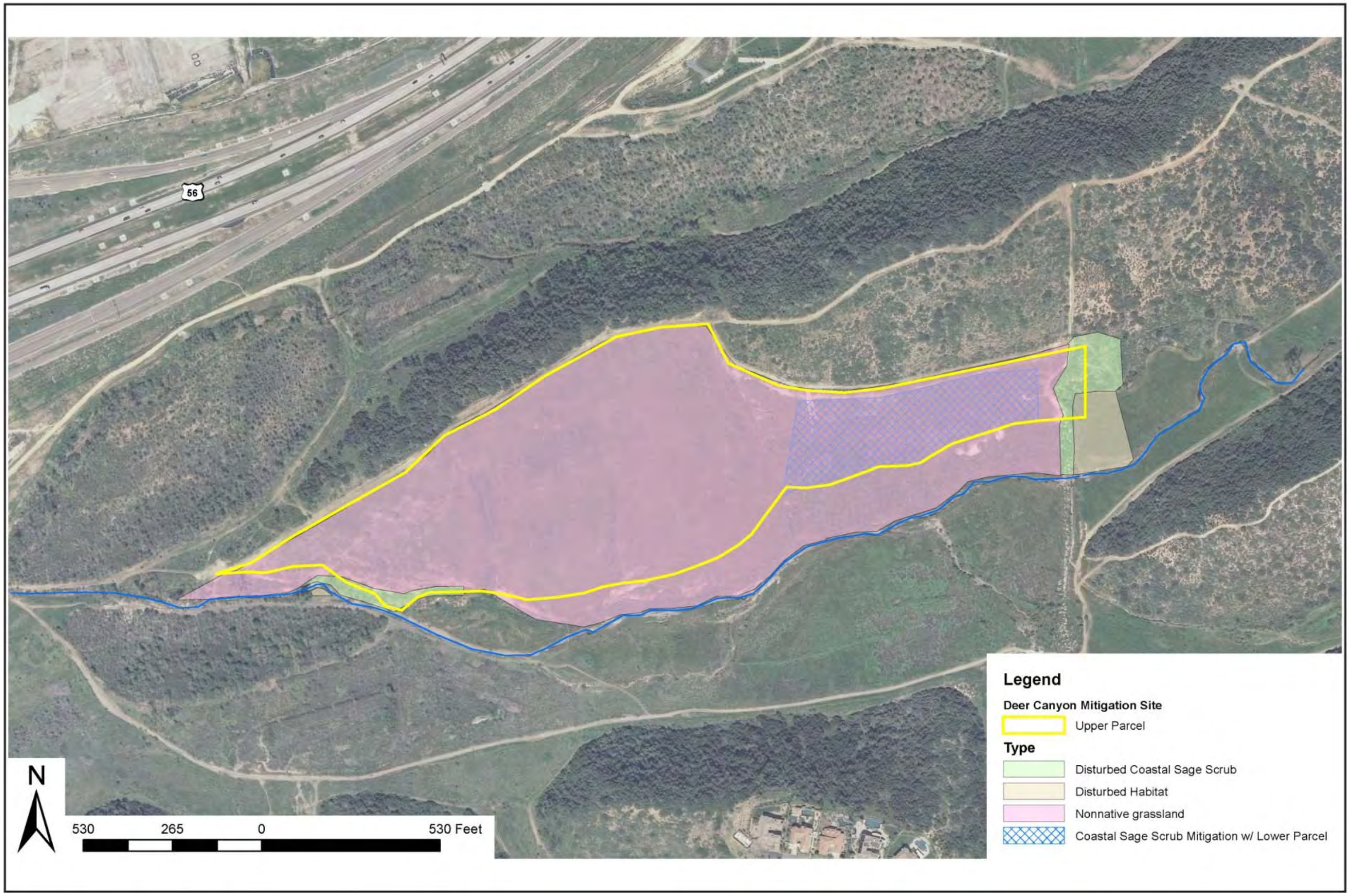


Figure 3-17.4c: Deer Canyon Mitigation Site

Figure 3-17.4d: Dean Mitigation Site

Figure 3-17.4e: Laser Mitigation Site

Figure 3-17.4f: La Costa (Ayub) Mitigation Site

Uplands

Compensatory mitigation for *I-5 NCC Project* impacts to Baccharis scrub, CSS, maritime succulent scrub, and maritime chaparral would be mitigated through establishment or significant restoration activities to achieve no net loss. Several parcels discussed below have already been purchased and identified as appropriate upland mitigation areas. Native upland vegetation would be created/restored at the Dean Mitigation Site, at the Deer Canyon II (upper parcel), and on the slopes of the San Dieguito Lagoon W19 restoration. The Hallmark Mitigation Sites have areas where some CSS can be created and other areas with existing disturbed/sparse CSS that would be restored on site. In addition, several parcels have been purchased to preserve important linkage areas and habitats that were originally slated for development. Wetland and upland establishment are currently underway on a portion of the Deer Canyon Mitigation Site in the Los Peñasquitos Lagoon watershed. An additional 14.6 ac of upland in a second parcel is in negotiation that would be used for creating additional CSS habitat. The resource agencies provided preliminary agreement that purchase of the Laser property at San Elijo Lagoon, and the La Costa (Ayub) property at La Costa Boulevard would be reviewed and considered for habitat mitigation. Other parcels have also been identified; however, purchase has not yet been completed, or negotiations with the seller are ongoing. Caltrans and SANDAG continue to seek appropriate parcels for restoration and/or preservation of native upland habitats for mitigation. The parcels within Caltrans ownership are briefly described below.

<u>Deer Canyon II</u>

SANDAG and Caltrans propose to mitigate impacts to sensitive upland habitats associated with the project PWP/TREP by enhancing poor quality uplands habitat on the Deer Canyon II Mitigation Site, located in Deer Canyon adjacent to Deer Canyon Creek (*Figure 3-17.3a*). The Deer Canyon Mitigation Site is within the coastal zone. The Deer Canyon II Mitigation Site consists of approximately 22.2 ac and is located adjacent to lands subject to a separate mitigation that is underway for the I-5 / Genesee Avenue Interchange Reconstruction Project, I-805 North Managed Lanes Project, I-805 / Carroll Canyon Road Extension and Direct Access Ramp, and double-tracking projects on the LOSSAN corridor (*Figure 3-17.4c*).

The goal of the upland enhancement in Deer Canyon is to enhance non-native grassland habitat and manage the parcel as open space in perpetuity. The proposed enhancement and in-perpetuity management of the native uplands vegetation communities would:

- Provide wildlife habitat for the coastal California gnatcatcher and other native wildlife species habitat by removing non-native grassland and converting it to high quality CSS and native grassland habitat
- Improve CSS habitat and ecosystem continuity through connectivity between coastal wetlands and native uplands
- Stabilize slopes in Deer Canyon by converting non-native grassland habitat to more appropriate CSS and native grassland habitat
- Provide a buffer between the riparian habitat and the surrounding land uses
- Preserve the enhanced areas in Deer Canyon as permanent open space

Portions of the upper parcel are already slated for restoration from non-native grassland and disturbed habitat to CSS. The existing mitigation for the lower parcel and portions of the upper parcel would likely be amended to include the additional 14.6 ac of restoration. Construction on this parcel is anticipated to begin in fall of 2013.

Dean Mitigation Site

The 23.1-ac property is immediately north of the City of San Diego's Crest Open Space and west of fallow agricultural fields that are being restored to CSS by the SONGS San Dieguito Wetland Restoration Project (*Figures 3-17.3a* and *3-17.4d*). The Dean parcel is located within the City of San Diego Multi-Habitat Planning Area (MHPA). This parcel is dominated by disturbed habitat and disturbed Baccharis scrub with a small area of CSS/southern maritime chaparral in the southeastern corner of the parcel and some bare ground on the perimeter road. The CSS/southern maritime chaparral habitat is dominated by lemonadeberry, chamise, and black sage, with wart-stemmed ceanothus (*Ceanothus verrucosus*), sea dahlia, Mohave yucca (*Yucca schidigera*), and scrub oak. There are approximately 1.45 ac of this habitat above the road at the southeastern end of the parcel. It has very little disturbance except along the edges and is contiguous with the same habitat upslope in the Crest Open Space. Coastal California gnatcatcher also occur on and adjacent to the site. This area would be preserved.

The main portion of the parcel is fallow agricultural field that is now either dominated entirely by exotic species or is dominated by coyote brush with weedy species. Bare ground consists of the hard-packed cleared road on the southern and western ends of the parcel. Disturbed habitat on site is dominated by a thick layer of filaree and black mustard (*Brassica nigra*), with scattered tamarisk (*Tamarix sp.*), tree tobacco (*Nicotiana glauca*), pampas grass, goldenbush, and ice plant. Disturbed Baccharis scrub is dominated by coyote brush with twiggy leaf plant (*Stephanomeria spp.*), deerweed (*Lotus scoparius*), filaree, acacia, and Mexican elderberry (*Sambucus mexicanus*). There are approximately 0.85 ac of bare ground, 8.5 ac of disturbed Baccharis scrub, and 12.3 ac of disturbed habitat on site.

Mitigation on site would include removal of all exotic species, planting approximately 20.8 ac with native species, and temporary irrigation. In addition, some check dams would be installed in an erosion rill to slow water flow and encourage sediment retention and plant growth. After approval of the mitigation plan, this site is planned for construction in the fall of 2013 (*Table 3.17.4*).

Hallmark Mitigation Sites

The Hallmark mitigation sites are located along the margins of the northeastern portion of Agua Hedionda Lagoon (*Figure 3-17.3b*). The properties consist of three parcels of land; a western parcel and two adjoining eastern parcels. The western parcel (Hallmark West) is approximately 11.1 ac in size and is located between Park Drive and Agua Hedionda Lagoon. The other two parcels (combined Hallmark East) are between the lagoon and the neighborhoods along Via Hinton and Via Marta (*Figure 3-17.3b*); these parcels comprise approximately 8.2 ac.

The Hallmark West parcel supports a combination of salt marsh vegetation, disturbed CSS, and disturbed areas. There are approximately 1.57 ac of wetland habitat on site. There are also 0.9 ac of good quality CSS, and 5.2 ac of disturbed and sparse CSS and salt bush scrub that could be restored to good quality CSS. The remainder is comprised of disturbed habitat and bare ground. Mitigation on this site would enhance biological resources within the lagoon ecosystem and provide greater synergistic ecological benefits in association with the larger system; such as improved water quality, wildlife, and habitat continuity on the north lagoon shoreline. Upland mitigation would benefit coastal California gnatcatcher and south coast saltbush (*Atriplex pacifica*) through direct habitat enhancements and preservation through site access restrictions and long-term management.

The Hallmark East parcel lies between residential development and riparian habitat associated with Agua Hedionda Creek. The riparian habitat is owned and managed by the CDFW. The east parcel is 0.8 mi upstream of Agua Hedionda Lagoon. The mitigation site presents an opportunity to preserve the existing 0.7 ac of high quality CSS, and restore 1.11 ac of disturbed CSS. Slope treatments may be possible to create a habitat buffer between the existing residential land use and riparian habitat. An additional 2.2 ac of CSS establishment is possible in disturbed habitat at the base of the slope and on the ornamental slopes outside of the fuel modification zones for the adjacent homes. Fuel modification areas and deed restricted areas would not be restored or counted toward total restoration and enhancement. As stated earlier, construction on the west parcel is anticipated to begin in the fall of 2014 and construction on the eastern parcel would also be expected at the same time.

Laser Mitigation Site

The approximately 5.0-ac Laser mitigation site is located immediately west of the viewpoint on southbound I-5, and north of Manchester Avenue (*Figure 3-17.3a*). Diegan CSS (3.9 ac), coastal bluff scrub (0.5 ac), non-native grassland (0.16 ac), bare ground (0.11 ac), and ornamental (0.21 ac) communities were identified on the two parcels comprising the Laser site (*Figure 3-17.4e*). In addition, a small area of disturbed salt marsh (0.02 ac) and developed habitats were observed adjacent to Manchester Avenue. Two territories of threatened coastal California gnatcatcher were observed, one on each parcel. Both of these parcels have high quality habitat that supports six sensitive plant species. The site presents an opportunity to preserve the existing native communities through site access restrictions and long-term management. The site is already owned by Caltrans and once approval for use as mitigation for I-5 is received, the parcel would be deed restricted and likely transferred to the San Elijo Lagoon Conservancy with an endowment for long-term maintenance and management.

La Costa (Ayub) Mitigation Site

The La Costa (Ayub) mitigation site is a 19.8-ac parcel located east of I-5, south of La Costa Avenue, and east of Piraeus Street (*Figure 3-17.3b*). La Costa Avenue separates the site from Batiquitos Lagoon. The parcel was identified as having high to very high habitat values in the draft Multiple Habitat Conservation Plan (MHCP) for coastal northern San Diego County and is located within a Biological Core Linkage area. The preservation area abuts the Carlsbad Habitat Conservation Plan (HCP) core area #8 that comprises Batiquitos Lagoon. The lagoon is owned and managed by CDFW.

Other open space lands are present south and east of the proposed preservation parcel at Batiquitos Lagoon. These open space areas are located on slopes and canyons that topographically form the southern boundary of Batiquitos Lagoon (*Figure 3-17.4f*). The slopes provide linkages to inland areas associated with Encinitas Creek and other drainages that flow into the lagoon.

Diegan CSS (15.0 ac), chaparral (both southern maritime chaparral and chamise chaparral, 3.38 ac), and disturbed habitat (0.97 ac) communities were identified on the parcel. The parcel generally has good habitat, with excellent habitat found on the top of the mesa. It provides habitat for sensitive plants as well as the threatened coastal California gnatcatcher. There is little weed invasion in most places and minimal effort would be needed to fence this parcel to control access and preserve the habitat in place. The site is already owned by Caltrans and once approval for use as mitigation for I-5 is received, the parcel would be deed restricted and transferred to another entity with an endowment for long-term maintenance and management.

Batiquitos Bluffs Site

The Batiquitos Bluffs parcel is located immediately south of La Costa Avenue and west of El Camino Real in northern San Diego County. The parcel is approximately 47.8 ac made up of primarily native uplands. The parcel has approximately 8.6 ac of coyote bush scrub, 13.9 ac of coastal sage scrub, 12.9 ac of southern maritime chaparral, 3.5 ac southern mixed chaparral, 1.0 ac of scrub oak chaparral, 1.0 ac of ruderal, 1.7 ac of non-native grassland, 0.8 ac of eucalyptus woodland, 0.2 ac of disturbed, 1.7 ac of developed, and 2.5 ac of disturbed freshwater marsh/southern willow scrub. Batiquitos Bluffs lies just south of Batiquitos Lagoon and is adjacent to conserved upland habitats. This parcel is identified as a focused planning area in the Encinitas Multiple Habitat Conservation Program Subarea Plan. This parcel is currently privately owned; however, Caltrans and SANDAG are inquiring concerning the possibility of purchasing this parcel.

Several sensitive plants were identified on site in 2006/2007 including Nuttall's scrub oak, summer holly (*Comarostaphylis diversifolia* ssp. *diversifolia*), Del Mar sand aster, adophia (*Adolphia californica*), and wart-stemmed ceanothus. In addition, the property is near populations of the federally threatened Encinitas Baccharis (*Baccharis vanessae*), which may occur on site. Several species of sensitive wildlife also have been identified on site, including the federally threatened coastal California gnatcatcher, yellow-breasted chat (*Icteria virens*), red-shouldered hawk (*Buteo lineatus*), and American kestrel (*Falco sparverius*).

There is potential for on-site restoration of approximately 3.7 ac of ruderal, disturbed, eucalyptus, and non-native grassland habitat. The disturbed wetland that flows along La Costa Avenue also could be restored. The remainder of the native habitat on the property (42.4 ac) would be preserved on site with some enhancement through weeding. The entire property is considered critical habitat for the coastal California gnatcatcher and would provide an important link in the conserved land immediately south of Batiquitos Lagoon.

Summary of Compensatory Mitigation

Caltrans proposes to establish, restore, and preserve the habitats identified for these six sites where property rights have been secured and to pursue another location near Batiquitos Lagoon called Batiquitos Bluffs. The establishment and restoration of habitats on these sites would satisfy the no net loss compensatory mitigation requirement for the *I-5 NCC Project* and for LOSSAN double tracking projects. Although the REMP covers all corridor impacts as part of the PWP/TREP, this Final EIR/EIS addresses mitigation relevant and specific to impacts identified for the *I-5 NCC Project*. These upland sites all currently support coastal California gnatcatchers either on or adjacent to the sites. The tidal wetland establishment at the W19 and Hallmark sites would contain salt marsh habitat that would potentially support light-footed clapper rail, Belding's savannah sparrow and a number of other species and would enhance the existing habitat surrounding the sites. HMMPs would be developed and submitted for review and approval and all of the sites could be in construction by fall of 2016. Upland sites should achieve goals within 5 years or less and wetland sites should achieve goals within 5 to 10 years. Regardless, the majority of mitigation would be in construction or completed prior to impacts from construction of the *I-5 NCC Project*.

Credit Establishment and Accounting

A compensatory mitigation "credit" is a unit of measure (e.g., an ac, linear ft, functional or conditional measure, or other suitable metric) representing the accrual or attainment of aquatic or terrestrial area and functions at a mitigation site. REMP credits will be further defined in the site-specific HMMPs by the mitigation type (establishment, re-establishment, rehabilitation, enhancement, or preservation), the resource type (non-wetland waters of the U.S., wetlands waters of the U.S.), aquatic resource buffer (i.e., riparian and uplands), and habitat type (tidal wetlands, freshwater wetlands, riparian, sage scrub, etc.).

Mitigation credit availability is based on the timing of site-specific HMMP approval, mitigation project implementation, and attainment of specific site protections and project performance criteria. The REMP coordinates with the larger PWP/TREP Implementation Phasing Plan to ensure mitigation credits are available when PWP/TREP projects are implemented to ensure resource protections are in advance to the maximum extent possible, while achieving a balance of transportation infrastructure and community enhancement projects in each phase. Under these procedures, a percentage of mitigation credits will be released at the time the final site-specific HMMP and LTMPs (draft and/or final) are approved by resource and regulatory agencies and both site protections and funding mechanisms are secured. Additional percentages of mitigation credits will be released after site grading and planting is complete (as-builts), and interim performance standards are achieved. More specific USACE crediting informational needs and site evaluation requirements are attached in Appendix A of the REMP (Appendix P to this Final EIR/EIS). See the specific credit release schedules for each type of no net loss and preservation sites are described in Appendix P.

REMP Project Maintenance and Monitoring

Monitoring requirements for each REMP mitigation project would be conducted according to final HMMPs and/or restoration plans. In addition, the PWP/TREP Implementation Plan includes a monitoring and reporting program which would provide a yearly assessment and summary of information and updates to the Implementation Framework to document projects and associated mitigation requirements completed, and to assess cumulative phase project impacts, benefits, and available resource mitigation credits for future project and/or phase implementation.

Site-specific HMMPs are required for all REMP compensatory mitigation sites, with the exception of purely preservation sites, whereas LTMPs are required for all mitigation sites. The HMMPs will be developed in compliance with the USACE and EPA Mitigation Rule (2008), but also include sections and supplemental documents that will allow for use of the Advance Permittee-Responsible Mitigation Guide (2012)[3] or comparable approaches by the USACE Los Angeles District and meet Coastal Commission and other resource agency permitting needs. These HMMPs will include the information agreed upon in this REMP for determination of a Service Area (North Coast Corridor), defining the number and type of credits and methodology used to determine crediting, a credit release schedule based on performance standards, a credit ledger to track PWP/TREP project implementation, and the projected permanent and temporary impacts from PWP/TREP transportation infrastructure and community enhancement projects intended to be mitigated by the compensatory mitigation site.

Ecological Performance Standards

Ecological performance standards are benchmarks to be used as indicators of the relative progress towards achieving site-specific habitat establishment, restoration, and enhancement goals and ecosystem types. Performance standards will be developed for each compensatory

[3] Interagency Regulatory Guide, Advance Permittee-Responsible Mitigation by U.S. Army Corps of Engineers Seattle District, Department of Ecology State of Washington, and Washington Department of Fish and Wildlife, December 2012, Ecology Publication no. 12-06-015

mitigation site and provided in the site-specific HMMPs for review and approval by the REMP Working Group and resource and regulatory agencies, as appropriate. Performance standards will be developed for a 10-year monitoring schedule for tidal wetlands and a 5-year monitoring schedule for all upland habitats and other aquatic resource types.

The interim performance standards will be based on realistic benchmarks anticipated based on the design of the site, reference site data, and best professional judgment of experts in the field of restoration for the specific ecosystem. Reference sites will be used where appropriate and will be within close proximity or adjacent to the compensatory mitigation site unless otherwise justified (i.e., lagoons) and represent the physical, hydrological, and biological functions or conditions anticipated for the mitigation site. The REMP Working Group, as needed for significant wetlands or uplands no net loss mitigation sites, shall select appropriate reference site locations. Performance standards will either be fixed standards or relative standards compared to the selected reference sites. One or more performance standards will be developed in each of five categories: Physical, Hydrology, Water quality, Flora, and Fauna unless otherwise approved by the REMP Working Group and resource and regulatory agencies, as appropriate. Performance standards will be assessed based on the results of quantitative and qualitative sampling.

Performance standards must be assigned with the intent to provide resource and regulatory agencies with a high level of confidence that, once performance standards are achieved, the restored habitat is providing the desired ecological functions and will be self-sustainable under a long-term management program. Once the mitigation areas are established, restored, and/or enhanced a comparative analysis of pre-and post-mitigation site conditions will demonstrate the improvements in ecological functions. Reference sites will be utilized and monitored pre- and post-construction of the mitigation site to account for regional trends in the habitat type. Continued success of the restored habitat, without supplemental irrigation or significant remedial actions, must be demonstrated for three consecutive years prior to regulatory agency sign-off and release of the final credits.

Caltrans and SANDAG (permitees) shall be fully responsible for any failure to meet assigned performance standards. The REMP Working Group can modify performance standards based on site conditions if modified performance standards are equal or superior to the originally approved standards. If approved performance standards are not achieved, the REMP Working Group would prescribe remedial measures with guidance from the Scientific Advisory Committee, which would be immediately implemented by the permittee. If the permittees do not agree that remediation is necessary, the matter may be set for hearing and disposition by the Coastal Commission.

In measuring the performance of wetland or other aquatic compensatory mitigation sites, the following physical and biological standards will be utilized as appropriate. The following list includes all performance standards available for inclusion within each individual HMMP. The Biological Opinion issued by the USFWS already identifies specific information that must be contained in each HMMP, and other conditions may be identified in permits issued by other agencies. The REMP Working Group will determine what suite of the described performance standards shall be utilized as a component of the final HMMP review process.

- Topography. The wetland/and or aquatic habitat shall not undergo major topographic degradation (such as excessive erosion or sedimentation) and shall maintain a specified final wetland acreage amount.

- Water Quality. Water quality variables (to be specified) shall be similar to reference wetlands or aquatic habitat.

- Tidal Prism. The designed tidal prism shall be maintained, and tidal flushing shall not be interrupted.

- Habitat Areas. The area of different habitats shall not vary by more than 10 percent from the area indicated in the final HMMP.

- Biological Communities. Community composition and the total densities and number of species of fish, macroinvertebrates and birds shall be similar to that in similar habitats in the reference wetlands.

- Vegetation. The proportion of total vegetative cover and open space and plant species diversity in the marsh shall be similar to those proportions and diversity found in the reference sites. The percent cover of algae shall be similar to the percent cover found in the reference sites.

- *Spartina* Canopy Architecture. The restored wetland shall have a canopy architecture that is similar in distribution to the reference sites, with an equivalent proportion of stems over three ft tall.

- Reproductive Success. Certain plant species, as specified in the HMMP, shall have demonstrated reproduction at least once in three years.

- Food Chain Support. The food chain support provided to birds shall be similar to that provided by the reference sites, as determined by feeding activity of the birds.

- Exotics. The important functions of the wetland shall not be impaired by exotic species, including zero percent coverage will be maintained for Cal-IPC's "Invasive Plant Inventory" species, and no more than five percent coverage for other exotic/weed species.

In measuring the performance of upland habitat mitigation sites, the following physical and biological standards will be utilized. The following list includes all performance standards available for inclusion within each individual HMMP. The Biological Opinion issued by the USFWS already identifies specific information that must be contained in each HMMP, and other conditions may be identified in permits issues by other agencies. The REMP Working Group will determine what suite of the described performance standards shall be utilized as a component of the final HMMP review process.

- Vegetation Cover. The proportion of total vegetative cover of shrubs, subshrubs, herbaceous and open space in the upland habitat shall be similar to those proportions found in the reference sites.

- Species Diversity. Community composition and species diversity for both perennial and annual plant species shall be similar to that in similar upland habitats found in the reference sites.

- Exotics. The important functions of the upland habitat shall not be impaired by exotic species, including zero percent coverage shall be maintained for Cal-IPC's "Invasive Plant Inventory" species, and no more than five percent coverage for other exotic/weed species.

Supplementing REMP Opportunities – Mitigation Contingencies and Future Opportunities
In the event that there are permanent or temporary impacts to resources beyond those authorized by resource and regulatory agencies either as a whole or by phase, available mitigation credits will be used or additional compensatory mitigation opportunities from the suite in this REMP will be utilized. In the unlikely event a previously identified compensatory mitigation opportunity is no longer feasible or available, SANDAG and Caltrans will be responsible for identifying and advancing additional projects through the REMP Working Group and applicable resource and regulatory agencies to amend the REMP and obtain permit modifications if necessary, pursuant to: (1) the applicable NOID and/or PWP amendment procedures outlined in Chapter 6 of the PWP/TREP, (2) the coastal development permit review process, and/or (3) the federal consistency certification process. The REMP allows for the flexibility necessary to sufficiently balance program impacts and benefits prior to initiating PWP/TREP transportation and community infrastructure projects by phase. Compensatory mitigation opportunities and funding can be moved between phases to account for shortfalls as necessary. Also, if needed, new compensatory mitigation sites can be added to the REMP in consultation with stakeholders and resource and regulatory agencies, if the site has been identified as meeting the category and evaluation criteria identified in the REMP and funds are available.

3.17.4 Regional Benefits

As noted in the discussion of avoidance, minimization, and/or mitigation measures in *Section 3.17.3*, the REMP proposes comprehensive corridor lagoon restoration, over and above mitigation components necessary to meet the requirement of no net loss of habitat. Additional out-of-kind habitat restoration and integrated lagoon ecosystem restoration and enhancements proposed in the REMP would provide significant ecological lift to the lagoon systems.

As previously noted, lagoon optimization studies were completed to ensure the project is designed to improve tidal flow, fluvial flow, and sediment transport. The studies identify the channel configurations to optimize both lagoon hydraulic functions and construction feasibility. The longer and/or deeper channels and lagoon crossings proposed as part of the *I-5 NCC Project* would improve water quality, increase the quality of coastal wetland habitat, decrease flood impacts, and improve the overall health and function of the lagoon systems.

The REMP offers a unique opportunity for a comprehensive approach to restoring and enhancing the lagoon ecosystems. Specifically, in addition to benefits for individual lagoon habitats, species, and hydraulic function as outlined in *Section 3.17.3*, a number of regional benefits would also be achieved. As previously noted, the mitigation and enhancement features described in this chapter comprise a (substantial) part of the PWP/TREP, which addresses all impacts and proposed mitigation for the *I-5 NCC Project*, the LOSSAN projects, and a number of identified local agency projects. Compilation of all North Coast Corridor projects into a single mitigation and enhancement effort ensures that the most accurate assessment of total potential impacts is being made and that the best overall options for mitigation of that total effect are being evaluated. Addressing impacts on this corridor-wide basis would provide greater regional benefit than mitigating on an individual project basis as these projects independently move forward over the next few decades. This is because: (1) mitigation for all included projects would be implemented in the near-term rather than as impacts occur (which would result in some mitigation being delayed for substantial periods of time); (2) areas proposed to be acquired for habitat preservation, restoration, and/or enhancement are more likely to be available in the near-term (i.e., such areas could be subject to development or other uses that would preclude mitigation if they are not secured in the near-term); and (3) implementing mitigation in the near-term would result in substantial additional time during which functional and connected habitat areas mature and are available for use by associated flora and fauna, including sensitive species. Specifically, then, benefits would include the following:

- Immediate and permanent set aside of existing (or appropriate for restoration) habitats would occur. Because a number of these habitats support sensitive floral and faunal species, associated benefits to activities such as breeding, foraging, and nesting would also be realized, thereby improving the overall conditions for these species on a regional basis.

- The corridor-wide approach to mitigation would provide greater regional benefits to coastal resources than a more traditional site-specific approach. Specifically, this conclusion is based on considerations including the fact that potential conflicts between in-place habitat preservation/restoration sites and impacts from subsequent development proposals would be minimized or avoided.

- A number of new pedestrian/bicycle trails and connections with existing trails/corridors addressed in the PWP/TREP, as well as project-implemented wildlife corridor improvements, would provide potential for recreational and wildlife movements between different areas such as lagoons, habitats, and recreational sites, with associated regional benefits for wildlife (e.g., enhanced gene flow between populations) and recreationalists (e.g., opportunities for unhindered access between coastal and/or inland sites).

- Implementation of the PWP/TREP on a corridor-wide basis would allow enhanced opportunities to implement water quality treatment/enhancement, as opposed to a traditional project-specific approach. Specifically, BMPs (particularly design pollution prevention and treatment measures) can be more effectively designed to address issues affecting entire watersheds (rather than individual drainages or water bodies), thereby providing a more regionally based approach to pollutant control/treatment and related ecosystem benefits.

Table 3.17.13: Resource Enhancement Package No Net Loss Mitigation Acreage and Timing

Mitigation/Enhancement Opportunities by Watershed		**Coastal Wetland Established**	**Coastal Wetland Restored**	**Coastal Wetland Preserved**	**Upland Created**	**Upland Restored**	**Upland Preserved**	**Begin Construction**	**Projected to Meet Criteria**
Establishment/Restoration (No Net Loss) & Preservation		**Wetland (acres)**			**Upland (acres)**				
Los Peñasquitos	Deer Canyon II				14.6			fall 2013	winter 2019
	Dean Family Trust					20.8	1.5	fall 2013	winter 2019
San Dieguito	San Dieguito W19	47.3			9.6	19.8		fall 2016	winter 2026
San Elijo	Laser			0.02			4.1	Already Preserved*	
Batiquitos	La Costa						18.8	Already Preserved*	
	Batiquitos Bluffs		2.5			3.7	39.9	fall 2014	winter 2020
Agua Hedionda	Hallmark	4.37	0.97	0.44	3.5	6.6	1.8	fall 2014	winter 2020-2024
	Sub Total	**51.67**	**3.47**	**0.46**	**27.1**	**50.9**	**66.1**		
Lagoon Restoration									
San Elijo Restoration		Funding will be set aside for selected alternative as determined by the Final REMP						fall 2016	
Buena Vista Restoration								Timing depends on Planning and process	
Lagoon Management/ Endowment									
Regional Lagoon Maintenance Program		20.7**						2014 Endowment established	

* Sites already purchased and protected from development. Deed restriction and endowment would be established when site is accepted as mitigation.

** Caltrans and SANDAG find that establishing an endowment should either be credited 20.7 ac based on hydraulic improvement and habitat establishment as a result of maintaining the lagoon mouths at Batiquitos and Los Peñasquitos Lagoons, or it is understood that this endowment would address any potential no net loss deficits between credit release and when impacts would occur, as well as any temporal impacts.

Table 3.17.5: Los Peñasquitos Lagoon Bridges Options Summary Analysis

Lagoon System Concerns/ Constraints/Goals	Bridge Options	Bridge Design [a]	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit [c] (CA§ 30230/30231)	Habitat Impact/ Benefit from Improved Tidal Circulation [d] (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential Sea Level Rise (SLR) Constraints [i]	Construction Cost [j]
<u>Concerns</u> -Sedimentation/siltation -Excess freshwater inputs/increased salinity -Lack of permanent tidal influence -Invasive plant species -Acoustic impacts from pile driving (during bridge footing construction) on both avian and fish species <u>Special Status Species</u> -Belding's savannah sparrow -Western snowy plover (Critical Habitat) -Light-footed clapper rail -California gnatcatcher -Tidewater goby surveys are recommended by USFWS -Wandering skipper surveys are recommended by USFWS <u>Constraints</u> -LOSSAN Railroad Bridge Crossings (CC-059-09; approved 2/9/11) -Highway 101 Crossing (approved/updated in 2005) -Urban infringement <u>San Diego LCP Goals</u> -Preserve as open space; encourage restoration -Minimize disturbance of wildlife; avoid blockage of tidal action -Incorporate drainage control measures -Remove/relocate public utility/facility projects from lagoon, as feasible	**No Action (Existing I-5 Bridge over Los Peñasquitos Creek, Soledad Canyon Creek, and Carmel Creek)** ***Assumes no new I-5 crossings**	Los Peñasquitos Creek: multiple existing facilities and roadways Soledad Canyon Creek: multiple existing facilities and roadways Carmel Creek: 421 ft long 179-209 ft wide	Los Peñasquitos Creek has existing rip rap; Canyon Creek is concrete channel; Carmel Creek has no existing channel protection	0 ac existing I-5 roadbed fill at all bridge crossings; long bridge spans located outside of active channels, except where columns occur	The lagoon is a salt marsh system with no permanent tidal influence reaching the I-5 crossings at the easternmost boundary of the lagoon	463 ac existing salt marsh system with no permanent tidal influence reaching any of the I-5 crossings	Sloped abutment and area under existing bridges presently used by wildlife	100-year flood events not contained within existing floodplain boundary at Carmel Creek only; freeboard deficiency noted under existing conditions (see SLR); risk of inundation under Q100 storm events considered short duration. Flood events at Los Peñasquitos Creek and Soledad Canyon Creek contained within existing floodplain boundary	Bridges are not a noted constriction point subject to surface water flood flows and associated erosion/ scour. Low potential for tidal erosion/scour near bridge abutments due to minimal/no tidal influence at I-5 crossings	Some sediment is trapped in detention basin upstream of I-5. Remaining sediment trapped in system/ shoreline sand supply limited due to limited tidal flushing. Maintenance required to open inlet annually	Greater than -0.7 ft freeboard deficiency noted under 'high' projection of SLR estimates in year 2100 at Carmel Creek; risk of inundation under Q100 storm events considered short duration and adaptation strategies feasible. All other I-5 crossings have freeboard to pass flows (3-35+ ft)	N/A
	Approved Railroad Single-track Replacement Bridge Crossings (3 total) (see CC-059-09)	B246.1: 280 ft long 23 ft wide B246.9: 196 ft long 23 ft wide B247.1: 84 ft long 23 ft wide	No change to existing conditions; replacement bridges would be in-line with existing trestle bridges	Removal of 2520 sf of earthen railroad berm and 147 sf of railroad pilings	No change to existing conditions; replacement bridges would be in-line with existing trestle bridges and continue to present a constraint to flows within the lagoon	No change to existing tidal range; reduced wetland fill from removal of railroad berm and pilings	No change to existing conditions; no designated public trails approach or cross over/under the railroad	No change to existing conditions; replacement bridges would be in-line with existing trestle bridges and continue to present a constraint to flows within the lagoon	Erosion protection around the bridge abutments provided by Armor Flex; allows water to permeate into the ground and wetland plants to grow within the preformed openings between the blocks	No change to existing conditions; tidal velocities insufficient to transport sand supply to lagoon mouth	No known change to existing conditions	N/A
	Proposed I-5 Bridge 1 (refined 8+4 Buffer-Preferred Alternative) ***Carmel Creek I-5 Bridge widening 9 - 16 ft wider to west on south bound lanes**	**421 ft long 188 - 225 ft wide**	**Channel width: ~415 ft** **Channel bottom: Varies** **Riprap or armoring on southern abutment only, by proposed trail**	**0 ac add'l roadbed fill; potential for 100 sq ft of new column fill** **0.03 ac add'l shaded open water from widened bridge**	**The lagoon is a salt marsh system with no permanent tidal influence reaching the I-5 Carmel Creek crossing at the easternmost boundary of the lagoon**	**No change to existing tidal range, or its effects on wetland or upland habitats**	**New, wider 10 ft bench at south bridge abutment for wildlife, with new pedestrian/ bike trail connection under the bridge connecting to Carmel Valley and Sea-to-Sea trails. Existing 8 ft bench on northern abutment will remain as is**	**100-year flood events not contained within existing floodplain boundary; noted bridge freeboard deficiency -0.7 ft of freeboard; risk of inundation under Q100 storm events considered short duration and adaptation strategies feasible**	**Low potential for tidal erosion/scour near bridge abutments due to minimal/no tidal influence at I-5 crossing**	**No change to existing conditions**	**Greater than -0.7 ft freeboard deficiency noted under 'high' projection of SLR estimates in year 2100 (requiring 4.5 ft of SLR); risk of inundation under Q100 storm events considered short duration and adaptation strategies feasible**	**Baseline**

Table 3.17.5 (cont.): Los Peñasquitos Lagoon Bridges Options Summary Analysis

Lagoon System Concerns/ Constraints/Goals	Bridge Options *	Bridge Design [a]	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit [c] (CA§ 30230/ 30231)	Habitat Impact/ Benefit from Improved Tidal Circulation [d] (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential SLR Constraints [i]	Construction Cost [j]
Cont. <u>Del Mar LCP Goals</u> -Develop pedestrian trails and bike paths -Ensure protection of wetlands and ESHA <u>Restoration Efforts</u> -Dredging/sedimentation control -Reduce urban/landscape runoff -Maintain tidal influence at lagoon mouth -Control/remove invasive plant species <u>Monitoring/Management</u> -Annual maintenance dredging	**Proposed I-5 Bridge 2 Sorrento Valley Road Bike Bridge (refined 8+4 Buffer-Preferred Alternative)** ***Carmel Creek culvert replaced with bridge**	**443 ft long 15 ft wide**	**Channel width: ~415 ft** **Channel bottom: Varies** **Riprap on abutments will likely be required - TBD**	**Reduced roadbed fill after culvert replaced by new bridge** **Added 0.44 ac partially shaded open water established from removal of culvert fill outside of stone column footprints**	**No tidal influence reaches the proposed bike bridge; no change to tidal range**	**No change to existing tidal range, or its effects on wetland or upland habitats** **Establishment of approximately 0.44 ac of partially shaded open water from removal of culvert fill**	**New bridge to replace existing culvert at Sorrento Valley Road, which is only open to pedestrian/ bike use. Northern abutment of bridge will have an 8 ft bench that connects to the existing bench under I-5**	**100-year flood events contained within existing floodplain boundary over Carmel Creek; replacing culvert with bridge reduces floodplain elevation upstream by 4.4 ft. 3.2 ft of freeboard at bike bridge**	**No potential for tidal erosion; existing surface water flow constriction at Sorrento Valley Road culvert removed by new bridge spanning floodplain**	**Removal of culverts and construction of bike bridge may facilitate some sediment transport downstream of I-5**	**3.2 ft freeboard for bike/ped bridge under existing bridge; should existing water levels increase by 4.5 ft with 'high' projection of SLR estimates in year 2100 there could be a -1.3 ft freeboard deficiency. However, tides do not currently reach bridge**	**Baseline**
	Proposed I-5 Bridge 3 (refined 8+4 Buffer-Preferred Alternative) ***HOV connector bridge over Soledad Canyon and Los Peñasquitos creeks**	**3376 ft long 60 ft wide over Los Peñasquitos Creek** **863 ft long 60 ft wide over Soledad Canyon Creek**	**New bridge over Los Peñasquitos Creek and Soledad Canyon Creek would continue to span the active channels, with proposed bridge columns located outside of the creeks; no new shoreline protection required**	**0 ac add'l roadbed fill anticipated at HOV connector bridge over Los Peñasquitos or Soledad Canyon creeks; long bridge span, columns located outside of creeks.**	**No tidal influence at these locations. No change to tidal range of lagoon from these proposed bridges**	**No change to existing tidal range, or its effects on wetland or upland habitats**	**Possible 16 ft bench at south bridge abutment; north bridge abutment maintained as wildlife corridor with 2:1 slope**	**100-year flood events contained within existing floodplain boundary over Los Peñasquitos Creek; no change to floodplain or waterway elevations. At Soledad Canyon Creek, new columns would minimally increase upstream floodplain elevation by 0.4 ft. 35+ ft of freeboard noted at both bridges**	**No potential for tidal erosion at either bridge as they are located too far upstream for any tidal impacts. New bridges would continue to span floodplain at Los Peñasquitos Creek, with proposed bridge columns located outside of the floodplain**	**Same as existing or, dependent on lagoon restoration, proposed bridge could facilitate improved sediment transport to shoreline**	**24.0 to 30.6 ft freeboard (range at Soledad Canyon and Los Peñasquitos creek crossings) maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)**	**Baseline**
	Proposed LOSSAN Double-track Bridge Crossings (3 total)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

NOTES:

a Bridge design features for I-5 options are described in detail within the Draft EIR/EIS. Railroad single-track bridge replacements are discussed within the CCC staff report for approval of a federal consistency certification (CC-059-09); whereas LOSSAN double-track bridge design features are under consideration. No proposed bridge would involve the construction of new or expanded shoreline protective devices beyond existing abutment protection structures, if required.

b Wetland fill consists of road bed fill supporting the bridge span. Bridge support structure footprint within the lagoon channel is calculated separately, and would only be required at the proposed culvert-to-bridge replacement over Carmel Valley Creek (for the Sorrento Valley Road bike trail).

c Maximum tidal range is the difference between the lowest observed water level and the highest observed water level. The greater the range, the lower the tidal muting effect within the lagoon system. Due to existing downstream constraints, there is no permanent tidal influence at the I-5 crossing.

d Due to the current constraints and north-south transecting facilities, Los Peñasquitos Lagoon has developed into a salt marsh with increasing freshwater influences and no permanent tidal influence. Dredging activities have led to breaching of existing ocean inlet to support lagoon water quality.

e All north-south trending transportation facilities, including I-5, LOSSAN, and Highway 101, currently act as a wildlife barrier to east-west movement. All designs for the proposed I-5 widened or new replacement bridges may include a bench at the abutment to facilitate wildlife movement.

f Drainage and floodplain impacts are expected to be negligible, which would in turn minimize potential adverse impacts associated with alteration and channelization of floodplains and associated erosion. Hydraulic Studies conclude that 100-year flood events would continue to be contained within the existing floodplain boundaries for each bridge, and therefore would not result in substantial impacts to on-site or off-site locations associated with drainage and flooding.

g There is no (or minimal) potential for channel erosion or scouring at the bridge abutments to occur due to lack of tidal influence and distance from the ocean inlet at I-5 crossings. Channel erosion/scouring at the LOSSAN bridge crossings is discussed in CC-059-09.

h Los Peñasquitos Lagoon is managed under an existing sediment control program. No sedimentation is transported between the Los Peñasquitos or Carroll Canyon creeks on the far east of the system to the Pacific Ocean, which is naturally closed to tidal influence as a result of existing downstream constraints at the railroad bridge crossings and minimally at the Highway 101 bridge crossing (this bridge was redesigned and constructed in 2005 to reduce fill and maintain tidal influence to the extent feasible).

i All of the proposed bridge designs would address potential impacts associated with the exacerbating effects of SLR on channel erosion, storm surge and flooding; by siting and designing the bridge support structures in a manner that minimizes the frequency at which structures could be subject to wave action, tidal inundation, and flooding. Furthermore, due to the distance from the ocean inlet and lack of tidal influence at the I-5 bridge crossings, SLR is not anticipated to result in substantial adverse effects on the bridge structures.

j Construction costs associated with the proposed new or widened I-5 bridges are anticipated to be provided through either Capital and/or Environmental Mitigation Program (EMP) program funds; further discussions are anticipated to determine appropriate use and allocation of available funds

Table 3.17.6: San Dieguito Lagoon Bridge Options Summary Analysis**

Lagoon System Concerns/ Constraints/Goals	Bridge Options	Bridge Design [a]	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit [c] (CA§ 30230/30231)	Habitat Impact/ Benefit from Improved Tidal Circulation [d] (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)[l]	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential Sea Level Rise (SLR) Constraints [i]	Construction Cost [j]
Concerns -Sedimentation/Siltation -Sensitive bird species/island maintenance -Maintenance of open tidal inlet -Eelgrass Special Status Species -Belding's savannah sparrow -Light-footed clapper rail -Western snowy plover (Proposed Critical Habitat) -California least terns -California gnatcatchers -Tidewater goby surveys are recommended by USFWS -Wandering skipper surveys are recommended by USFWS Constraints -Railroad Crossing -Coast Highway Crossing -Jimmy Durante Boulevard -Upstream dams (e.g., Lake Hodges Dam) San Diego LCP Goals -Preserve floodplain, open waters of the lagoon and river, wetlands, marshlands and uplands; encourage restoration -Enlarge to enhance plant and animal habitats, and to create a sufficient tidal prism to ensure adequate water circulation and to keep the mouth of the river open -Minimize disturbance of wildlife -Incorporate drainage control measures Del Mar LCP Goals -Prohibit impediments to flow of floodwaters and restoration of tidal function -Establish trails/bike paths that link coastal recreational areas -Ensure protection of wetlands and ESHA; improve for use as a wildlife preserve	**No Action I-5 (Existing Bridge)**	650 ft long 179 ft wide	Main Channel Bottom: 140 ft Flow Area under bridge: 575 ft Channel Depth: -4.0 NGVD Riprap on abutments and along north side of channel; no riprap on south side of channel	30.25 ac existing roadbed fill (0 ac additional roadbed fill) 0.75 ac existing shaded open water (0 ac additional shaded open water)	Existing I-5 bridge accommodates current and ongoing lagoon restoration and does not act as a constriction point to tidal prism due to long bridge span	No change to existing/restored wetland and intertidal habitats; restoration efforts occurring outside of bridge crossing/highway ROW	Paved trail located on the northern I-5 bridge abutment; large expanse under existing bridge may be used by wildlife	Relatively flat, established FEMA floodplain; existing bridge is a constriction point for upstream surface water flood flows although all flows can be contained within the 100-year floodplain	I-5 bridge a constriction point for upstream surface water flood flows and associated erosion/scour. Low potential for tidal erosion/scour near bridge abutments from ocean inlet as threshold transport velocity on either side of the bridge is extremely low	Sediment trapped in system/shoreline sand supply limited; however, with restoration efforts, tidal flows from the ocean inlet are now uninhibited. Restoration project designed to keep sediment suspended until it reaches the beach.	1.5 ft freeboard maintained under 'high' projection of SLR estimates in year 2100 (requiring 4.5 ft of SLR); floodplain elevation may be lowered with ongoing restoration efforts	N/A
	No Action Railroad (Existing Single-track Bridge)	1,038 ft long 14 ft wide	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	N/A
	Proposed I-5 Bridge (refined 8+4 Buffer-Preferred Alternative) ***Widened only**	**650 ft long 258 ft wide**	**Same as existing, or accommodates current and ongoing lagoon restoration. No riprap will be placed on south side of channel or channel bottom.**	**2.94/3.64 ac add'l roadbed fill in USACE WUS/State wetland 0.34/0.69 add'l shaded USACE WUS/State wetland**	**No change to existing conditions; accommodates current and ongoing lagoon restoration. With lagoon restoration, introduction of new tidal prism further supported by the existing bridge span located outside of active tidal channel**	**No change to existing tidal range, or its effects on wetland or upland habitats east of I-5**	**No change to existing corridors/trails needed**	**100-year flood flows based on FEMA worst case with a constant channel depth, spring tides, and storm wave run-up would have 0.7 ft freeboard under bridge. Modeling by Chang and Moffat and Nichol identified at least 6 ft of freeboard for 100-year flood with more realistic modeling inputs and including recent restoration activities**	**No change to existing conditions; accommodates current and ongoing lagoon restoration**	**No change to existing conditions**	**1.5 ft freeboard maintained under 'high' projection of SLR estimates in year 2100 (requiring 4.5 ft of SLR) based on Chang modeling; floodplain elevation may be lowered with ongoing restoration efforts**	**Baseline**

Table 3.17.6 (cont.): San Dieguito Lagoon Bridge Options Summary Analysis**

Lagoon System Concerns/ Constraints/Goals	Bridge Options	Bridge Design [a]	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit [c] (CA§ 30230/30231)	Habitat Impact/ Benefit from Improved Tidal Circulation [d] (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)[i]	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential Sea Level Rise (SLR) Constraints [i]	Construction Cost [j]
Restoration Efforts (Began in 2006) -Excavation for establishment of new intertidal wetlands; lowering of floodplain elevation -Development of native upland habitat/bird nesting areas - Establishment of storm water management basin -Public access and interpretation component -San Dieguito River Valley Planning/ Restoration Site Monitoring/Management -SCE Maintenance dredging for open inlet	**Proposed LOSSAN Railroad Bridge (Double-track)**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**

NOTES:

** Removal of all fill for the I-5 bridge crossing is not considered due to the high profile of the road, the length of the current bridge is much longer than the channel, and the current SCE restoration project was designed assuming the existing I-5 bridge would remain in place and be widened.

a I-5 bridge design features are described in detail within the Draft EIR/EIS; LOSSAN replacement bridge design features are under consideration. The proposed I-5 bridge would not involve the construction of new or expanded shoreline protective devices beyond existing abutment protection structures, if required.

b Wetland fill consists of I-5 roadbed fill supporting the bridge span piers within the active tidal channel (3 of 10 total piers)

c Maximum tidal range is the difference between the lowest observed water level and the highest observed water level. The greater the range, the lower the tidal muting affect within the lagoon system. With current and ongoing restoration efforts, the tidal prism is expected to increase up to 13 percent. The existing and proposed (wider) I-5 bridge would not constrict the tidal prism as the longer span is located outside of the active tidal channel.

d Due to the current constraints and north-south transecting facilities, San Dieguito Lagoon has developed into a salt marsh with increasing freshwater influences and no permanent tidal influence. Dredging activities have led to breaching of existing ocean inlet to support lagoon water quality. The restoration and preservation of disturbed wetland and upland (coastal sage scrub) habitats associated with the San Dieguito River Planning/Restoration sites (San Dieguito MOU/JPA and Dean Family Trust parcels) would result in additional habitat improvements within the lagoon system, and provide offsetting mitigation for potential impacts that would result from the proposed I-5 and LOSSAN replacement bridges throughout the North Coast Corridor. Approximately 50 ac of wetland establishment, 78.6 ac of coastal sage scrub establishment, and 1.5 ac of upland preservation are anticipated at the combined San Dieguito River Planning/Restoration sites.

e There is currently a large amount of open area outside of the active channel that can accommodate wildlife movement, and there is a pedestrian/bike trail located on the existing north abutment at the I-5 bridge.

f Drainage and floodplain impacts are expected to be negligible, which would in turn minimize potential adverse impacts associated with alteration and channelization of floodplains and associated erosion. Hydraulic studies conclude that 100-year flood events would continue to be contained within the existing floodplain boundaries, and therefore would not result in substantial impacts to on-site or off-site locations associated with drainage and flooding.

g There is no (or minimal) potential for channel erosion or scouring at the I-5 bridge piers within the active tidal channel due to low transport velocities within the relatively flat floodplain.

h San Dieguito Lagoon is being restored according to a Master Plan effort. No sedimentation is currently transported between the upstream watershed inputs on the far east of the system to the Pacific Ocean due to numerous dams reducing tidal influence at the ocean inlet. Restoration efforts are expected to improve sediment transport through maintaining an open ocean inlet and increasing tidal influence.

i The proposed I-5 widened bridge design addresses potential impacts associated with the exacerbating effects of SLR on channel erosion, storm surge, and flooding through the existing siting and design of the bridge support structures which are not expected to be subject to wave action, tidal inundation, and flooding due to the distance from the ocean inlet and available flood freeboard. Hydraulic studies completed included the SONGS restoration effort, which further indicate available freeboard would be maintained during a combined 100-year flood event with a projected "high" SLR scenario of 4.5 ft by year 2100, potentially as a result of the floodplain elevation being lowered with ongoing restoration efforts. Studies are underway to determine the potential effects of SLR on the proposed replacement LOSSAN bridge.

j Construction costs associated with the proposed I-5 bridge are anticipated to be provided through either Capital and/or Environmental Mitigation Program (EMP) program funds; further discussions are anticipated to determine appropriate use and allocation of available funds.

Table 3.17.7: San Elijo Lagoon Bridge Options Summary Analysis****

Lagoon System Concerns/ Constraints/Goals	Bridge Options	Bridge Design [a]	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit [c] (CA§ 30230/30231)	Habitat Impact/ Benefit from Improved Tidal Circulation [d] (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential Sea Level Rise (SLR) Constraints [i]	Construction Cost [j]
<u>Concerns</u> -Increased freshwater/nutrient-rich inputs -Flooding/vector control -Sedimentation/siltation -Reduced tidal prism/constrictions resulting in a transition from mudflat to subtidal habitat Special Status Species -California least tern -Belding's savannah sparrow -Wandering skipper butterfly -California coastal gnatcatcher (Critical Habitat) <u>Constraints</u> -Railroad Bridge Crossing -South Coast Highway 101 Crossing -Concrete dike/floodgates -Upstream reservoirs -Buried utilities <u>Encinitas LCP Goals</u> -Preserve scenic views/vista points at lagoon -Preserve the integrity, function, productivity, and long-term viability of sensitive habitats -Acquire or preserve the entire undeveloped riparian corridor that drains into the lagoon -Preserve/protect no net loss of wetlands -Maintain/enhance wildlife corridors -Encourage passive/compatible recreational activity -Remove impediments to internal lagoon water circulation and increase tidal circulation	**No Action I-5 (Existing Bridge)**	340 ft long 176 - 188 ft wide *Two bridges	Channel bottom width: 130 ft Channel depth: -6.0 ft NGVD Channel slope: 1:1 on north abutment, adjacent channel and Manchester Avenue (riprap)	10.2 ac existing fill (0 ac additional fill) 0.6 ac existing shaded wetland (0 ac additional shaded wetland)	Max. tidal range: 5.06 ft Max. residence time: N/A as minimal tides in east basin	612 ac existing wetland/upland riparian habitat	Narrow south abutment presently used by wildlife and pedestrians; Manchester Avenue located on north abutment	Existing constriction point; 100-year flood events contained within existing floodplain boundary	Max. flood currents in channel under I-5 bridge: 0.1 ft/sec Max. ebb currents: -0.1 ft/sec	Sediment trapped in system due to active tidal channel constriction points; shoreline sand supply limited without improved/increased tidal flushing	19.7 ft freeboard maintained under 'high' projection of SLR estimates in year 2100 (assumes 4.5 ft of SLR)	N/A
	No Action Railroad (Existing Single-track Bridge)	~321 ft long ~22 ft wide	Channel bottom width: 161 ft Channel depth: Varies Slope: TBD	No additional fill	Central Basin max. tidal range: 4.97 ft Max. residence time: 6.8 days	Change in tidal wetlands acreage is dependent on which restoration alternative is selected	No wildlife corridors or sanctioned trails provided at railroad crossing	Existing constriction point	Max. flood currents in channel under railroad bridge: 1.0 ft/sec Max. ebb currents: -1.0 ft/sec	Sediment trapped in system due to active tidal channel constriction points; shoreline sand supply limited without improved/increased tidal flushing	6.4 ft freeboard maintained under 'high' projection of SLR estimates in year 2100 (assumes 4.5 ft of SLR)	N/A
	Proposed I-5 Bridge (8+4 Buffer) **No project/Alt 1A** **For SELRP**	370 ft long 252.9 ft wide *Single bridge – gap filled	Channel bottom width: 130 ft Channel depth: -6.0 ft NGVD Channel slope: 2:1 (riprap)	0.63/0.99 ac add'l roadbed fill in USACE/State waters/ wetland 0.54 add'l shaded USACE/State waters/ wetland	At I-5 max. tidal range: 5.06 to 5.43 ft for No Project and Alt 1A Max. residence time 12.7 days depending for Alt 1A	Change in tidal wetlands acreage is dependent on which restoration alternative is selected	A fenced 12 ft pedestrian trail would be created on the south abutment with a 12 ft wildlife bench lower on the abutment and separated from the trail; wildlife bench would be near the high tide elevation at the lagoon	The floodplain is dependent on the restoration alternative selected. Only Alt 2A keeps all of Manchester Avenue outside the floodplain. Increasing the length of I-5 for Alts 1A and 1B moves the area of inundation for Manchester Avenue farther west	Max. flood currents in channel under I-5 bridge: 0.1 to 0.3 ft/sec Max. ebb currents: --0.1 to -0.4 ft/sec For No Project and Alt 1A	Dependent on restoration alternative selected; along main flow path in lagoon sediment would be carried to the ocean; along edges sediment would be deposited. Alt 2A most efficiently transports sediment downstream	19.6 to 19.7 ft freeboard maintained under 'high' projection of SLR estimates in year 2100 (assumes 4.5 ft of SLR) for No Project and Alt 1A	Baseline $26.8M

Table 3.17.7 (cont.): San Elijo Lagoon Bridge Options Summary Analysis**

Lagoon System Concerns/ Constraints/Goals	Bridge Options	Bridge Design [a]	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit [c] (CA§ 30230/30231)	Habitat Impact/ Benefit from Improved Tidal Circulation [d] (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential Sea Level Rise (SLR) Constraints [i]	Construction Cost [j]
Cont. <u>Restoration Efforts</u> -Dredging/maintaining an open tidal inlet -Tidal marsh restoration -Removal of invasive weed species -Modifications to constriction points	**Optimized I-5 Bridge (refined 8+4 Buffer-Preferred Alternative)**	**560 ft long 303-388 ft wide**	**All Alts = Channel bottom width: 261 ft Channel depth: -6.0 to -6.5 ft NGVD Channel slope: 2:1 (riprap)**	**0.60/0.09 ac net established USACE/State waters/wetland from wider bridge 1.4 add'l shaded USACE/State waters/ wetland**	**At I-5 max. tidal range: 4.66 to 8.06 ft depending on which restoration alternative is selected Max. residence time: 4.5 to 7.5 days for Alts 2A and 1B**	**Change in tidal wetlands acreage is dependent on which restoration alternative is selected**	**A fenced 12 ft pedestrian trail would be created on the south abutment with a 12 ft wildlife bench lower on the abutment and separated from the trail; wildlife bench would be near the high tide elevation at the lagoon**	**The floodplain is dependent on the restoration alternative selected. Only Alt 2A keeps all of Manchester Avenue outside the floodplain. Increasing the length of I-5 for Alts 1A and 1B moves the area of inundation for Manchester Avenue farther west**	**Max. flood currents in channel under I-5 bridge: 0.4 to 0.9 ft/sec Max. ebb currents: -0.3 to -0.7 ft/sec for Alts 1B and 2A**	**Dependent on restoration alternative selected; along main flow path in lagoon sediment would be carried to the ocean; along edges sediment would be deposited. Alt 2A most efficiently transports sediment downstream**	**19.5 to 21.2 ft freeboard maintained under 'high' projection of SLR estimates in year 2100 (assumes 4.5 ft of SLR) for Alts 1B and 2A**	**$16.1M (additional cost)**
<u>Monitoring/Management</u> -Maintenance dredging -Invasive species control program -Chemical/biological water quality monitoring to ensure adequate tidal mixing	**Optimized LOSSAN Railroad Bridge (Double-track Alternatives)**	**Alts 1A and 1B = ~321 ft long ~50 ft wide Alt 2A = 590 ft+ long for ~50 ft wide**	**Alts 1A and 1B = Channel bottom width: 161 ft Channel depth: -5.5 ft Alt 2A = Channel bottom width: 590 ft Channel depth: -15.0 ft NGVD Channel slope: TBD**	**TBD**	**Central Basin max. tidal range: 5.49 to 8.10 ft depending on which restoration alternative is selected Max. residence time: 1.9 to 4.8 days depending on which restoration alternative is selected**	**Change in tidal wetlands acreage is dependent on which restoration alternative is selected**	**TBD**	**The floodplain is dependent on the restoration alternative selected. Only Alt 2A keeps all of Manchester outside the floodplain**	**Max. flood currents in channel under railroad bridge: 1.4 to 2.0 ft/sec Max. ebb currents: -0.6 to -1.9 ft/sec Depending on which restoration alternative is selected**	**Dependent on restoration alternative selected; along main flow path in lagoon sediment would be carried to the ocean; along edges sediment would be deposited. Alt 2A most efficiently transports sediment downstream**	**6.3 to 7.9 ft freeboard maintained under 'high' projection of SLR estimates in year 2100 (assumes 4.5 ft of SLR) depending on which restoration alternative is selected**	**TBD**

Table 3.17.7 (cont.): San Elijo Lagoon Bridge Options Summary Analysis****

Lagoon System Concerns/ Constraints/Goals	Bridge Options	Bridge Design [a]	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit [c] (CA§ 30230/30231)	Habitat Impact/ Benefit from Improved Tidal Circulation [d] (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential Sea Level Rise (SLR) Constraints [i]	Construction Cost [j]
	I-5 Bridge Option w/ Removal of All Roadbed Fill	1,340 ft long; max bridge length needed to remove all roadbed fill 252.9 ft wide	Removes shoreline alteration from roadbed fill; however, shoreline protection required for bridge pilings and potentially areas subject to expanded floodplain and tidal inundation (depending on lagoon restoration)	+8.85 ac net, new shaded wetland	Max. tidal range unrestricted except by bridge pilings; expanded area subject to tidal inundation	Change in tidal wetlands acreage is dependent on which restoration alternative is selected	A fenced 12 ft pedestrian trail would be created on the south abutment with a 12 ft wildlife bench lower on the abutment and separated from the trail; wildlife bench would be near the high tide elevation at the lagoon	Greater capacity to pass flood flows; max. flood event conveyed in expanded floodplain	Removes flood flow and tidal constrictions causing scour at abutments; however, expanded floodplain subjects new areas to scour/erosion	Expanded floodplain subjects new areas to scour/erosion; removes constriction to better convey sediment to shoreline	TBD	$60.4M (additional cost)

NOTES:

**The SELRP is under development to restore and maintain the lagoon's estuarine and brackish tidal habitats through improved tidal flushing; the I-5 bridge options would be designed to accommodate and facilitate the lagoon restoration plan alternative selected.

a Bridge design and channel features are described in detail within the Draft EIR/EIS; LOSSAN replacement bridge design features are under consideration. No proposed I-5 bridge options would involve the construction of new or expanded shoreline protective devices beyond existing abutment protection structures, if required.

b Wetland fill consists of I-5 bridge structure footprint within the active tidal lagoon channel (column dimensions and placement are unknown, thus the whole bridge footprint was included), as well as road bed fill supporting the bridge span.

c Maximum tidal range is the difference between the lowest observed water level and the highest observed water level. The greater the range, the lower the tidal muting affect within the lagoon system. Due to existing downstream constraints, tidal influence at the I-5 crossing is limited. The lagoon's flat bottom lacks the change in elevation to achieve higher flow velocities and thus produces an extremely level water surface profile until the flow passes the Coast Highway.

d Due to the current constraints at all north-south transecting facilities across the lagoon, San Elijo Lagoon has been transitioning from mudflats to subtidal habitat. Dredging activities have led to breaching of existing ocean inlet to support lagoon water quality.

e I-5 currently acts as a wildlife barrier to east-west movement. All bridge design options would include a wider bench at the south abutment to facilitate wildlife movement, as well as a separate, fenced pedestrian trail.

f Drainage and floodplain impacts are expected to be negligible, which would in turn minimize potential adverse impacts associated with alteration and channelization of floodplains and associated erosion. Hydraulic studies conclude that 100-year flood events would continue to be contained within the existing floodplain boundaries under each option, although the resulting floodplain is dependent on the restoration alternative selected.

g The existing I-5 and LOSSAN bridges are a constriction point within the active tidal channel. With increased/improved tidal flows, as well as storm water runoff flood flows, there is potential for channel erosion or scouring at the bridge abutments.

h San Elijo Lagoon is managed under an existing sediment control program. Despite this active management, the tidal prism of the lagoon is not sufficient to prevent undesirable sedimentation of the lagoon, and dredging of the majority of the west and central basins is necessary to maintain the ocean inlet. Major planning efforts to restore a "healthy" balance to the lagoon tidal regime have been made, especially through modeling of tidal inlet and channel relocation alternatives.

i All the bridge designs would address potential impacts associated with the exacerbating effects of SLR on shoreline erosion, storm surge, and flooding, by siting and designing the bridge support structures in a manner that minimizes the frequency with which structures are subject to wave action, tidal inundation, and flooding. Studies are underway to determine the potential effects of SLR on the proposed replacement LOSSAN bridge.

j Construction costs associated with the proposed I-5 bridge are anticipated to be provided through either Capital and/or Environmental Mitigation Program (EMP) program funds; further discussions are anticipated to determine appropriate use and allocation of available funds.

Table 3.17.8: Batiquitos Lagoon Bridge Options Summary Analysis

Lagoon System Concerns/ Constraints/Goals	Bridge Option	Bridge Design [a]	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit [c] (CA§ 30230/30231)	Habitat Impact/ Benefit from Improved Tidal Circulation [d] (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential Sea Level Rise (SLR) Constraints [i]	Construction Cost [j]
Concerns -Increased sedimentation/siltation -Excessive nutrient loads from agricultural land uses -Invasive plant species Special Status Wildlife Species -Western snowy plover -Belding's savannah sparrow -California gnatcatcher -California least tern -Light-footed clapper rail -Tidewater goby Constraints -Railroad bridge crossing -Carlsbad Boulevard/Highway 101 crossing -Buried utilities/infrastructure Carlsbad LCP Goals -Restoration of natural resources and wildlife habitat -Maintain maximum amount of permanent open space -Limit activities to habitat enhancement, educational and scientific nature study, passive recreation, and aquaculture having no significant adverse effect on natural processes or scenic quality -Incorporate stringent drainage control measures upstream/upslope Restoration Efforts -Maintain tidal inlet/tidal flows -Remove excess sediment -Bird nesting habitat/deep water fish habitat Monitoring/Management -Maintenance dredging -Reestablish eel grass and native cord grass -Monitor invasive plant species -Monitor chemical, biological, and tidal improvements within basins after 1996 restoration project initiated	**No Action I-5 (Existing Bridge)**	219 ft long 2 bridges each 68 ft wide+19.2 ft gap	Channel bottom width: 66 ft at bottom with 4:1 slopes to edges of the abutment (approx. 106 ft between abutments) Channel depth: -5.3 ft (shoaled) Channel slope: 2:1 (riprap)	9.2 ac existing roadbed fill (0 ac additional fill) 0.49 ac existing shaded wetland (0 ac additional shaded wetland)	Max. tidal range at east basin: 6.7 ft Max. phase lag: 186 min Max. residence time: TBD	600 ac wetland habitat; 267.6 max intertidal area	Steep, narrow abutments on north and south presently used by wildlife	Existing constriction point; 100-year flood events contained within existing floodplain boundary with approximately 6.3 ft of freeboard	Max. flood currents in channel under I-5 bridge: 2.3 ft/sec Max. ebb currents: -1.9 ft/sec (20 ft scour holes noted at bridge)	East basin swirl and eddy speeds (0.3 ft/sec) insufficient to transport fine sand but provide a stirring mechanism to maintain sediment particles in suspension	At least 4.5 ft of freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)	N/A
	No Action Railroad (Existing Single-track Bridge)	~310 ft long ~22 ft wide	Channel bottom width: 162 ft Channel depth: -6.35 ft	TBD	Maximum tidal range in central basin: 7.26 ft Maximum residence time: 1.6 days central basin	Tidal range would be unchanged with existing bridges	Existing slope on abutment could be used by wildlife; no sanctioned trails across railroad	100-year flood predicted for existing bridge is 9.5 ft of freeboard	Max. flood currents in channel under I-5 bridge: 3.7 ft/sec Max. ebb currents: 4.3 ft/sec	Velocity through railroad bridge high, with more potential to scour	At least 7.4 ft of freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)	N/A
	Proposed I-5 Bridge (8+4 Buffer) ***Replaces existing bridge length; does not include staging considerations**	246 ft long 226 ft wide	Channel bottom width: 66 ft at bottom with 4:1 slopes to edges of the abutment (approx. 106 ft between abutments) Channel depth: -5.3 ft (shoaled) Channel slope: 2:1 (riprap)	3.7/4.15 ac additional roadbed fill of USACE WUS/ State wetland 0.28 ac add'l shaded USACE WUS/State wetland	Max. tidal range at east basin: 6.7 ft Max. phase lag: 186 min Max. residence time: TBD	No change in intertidal area	New, wider 16 ft bench at both abutments; north abutment pedestrian trail could also be used by wildlife	Existing constriction point reduced, base floodplain lowered by 0.7 ft upstream; 100-year flood events contained within existing boundary. 6.3 ft of freeboard during 100 year flood with high tides and storm wave runup	Max. flood currents in channel under I-5 bridge: 2.3 ft/sec Max. ebb currents: -1.9 ft/sec (20 ft scour holes noted at bridge)	East basin swirl and eddy speeds (0.3 ft/sec) insufficient to transport fine sand but provide a stirring mechanism to maintain sediment particles in suspension	At least 4.8 ft of freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)	Baseline 13.4M
	I-5 Bridge Option 2 (Double Length of Proposed Bridge Span)	350 ft long** 226 ft wide	Channel bottom width: 212 ft Channel depth: -5.3 ft Channel slope: 2:1 (riprap)	TBD	Max. tidal range at east basin: 7.4 ft Max. phase lag: 120 min Max. residence time: TBD	Additional 19.2 ac of intertidal area	New, wider 16 ft bench at both abutments; north abutment pedestrian trail could also be used by wildlife	Longer bridge creates wider channel reducing constriction point and lowering base floodplain upstream; 100-year flood events contained within existing boundary. At least 6.6 ft of freeboard during 100-year flood with high tides and storm wave runup	Max. flood currents in channel under I-5 bridge: 1 ft/sec Max. ebb currents: -0.8 ft/sec (Flows below scour threshold)	East basin swirl and eddy speeds (0.3 ft/sec) insufficient to transport fine sand but provide a stirring mechanism to maintain sediment particles in suspension	At least 4.8 ft of freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)	$7.13M (additional cost)

Table 3.17.8 (cont.): Batiquitos Lagoon Bridge Options Summary Analysis

Lagoon System Concerns/ Constraints/Goals	Bridge Option	Bridge Design [a]	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit [c] (CA§ 30230/30231)	Habitat Impact/ Benefit from Improved Tidal Circulation [d] (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential SLR Constraints [i]	Construction Cost [j]
	I-5 Bridge Option 3 (Chang Channel)	246 ft long 226 ft wide	Channel bottom width: 180 ft Channel depth: -7.0 ft Channel slope: 1:1 (riprap)	TBD	Max. tidal range at east basin: 7.26 ft Max. phase lag: 136 min Max. residence time: TBD	Additional 13.5 ac of intertidal area	New, wider 16 ft bench at both abutments; north abutment pedestrian trail could also be used by wildlife	Wider channel alleviates constriction point, lowering base floodplain upstream; 100-year flood events contained within existing boundary. At least 6.6 ft of freeboard during 100-year flood with high tides and storm wave runup	Max. flood currents in channel under I-5 bridge: 1.24 ft/sec Max. ebb currents: -0.98 ft/sec (Flows below scour threshold)	East basin swirl and eddy speeds (0.3 ft/sec) insufficient to transport fine sand but provide a stirring mechanism to maintain sediment particles in suspension	At least 4.8 ft of freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)	$1.26M (additional cost)
	Optimized I-5 Bridge (refined 8+4 Buffer- Preferred Alternative) ***Staging with existing HOV**	282 ft long, two bridges each 101 ft wide with 19.2 ft gap	Channel bottom width: 183.5 ft Channel depth: -7 ft NGVD Channel slope: 2:1 (riprap)	4.32/4.8 ac net additional road bed fill in USACE/State wetland 0.56 ac add'l shaded USACE/State wetland	Maximum tidal range in east basin: 7.35ft Maximum phase lag: TBD Maximum residence time: 5.4 days in east basin	Additional ~13.0 ac of intertidal area	New, wider 16 ft bench at both abutments; north abutment pedestrian trail could also be used by wildlife.	Wider channel alleviates constriction point, lowering base floodplain upstream; 100-year flood events contained within existing boundary. At least 6.6 ft freeboard during 100-year flood with high tides and storm wave runup	Max. flood currents in channel under I-5 bridge: 2.4 ft/sec Max. ebb currents: 2.3 ft/sec	Velocity of flow through I-5 bridge would decrease allowing scour holes to fill; increased velocity at inlet would make it more stable	At least 4.8 ft freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)	$3.85M (additional cost)
	Optimized I-5 Bridge (refined 8+4 Buffer- Preferred Alternative) ***Staging without existing HOV**	**282 ft long, two bridges each 101 ft wide with 19.2 ft gap**	**Channel bottom width: 183.5 ft** **Channel depth: -7 ft NGVD** **Channel slope: 2:1 (riprap)**	**3.13/3.62 ac net additional road bed fill of USACE/State wetland** **0.37 ac add'l shaded USACE/State wetland**	**Maximum tidal range in east basin: 7.35 ft** **Maximum phase lag: TBD** **Maximum residence time: 5.4 days east basin**	**Additional ~13.0 ac of intertidal area**	**New, wider 16 ft bench at both abutments; north abutment pedestrian trail could also be used by wildlife**	**Wider channel alleviates constriction point, lowering base floodplain upstream; 100-year flood events contained within existing boundary. At least 6.6 ft freeboard during 100-year flood with high tides and storm wave runup**	**Max. flood currents in channel under I-5 bridge: 2.4 ft/sec** **Max. ebb currents: 2.3 ft/sec**	**Velocity of flow through I-5 bridge would decrease allowing scour holes to fill; increased velocity at inlet would make it more stable**	**At least 4.8 ft freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)**	**TBD**

Table 3.17.8 (cont.): Batiquitos Lagoon Bridge Options Summary Analysis

Lagoon System Concerns/ Constraints/Goals	Bridge Option	Bridge Design [a]	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit [c] (CA§ 30230/30231)	Habitat Impact/ Benefit from Improved Tidal Circulation [d] (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential SLR Constraints [i]	Construction Cost [j]
	Optimized LOSSAN Railroad Bridge (Double-track)	**~350 ft long ~50 ft wide**	**Channel bottom width: 202 ft Channel depth: -7.0 ft**	**TBD**	**Maximum tidal range in central basin: 7.40 ft Maximum residence time: 1.6 days central basin**	**Additional intertidal habitat would result from increased tidal range**	**TBD**	**100-year flood predicted for existing bridge is 9.0 ft of freeboard due to higher tides with optimized bridge**	**Max. flood currents in channel under I-5 bridge: 2.7 ft/sec Max. ebb currents: 2.9 ft/sec**	**Velocity of flow through railroad bridge would decrease making the channel less scoured; increased velocity at inlet would make it more stable**	**At least 7.0 ft of freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)**	**TBD**
	I-5 Bridge Option w/ Removal of All Roadbed Fill	1,918 ft long; max. length needed to remove all roadbed fill 226 ft wide	Removes shoreline alteration from roadbed fill; however, shoreline protection still required for bridge columns and potentially areas subject to expanded floodplain and tidal inundation	Establishes +9.2 ac new, shaded wetland	Max. tidal range unrestricted in east basin except by bridge columns; expanded area subject to tidal inundation	>19.2 ac additional intertidal area; potential erosion of nesting bird islands/shoals within Central Basin if tidal flows increase south of island	New, wider 16 ft bench at both abutments; north abutment pedestrian trail could also be used by wildlife	Greater capacity to pass flood flows; max. flood event conveyed in expanded floodplain. At least 6.6 ft freeboard during 100-year flood with high tides and storm wave runup	Removes constrictions causing scour at abutments and increases flood currents; however, expanded floodplain subjects new areas to scour/erosion	Removes constrictions better conveying sediment to shoreline with increased east basin eddy speeds/flow velocities	At least 4.8 ft freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)	$101M (additional cost)

NOTES:

a Bridge design and channel features are described in detail within the Draft I-5 EIR/EIS, Phase 2 Lagoon Study, and Batiquitos Lagoon Bridge Optimization Study; LOSSAN replacement bridge design features are under consideration, whereas current and optimized bridge lengths and widths for railroad crossings have been estimated using GIS. Habitats and wetland delineations around railroad bridge are not currently available. No bridge option would involve the construction of new or expanded shoreline protective devices beyond existing abutment protection structures. Bridge designs that remove a portion of the road bed fill to accommodate channel widening would restore a more natural shoreline slope at the facility crossing. Double length bridge span does not need to be twice as long for the channel to double in width.

b Wetland fill consists of road bed fill supporting the bridge span and directly affecting channel width only; existing and new proposed bridge support structure footprints within the lagoon channel are calculated separately.

c Maximum tidal range is the difference between the lowest observed water level and the highest observed water level. The greater the range, the lower the tidal muting affect within the lagoon system. A reduced time phase lag would also indicate more complete drainage of the east basin during low tide. Reduced tidal damping and more complete drainage would improve tidal flushing, or exchange between the ocean and lagoon areas, resulting in improved water quality as indicated by higher dissolved oxygen and reduced areas of nutrient concentrations.

d Maximum intertidal area indicates the potential for establishment of new mudflats or exposure time for existing mudflats, a benefit to shorebird foraging and overall feature of the east basin.

e I-5 and the railroad bridges currently act as a wildlife barrier to east-west movement. All I-5 bridge design options would include a wider bench at the abutment to facilitate wildlife movement, as well as for use by hikers on the new trail connection proposed along the north abutment adjacent the I-5.

f Drainage and floodplain impacts for all the bridge options are expected to be negligible, which would in turn minimize potential adverse impacts associated with alteration and channelization of floodplains and associated erosion. Hydraulic Studies conclude that 100-year flood events would continue to be contained within the existing floodplain boundaries under each option, and therefore would not result in substantial impacts to on-site or off-site locations associated with drainage and flooding.

g Reduced flood and ebb currents indicate more complete conversion of velocity head into potential energy or water elevation. This in turn reduces the potential for channel erosion or scouring at the bridge abutments to occur. Under the existing and proposed replacement bridge scenarios, two 20 ft deep scour holes have formed on either side of the I-5 bridge due to the excess velocity head of the tidal flow passing under the bridge. The threshold of motion resulting in scour is 0.8 ft/sec to 1 ft/sec.

h East basin eddy speeds in Batiquitos Lagoon are insufficient to transport fine sand to the shore regardless of bridge design option. For sufficient sediment transport, eddy speeds must be maintained at 0.6 ft/sec or greater.

i All the bridge design options would address potential impacts associated with the exacerbating effects of SLR on shoreline erosion, storm surge, and flooding, by siting and designing the bridge support structures in a manner that minimizes the frequency with which structures are subject to wave action, tidal inundation, and flooding. All I-5 bridge options would be able to maintain adequate freeboard. Studies are underway to determine the potential effects of SLR on the proposed replacement LOSSAN bridge.

j Construction costs associated with the proposed I-5 bridge are anticipated to be provided through either Capital and/or Environmental Mitigation Program (EMP) program funds; further discussions are anticipated to determine appropriate use and allocation of available funds.

Table 3.17.9: Agua Hedionda Lagoon Bridge Options Summary Analysis

Lagoon System Concerns/ Constraints/Goals	Bridge Options *	Bridge Design *	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit [c] (CA§ 30230/30231)	Habitat Impact/ Benefit from Improved Tidal Circulation [d] (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential Sea Level Rise (SLR) Constraints [i]	Construction Cost
Concerns -Impaired Waterbody -Indicator Bacteria -Sedimentation Siltation -Acoustic impacts from pile driving (during bridge footing construction) on both avian and fish species Special Status Species -Belding's savannah sparrow -California gnatcatcher -Light-footed clapper rail -Tidewater goby surveys are recommended by USFWS -Wandering skipper surveys are recommended by USFWS Constraints -Encina Power Plant Iron Lung Effect -Poseidon Desalination Plant Future Intake (CDP E-06-013; approved 3/5/08) -LOSSAN Railroad Bridge Crossing (CC-075-09; approved 3/12/10) -PCH Crossing LCP Goals -Wetland Acquisition/Restoration -Preserve Coastal Sage Scrub habitat -Preserve California gnatcatcher habitat -Maintain/Expand Recreational Uses Restoration Efforts -Dredging and Eelgrass Planting -Removal of Toxic Algae/Caulerpa (complete) -Hallmark Sites Planning/Preservation Monitoring/Management -Monitoring of Toxic Algae/Caulerpa (ongoing) -Maintenance Dredging	**No Action (Existing I-5 Bridge)**	191 ft long 157.5 ft wide	I-5 Channel bottom width: 76 ft I-5 Channel depth: -7.3 ft NGVD I-5 Channel slope: 1.5:1 (riprap)	4.7 ac existing roadbed fill (0 ac add'l roadbed fill) 0.33 ac existing shaded open water (0 ac add'l shaded open water)	Max. tidal range: 8.26 ft Max. phase lag: 80.1 min	Approx. 330 ac of open water/wetland habitat No change in max. intertidal area: 85.9 ac existing in eastern basin	Steep, narrow abutment at I-5 bridge presently used by wildlife	Existing constriction point; 100-year flood events contained within existing floodplain boundary	Max. flood currents in channel under I-5 bridge: 4.9 ft/sec Max. ebb currents: -2.6 ft/sec (Sand bars and erosion/scour noted)	Tidal velocities in the basins are insufficient to transport fine sand to lagoon mouth, resulting in localized shoaling	3.7 ft freeboard under I-5 bridge maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)	N/A
	Approved LOSSAN Bridge (see CC-075-09)	213 ft long 22 ft wide 4 columns/ 4-foot concrete pilings	No change to existing conditions (riprap)	64 sf add'l wetland fill	No change to existing conditions; maintains an existing constriction point near mouth	No change to existing conditions; no listed or sensitive species or habitats within area of effect; no Caulerpa found	Design provides for increased vertical clearance under bridge; no formal access, but may facilitate future trails	No change to existing conditions; maintains an existing constriction point near mouth	No change to existing conditions; narrow tidal flow through channel	No change to existing conditions; tidal velocities in the basins are insufficient to transport sand supply to lagoon mouth	No known change to existing conditions	$2M (estimated)
	Proposed I-5 Bridge (refined 8+4 Buffer-Preferred Alternative)	**191 ft long 269 ft wide**	**I-5 Channel bottom width: 76 ft I-5 Channel depth: -7.3 ft NGVD I-5 Channel slope: 2:1 (riprap)**	**3.56/3.77 ac add'l roadbed fill in USACE waters/State wetlands 0.37 ac add'l shaded open water**	**Max. tidal range: 8.38 ft Max. phase lag: 80.1 min**	**1.1 ac add'l intertidal area in eastern basin 1.1 ac decrease subtidal habitat in eastern basin**	**New, wider 16 ft bench at I-5 north bridge abutment; and16 ft bench at south abutment; facilitates new trail connections on east side of lagoon**	**Existing constriction point; no change to upstream elevations; 100-year flood events contained within existing boundary. 6.4 ft of freeboard during 100-year flood by FEMA calculations**	**Max. flood currents in channel under I-5 bridge: 2.3 ft/sec Max. ebb currents: -2.3 ft/sec (Sand bars and erosion/scour noted)**	**Tidal velocities in the basins are insufficient to transport fine sand to lagoon mouth, resulting in localized shoaling**	**At least 1.9 ft freeboard under I-5 bridge maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)**	**Baseline**
	Double Length of Proposed I-5 Bridge Span	267 ft long 267 wide	I-5 Channel bottom width: 152 ft I-5 Channel depth: -7.3 ft NGVD I-5 Channel slope: 1.5:1 (riprap)	TBD	Max. tidal range: 8.51 ft Max. phase lag: 61.6 min	2.3 ac add'l intertidal area in eastern basin 2.3 ac decrease subtidal habitat in eastern basin	New, wider 16 ft bench at I-5 north bridge abutment; and16 ft bench at south abutment; facilitates new trail connections on east side of the lagoon	Longer I-5 bridge creates wider channel reducing constriction point and lowering base floodplain upstream; 100-year flood events contained within existing boundary	Max. flood currents in channel under I-5 bridge: 1.1 ft/sec Max. ebb currents: -1.1 ft/sec (Sand bars and erosion/scour noted)	Tidal velocities in the basins are insufficient to transport fine sand to lagoon mouth, resulting in localized shoaling	At least 1.9 ft freeboard under I-5 bridge maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)	$6.6M (additional cost)
	I-5 Chang Channel Bridge	243 ft long 267 ft wide	I-5 Channel bottom width: 128 ft I-5 Channel depth: -7.3 ft NGVD I-5 Channel slope: 1:1 (concrete)	TBD	Max. tidal range: 8.4 ft Max. phase lag: 70.8 min	1.3 ac add'l intertidal area in eastern basin 1.3 ac decrease subtidal habitat in eastern basin	New, wider 16 ft bench at I-5 north bridge abutment; and16 ft bench at south abutment; facilitates new trail connections on east side of the lagoon	Wider I-5 channel alleviates constriction point, lowering base floodplain upstream; 100-year flood events contained within existing boundary	Max. flood currents in channel under I-5 bridge: 1.6 ft/sec Max. ebb currents: -0.98 ft/sec (Sand bars and erosion/scour noted)	Tidal velocities in the basins are insufficient to transport fine sand to lagoon mouth, resulting in localized shoaling	At least 1.9 ft freeboard under I-5 bridge maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)	$5.8M (additional cost)

Table 3.17.9 (cont.): Agua Hedionda Lagoon Bridge Options Summary Analysis

Lagoon System Concerns/ Constraints/Goals	Bridge Options *	Bridge Design *	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit [c] (CA§ 30230/30231)	Habitat Impact/ Benefit from Improved Tidal Circulation [d] (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential Sea Level Rise (SLR) Constraints [i]	Construction Cost
	Removal of All Roadbed Fill at I-5 Bridge	1,139 ft long; max. length needed to remove all roadbed fill 252 ft wide	*Shoreline protection required for I-5 bridge columns and areas subject to expanded floodplain and tidal inundation	Establishes 4.7 ac new, open water	Max. tidal range unrestricted in east basin, except by I-5 bridge columns and downstream at approved railroad bridge crossing; expanded area subject to tidal inundation	4.7 ac add'l intertidal area in eastern basin 4.7 ac decrease subtidal habitat in eastern basin	New, wider 16 ft bench at I-5 north bridge abutment; and16 ft bench at south abutment; facilitates new trail connections on east side of the lagoon	Greater capacity to pass flood flows; max. flood event conveyed in expanded floodplain	Removes constrictions causing erosion/scour at I-5 bridge abutments; however, loss of deep water habitat and expanded floodplain subjects new areas to scour/erosion	Tidal velocities in the basins are insufficient to transport fine sand to lagoon mouth, resulting in localized shoaling	At least 1.9 ft freeboard under I-5 bridge maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)	$55M (additional cost)

NOTES:

*The Phase 2 Study also included an assessment of alternative I-5 channel and bridge designs utilizing flow fence technology; however, due to agency comments and concerns about the technology as unproven and likely infeasible in this application, those concepts are no longer under consideration. Bridge design features for the I-5 options are described in detail within the Draft EIR/EIS and Phase 2 Lagoon Study, and for the LOSSAN bridge within the CCC Staff Report for approval of a federal consistency certification (CC-075-09). As a result of the LOSSAN bridge approval, its impacts and benefits are not considered as part of the PWP.

a No bridge option would involve the construction of new or expanded shoreline protective devices beyond existing abutment protection structures. Bridge designs that remove a portion of the road bed fill to accommodate channel widening would restore a more natural shoreline slope at the facility crossing, whereas bridge options resulting in steeper channel slopes may result in a less natural shoreline configuration.

b Wetland fill consists of road bed fill supporting the bridge span and directly affecting channel width; bridge support structure footprint within the lagoon channel is calculated separately.

c Maximum tidal range is the difference between the lowest observed water level and the highest observed water level. The greater the range, the lower the tidal muting affect within the lagoon system. A reduced time phase lag would also indicate more complete drainage of the east basin during low tide. Reduced tidal damping and more complete drainage would improve tidal flushing, or exchange between the ocean and lagoon areas, resulting in improved water quality as indicated by higher dissolved oxygen and reduced areas of nutrient concentrations.

d Maximum intertidal area indicates the potential for establishment of new mudflats or exposure time for existing mudflats, a benefit to shorebird foraging and overall feature of the east basin. None of the identified bridge design options would substantially change the high tide inundation area, and no additional wetland area would be established as a result of bridge design. Steep slopes around the man-made, deep water lagoon create a "bath tub" effect that prevents vertical habitat expansion. The restoration and preservation of disturbed wetland and upland (coastal sage scrub) habitats associated with the Hallmark sites would result in additional habitat improvements within the lagoon system, and provide offsetting mitigation for potential impacts that would result from the proposed I-5 replacement bridge. Approximately 10.8 ac of coastal sage scrub preservation, 4.2 ac of wetland establishment, and 1.5 ac of wetland preservation are anticipated at the Hallmark sites.

e I-5 and LOSSAN bridges currently act as a wildlife barrier to east-west movement. All bridge design options for the I-5 bridge would include a bench at the abutment to facilitate wildlife movement, as well as use by hikers on the new trail connections proposed adjacent the I-5 on the east and west sides at the Lagoon.

f Drainage and floodplain impacts for all the bridge options are expected to be negligible, which would in turn minimize potential adverse impacts associated with alteration and channelization of floodplains and associated erosion. Hydraulic studies completed by Howard Chang (October 2010) conclude that 100-year flood events would continue to be contained within the existing floodplain boundaries under each option, and therefore would not result in substantial impacts to on-site or off-site locations associated with drainage and flooding.

g Reduced flood and ebb currents indicate more complete conversion of velocity head into potential energy or water elevation. This in turn reduces the potential for channel erosion or scouring at the bridge abutments to occur. The threshold of motion resulting in scour is 0.8 ft/sec to 1 ft/sec.

h East basin eddy speeds in Agua Hedionda Lagoon are insufficient to transport fine sand to the shore due to the "iron lung" affect from the Encina Power Plant intake, regardless of bridge option design. For sufficient sediment transport, eddy speeds must be maintained at 0.6 ft/sec or greater. It is important to note, however, that maintenance dredging would be needed if both the existing Encina Power Plant and approved, future Poseidon Desalinization Plant were no longer operating within the lagoon.

i All the bridge design options would address potential impacts associated with the exacerbating effects of SLR on shoreline erosion, storm surge, and flooding, by siting and designing the bridge support structures in a manner that minimizes the frequency with which structures are subject to wave action, tidal inundation, and flooding.

j Construction costs associated with I-5 bridge alternatives are anticipated to be provided through either Capital and/or Environmental Mitigation Program (EMP) program funds; further discussions are anticipated to determine appropriate use and allocation of available funds.

Table 3.17.10: Buena Vista Lagoon Bridge Options Summary Analysis

Lagoon System Concerns/ Constraints/Goals (Coastal Conservancy Project)	Bridge Option	Bridge Design [a]	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit (CA§ 30230/ 30231)	Habitat Impact/ Benefit [d] from Improved Tidal Circulation[c] (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential Sea Level Rise (SLR) Constraints [i]	Construction Cost
<u>Concerns</u> -Sedimentation/Siltation -Sensitive bird species/island maintenance <u>Special Status Species</u> -Belding's savannah sparrow -California gnatcatcher -Light-footed clapper rail <u>Constraints</u> -Concrete weir at Lagoon mouth -Railroad Bridge Crossing -Carlsbad Boulevard/Coast Highway Crossing -Buried Infrastructure <u>LCP Goals</u> -Provide public access and passive recreation (e.g., upland trails/fishing/viewing areas) -Protect sensitive biological habitats and water quality with buffers/ fencing/restoration -Minimize siltation, erosion and sedimentation -Prohibit any diking, dredging, or filling, except for CDFW approved restoration <u>Restoration Efforts</u> -Dredging/sedimentation control -Native vegetation restoration <u>Monitoring/Management</u> -Potential for new freshwater, saltwater, or mixed regime with future restoration efforts -Maintenance Dredging	**No Action I-5 (Existing Bridge)**	102.4 ft long 184 ft wide	Channel bottom width: 24 ft Channel depth: -2.0 ft NGVD Channel slope: 1.5:1 (riprap)	3.4 ac existing fill 0.25 ac existing shaded USACE WUS/State wetland	The lagoon is an existing freshwater system with no tidal influence; future lagoon restoration efforts under consideration include a new tidal influenced regime, or a salt marsh/mixed system	No change to intertidal habitats.	Steep, narrow and low-profile abutment on north side may currently be used by wildlife	Existing constriction point; 100-year flood events contained within existing floodplain boundary	Existing constriction point subject to fluvial flood flows & associated erosion/ scour; existing riprap on slopes. Low potential for tidal flows to erode/scour near bridge abutments due to minimal/no tidal influence	Sediment trapped in system; shoreline sand supply limited due to absence of tidal flushing	6.4 ft freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)	N/A
	No Action Railroad (Existing Bridge)	~317 ft long ~22 ft wide	Channel bottom width: 17ft Channel depth: -2.5 ft NGVD	TBD	Minimal tidal circulation in the Weir and Railroad basins. Current bridge depth does limit tidal flows in proposed saltwater restoration alternatives	No change to existing habitats unless a saltwater restoration plan is implemented	Currently gradual slopes on both abutments	TBD	Existing constriction point subject to fluvial flood flows and associated erosion/ scour; existing riprap on slopes. Low potential for tidal flows to erode/scour near bridge abutments due to minimal/no tidal influence	Sediment trapped in system; shoreline sand supply limited due to absence of tidal flushing	TBD	N/A
	Proposed Bridge (8+4 Buffer)	131.2 ft long 252.9 ft wide	Channel bottom width: 50 ft (est.) Channel depth: -2.0 ft NGVD Channel slope: 2:1 (riprap)	1.12/1.39 ac additional roadbed fill in USACE WUS/ State wetland 0.15 ac additional shaded USACE WUS/State wetland	Same as existing, or accommodate future lagoon restoration. With lagoon restoration, introduction of new tidal prism possibly restricted by road fill and bridge pilings	No change to existing habitats unless a saltwater restoration plan is implemented	New, 16 ft bench at both abutments; will be implemented	Longer bridge with columns placed farther apart creates wider channel alleviating constriction point and lowers base floodplain 0.4 ft upstream. 100-year flood events contained within existing floodplain boundary	Wider channel alleviates constriction point and lowers base floodplain reducing erosion/scour from flood events dependent on future lagoon restoration	Same as existing or, dependent on future lagoon restoration, wider channel could facilitate improved sediment transport to shoreline	0 ft freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR) based on designed soffit height for Optimized bridge	Baseline $7.6M
	LOSSAN Railroad Bridge (Double-track, optimized)	**~317 ft long ~50 ft wide**	**Channel bottom width: 17ft Channel depth: -6.0 ft NGVD**	**TBD**	**Deeper channel optimized for saltwater restoration alternatives for maximum proposed tidal flows**	**No change to existing intertidal habitats unless a saltwater restoration plan is implemented**	**TBD**	**Depending on the restoration alternative 100-year flood would have 0.4 to 4.5 ft of freeboard if soffit is not changed based on fluvial modeling with dynamic channel, not FEMA fixed constraints**	**Depending on the restoration alternative optimized channel would result in the minimum amount of scour/erosion**	**Same as existing or, dependent on future lagoon restoration, optimized channel could facilitate improved sediment transport to shoreline**	**Bridge soffit would need to be raised to allow some freeboard for freshwater alternatives. Saltwater alternatives have minimal freeboard with 100-year flood and SLR**	**TBD**

Table 3.17.10 (cont.): Buena Vista Lagoon Bridge Options Summary Analysis

Lagoon System Concerns/ Constraints/Goals (Coastal Conservancy Project)	Bridge Option	Bridge Design [a]	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit (CA§ 30230/ 30231)	Habitat Impact/ Benefit [d] from Improved Tidal Circulation (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential SLR Constraints [i]	Construction Cost
	Proposed Bridge (8+4 Buffer) Optimized Bridge without existing HOV	197 ft long 293 ft wide * Wider channel reduces shoreline alteration; however, shoreline protection required for bridge pilings and abutments	Channel bottom width: 105 ft (estimated) Channel depth: -6.0 ft Channel slope: 2:1 (riprap)	0.73/1.00 ac net add'l roadbed fill in USACE WUS/State wetland 0.39 ac additional shaded USACE WUS/State wetland	Same as existing, or can accommodate future lagoon restoration. With lagoon restoration, optimized bridge works with a range of restoration alternatives	No change to existing intertidal habitats unless a saltwater restoration plan is implemented	New 16 ft bench at both abutments	Longer bridge with columns placed farther apart creates wider channel alleviating constriction point and lowers base floodplain. Optimized bridge would pass 100-year flood with at least 2.5 to 8.2 ft of freeboard depending on the restoration alternative. Optimized bridge at I-5 without changes to Coast Highway and inlet weir, and restoration dredging could cause flooding downstream	Wider channel alleviates constriction point and lowers base floodplain reducing erosion/scour from flood events dependent on future lagoon restoration	Same as existing or, dependent on future lagoon restoration, wider channel could facilitate improved sediment transport to shoreline	At least 1.0 ft of freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR) depending on which restoration alternative is selected	TBD
	Proposed Bridge (refined 8+4 Buffer-Preferred Alternative) Optimized Bridge w/existing HOV	**197 ft long 310 ft wide * Wider channel reduces shoreline alteration; however, shoreline protection required for bridge pilings and abutments**	**Channel bottom width: 105 ft (estimated) Channel depth: -6.0 ft Channel slope: 2:1 (riprap)**	**0.81/1.14 ac net add'l roadbed fill in USACE WUS/State wetland 0.45/0.48 ac add'l shaded USACE WUS/State wetland**	**Same as existing, or can accommodate future lagoon restoration. With lagoon restoration, optimized bridge works with a range of restoration alternatives**	**No change to existing intertidal habitats unless a saltwater restoration plan is implemented**	**New 16 ft bench at both abutments**	**Longer bridge with columns placed farther apart creates wider channel alleviating constriction point and lowers base floodplain. Optimized bridge would pass 100-year flood with at least 2.5 ft of freeboard. Optimized bridge at I-5 without changes to Coast Highway and inlet weir, and restoration dredging could cause flooding downstream**	**Wider channel alleviates constriction point and lowers base floodplain reducing erosion/scour from flood events dependent on future lagoon restoration**	**Same as existing or, dependent on future lagoon restoration, wider channel could facilitate improved sediment transport to shoreline**	**At least 1.0 ft of freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR) depending on which restoration alternative is selected**	**$7.0 M (additional cost)**

Table 3.17.10 (cont.): Buena Vista Lagoon Bridge Options Summary Analysis

Lagoon System Concerns/ Constraints/Goals (Coastal Conservancy Project)	Bridge Option	Bridge Design [a]	Channel Dimension and Protection Features [a] (CA§ 30253(2)/ 30235)	Estimated Wetland Fill [b] (CA§ 30233)	Tidal Circulation Impact/Benefit (CA§ 30230/ 30231)	Habitat Impact/ Benefit [d] from Improved Tidal Circulation (CA§ 30240)	Wildlife Corridor/ Trail Linkage Impact/Benefit [e] (CA§ 30240/ 30210-30214)	FEMA Floodplain Impact/Benefit [f] (CA§ 30253)	Erosion/Scour Impact/Benefit [g] (CA§ 30253(2)/ 30235)	Shoreline Sand Supply Impact/Benefit [h] (CA§ 30235)	Potential SLR Constraints [i]	Construction Cost
	Bridge Option w/ Removal of All Roadbed Fill	558 ft long; max. length needed to remove all roadbed fill 252.9 ft wide * Removes shoreline alteration from roadbed fill; however, shoreline protection required for bridge pilings and potentially areas subject to expanded floodplain and tidal inundation (depending on lagoon restoration; riprap assumed)	TBD	Adds 3.4 ac of shaded, freshwater marsh habitat to I-5 Basin/Coast Highway Basin	Same as existing, or accommodate future lagoon restoration. With lagoon restoration, introduction of new tidal prism unrestricted except by bridge pilings; expanded area could be subject to tidal inundation if mouth is maintained open	No change to existing intertidal habitats	Unrestricted movement under bridge, some areas under bridge would be left at a higher elevation than the water to accommodate wildlife movement	Greater capacity to pass flood flows. Max. flood event conveyed in expanded floodplain. However, without changes to Coast Highway, inlet weir, and restoration dredging wider floodplain could cause downstream flooding	Greater capacity to pass fluvial flood flows in expanded flood-plain; limits structures subject to erosion/ scour to bridge pilings. Introduction of tidal prism with lagoon restoration may increase potential for erosion/scour at bridge pilings and areas subject to expanded tidal inundation	Same as existing or, dependent on future lagoon restoration, expanded floodplain subjects new areas to scour/erosion upstream and conveys sediment transport to shoreline	At least 9.2 ft of freeboard maintained under 'high' projection of SLR estimates in year 2100 (4.5 ft of SLR)	$49M (additional cost)

NOTES:

a Bridge design features are described in detail within the Draft EIR/EIS. No bridge would involve the construction of new or expanded shoreline protective devices beyond existing abutment protection structures. Bridge designs that remove a portion of the road bed fill to accommodate channel widening would restore a more natural shoreline slope at the crossing.

b Wetland fill consists of bridge support structure footprint within the lagoon channel, as well as road bed fill supporting the bridge span and directly affecting channel width.

d Due to the current constraints and north-south transecting facilities, the lagoon has developed into a freshwater marsh with no tidal influence. Dredging activities have led to development of an island within the I-5 Basin that provides nesting/roosting opportunities for sensitive bird species.

e I-5 currently acts as a wildlife barrier to east-west movement. All bridge design options would include a bench at the abutment to facilitate wildlife movement, as well as use by hikers on the new trail connections proposed adjacent the I-5 on the east and west sides at the Lagoon.

f Drainage and floodplain impacts for all the bridge options are expected to be negligible, which would in turn minimize potential adverse impacts associated with alteration and channelization of floodplains and associated erosion. Hydraulic studies conclude that 100-year flood events would continue to be contained within the existing floodplain boundaries under each option, and therefore would not result in substantial impacts to on-site or off-site locations associated with drainage and flooding.

g The potential for channel erosion or scouring at the bridge abutments to occur is reduced with removal of existing channel constraints due to more complete conversion of flood velocity to energy.

h The Lagoon is a shallow freshwater system managed under an existing sediment control program. No sediment is transported between the Buena Vista Creek on the far east of the system to the Pacific Ocean, which is closed to tidal influence as a result of an existing concrete weir and berm.

i All bridge designs would address potential impacts associated with the exacerbating effects of SLR on shoreline erosion, storm surge, and flooding, by siting and designing the bridge support structures in a manner that minimizes the frequency with which structures are subject to wave action, tidal inundation, and flooding.

Table 3.17.11: PWP/TREP Project Impacts and Mitigation/Enhancement Opportunities Summary

Compensatory Mitigation Opportunities (By Watershed)		Coastal Wetland Acres Established	Coastal Wetland Acres Restored	Coastal Wetland Acres Preserved/ Enhanced	Total Impacts (LOSSAN & I-5)[1]	No Net Loss Wetland Balance[2]	Upland Habitat Acres Established	Upland Habitat Acres Restored	Upland Habitat Acres Preserved/Enhanced	Total Impacts (LOSSAN & I-5)[1]	No Net Loss Upland Balance[2]	Cost Estimate (Incl. Right-Of- Way & Construction Costs)[3]
		Wetland					Upland					
Establishment (No Net Loss) – No Net Loss Pool												
Los Peñasquitos	Deer Canyon II						14					$1,600,000.00
San Dieguito	Dean Family Trust							20.8				$2,650,000.00
	San Dieguito W19	47.3					9.6	19.8				$48,600,000.00
Batiquitos	Batiquitos Bluffs		2.5					3.7				TBD[4]
Agua Hedionda	Hallmark (East and West)	4.37	0.97				3.5	6.6				$9,600,000.00
Corridor Wide Establishment (No Net Loss) Sub Total		**51.67**	**3.47**				**27.1**	**50.9**				**$62,450,000.00**
Restoration, Enhancement, & Preservation –"Enhancement" Pool												
San Dieguito	Dean Family Trust								1.5			Costs identified, above.
San Elijo	Laser			0.02					4.1			$1,610,000.00
Batiquitos	La Costa								18.8			$1,430,000.00
	Batiquitos Bluffs								39.9			TBD[4]
Agua Hedionda	Hallmark (East and West)			0.44					1.8			Costs identified, above.
San Elijo Lagoon Restoration Project												$90,000,000.00[5]
Buena Vista Lagoon Restoration Project												
Corridor Wide Preservation & Enhancement Sub Total				**0.46**					**66.1**			**$93,040,000.00**
Bridge Optimization												
Batiquitos I-5 Bridge Lengthening		Included for project avoidance and minimization purposes.										$8,000,000.00
San Elijo I-5 Bridge Lengthening												$16,000,000.00
San Elijo LOSSAN Bridge Lengthening (Assumes SELRP Alt 2A)												$25,100,000.00
Buena Vista I-5 Bridge Lengthening												$7,000,000.00
											Bridge Optimization Sub Total	**$56,100,000.00**
Lagoon Management Endowments – Contingency Pool												
Regional Lagoon Maintenance Program	Batiquitos - $9.50/ cy [est.] Peñasquitos - $3.90/ cy [actual]	20.7*										$10,000,000.00
Corridor Wide Lagoon Management Endowments Sub Total		**20.7***										**$10,000,000.00**
Corridor Wide Project Impact vs. Habitat Establishment, Preservation, Enhancement & Lagoon Management Endowment Totals		**72.37**	**3.47**	**0.46**	**39.28 – 40.04**	**35.8 – 36.56**	**27.1**	**50.9**	**66.1**	**63.79 – 73.89**	**4.11 – 14.21**	**$165,490,000.00**
Project Prioritization/ Lagoon Management Technical Support[6]												
Scientific Advisory Committee		Included to ensure mitigation site success.										$1,000,000.00
											Technical Support Sub Total	**$1,000,000.00**

Source: REMP. This table includes LOSSAN and costs information as identified in the PWP/TREP (EIR/EIS Appendix R).

NOTES:

* Caltrans and SANDAG find that establishing an endowment should either be credited 20.7 acres based on hydraulic improvement and habitat creation as a result of maintaining the lagoon mouths at Batiquitos and Los Peñasquitos Lagoons, or it is understood that this endowment would address any potential no net loss deficits between credit release and when impacts would occur, as well as any temporal impacts.

1 Corridor-wide impacts identified for the I-5 Locally Preferred Alternative (8+4 with Buffer) combined with LOSSAN Project impacts. See Tables 5a and 5b of the REMP (Appendix P) for detailed project impacts by phase.

2 No net loss balance totals for purposes of Coastal Commission mitigation do not include preservation acreage.

3 Costs are preliminary and identified for all opportunities, including those to be funded by Environmental Mitigation Program (EMP) (i.e., No Net Loss Pool, Enhancement Pool, Lagoon Management Endowments, and Technical Support) or Capital funds (i.e., Bridge Optimization).

4 Contingent upon a willing seller and reasonable cost.

5 These restoration planning efforts are in process, and final cost estimates are not available at this time. However, it is acknowledged that at least one large-scale lagoon restoration project will be funded in full through the REMP.

6 A REMP Working Group to include resource and regulatory agencies will be formed to evaluate, prioritize, and oversee the implementation of the potential compensatory mitigation sites identified in this REMP.

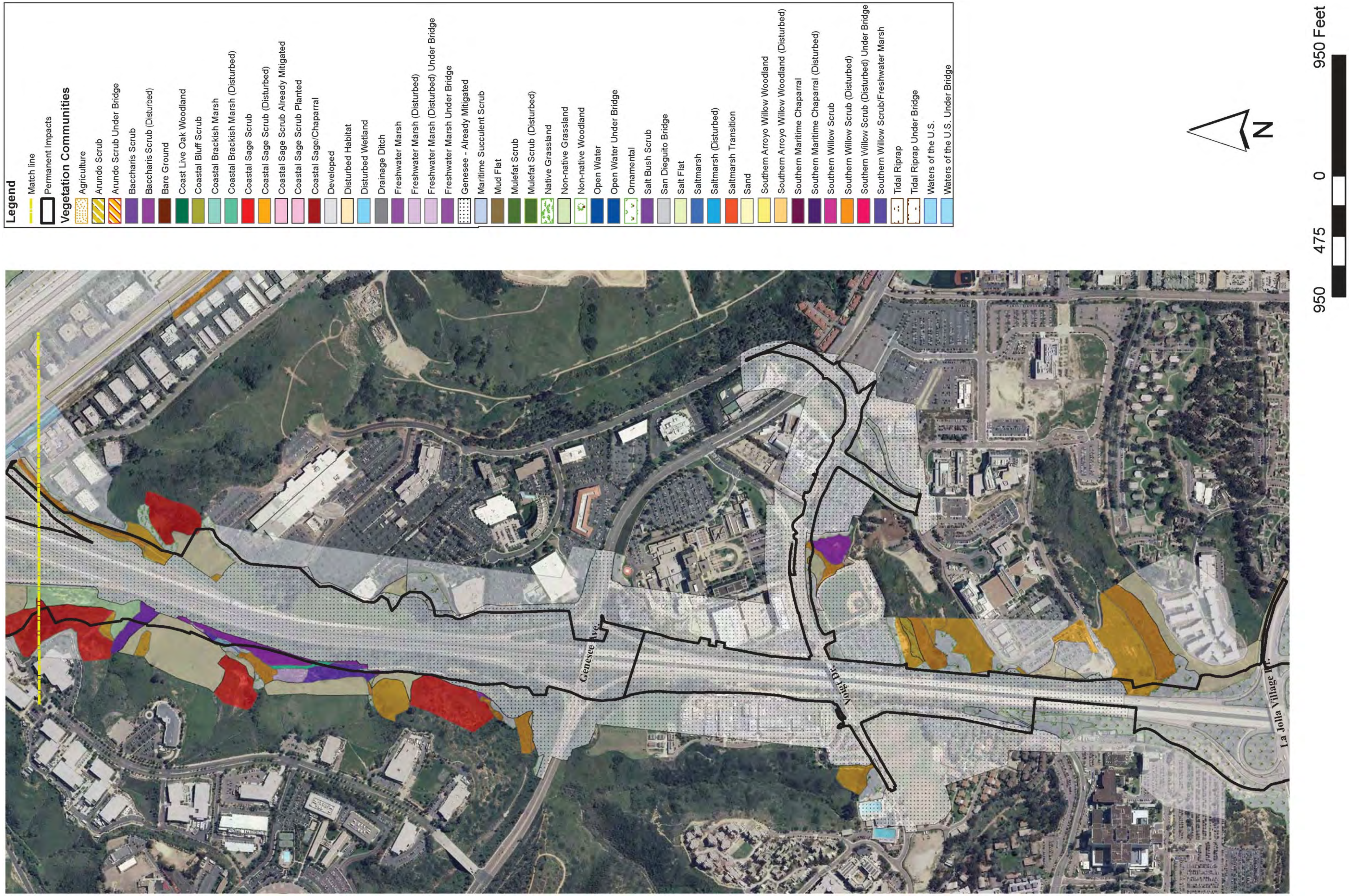


Figure 3-17.1a: Vegetation Communities

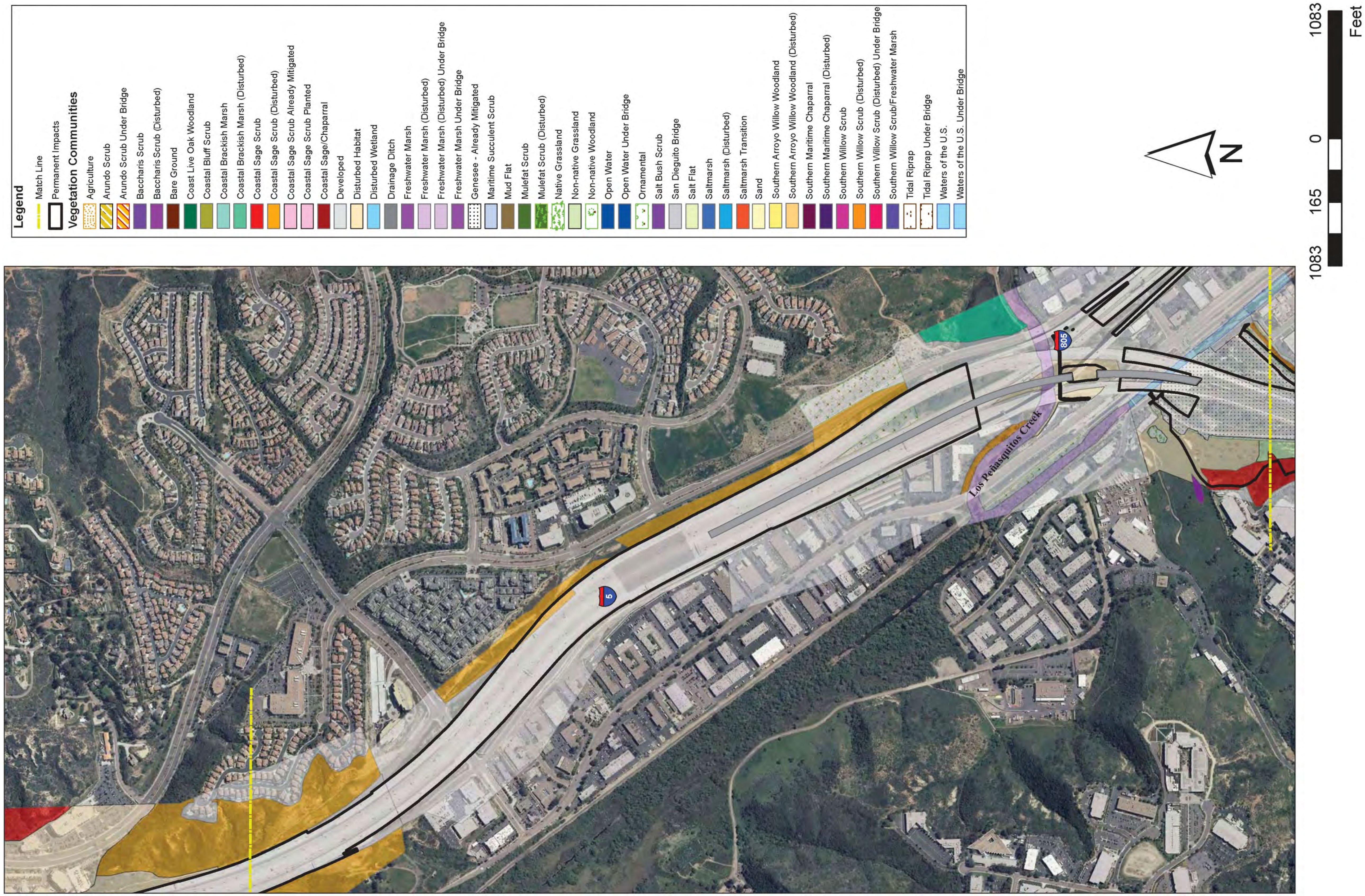


Figure 3-17.1b: Vegetation Communities

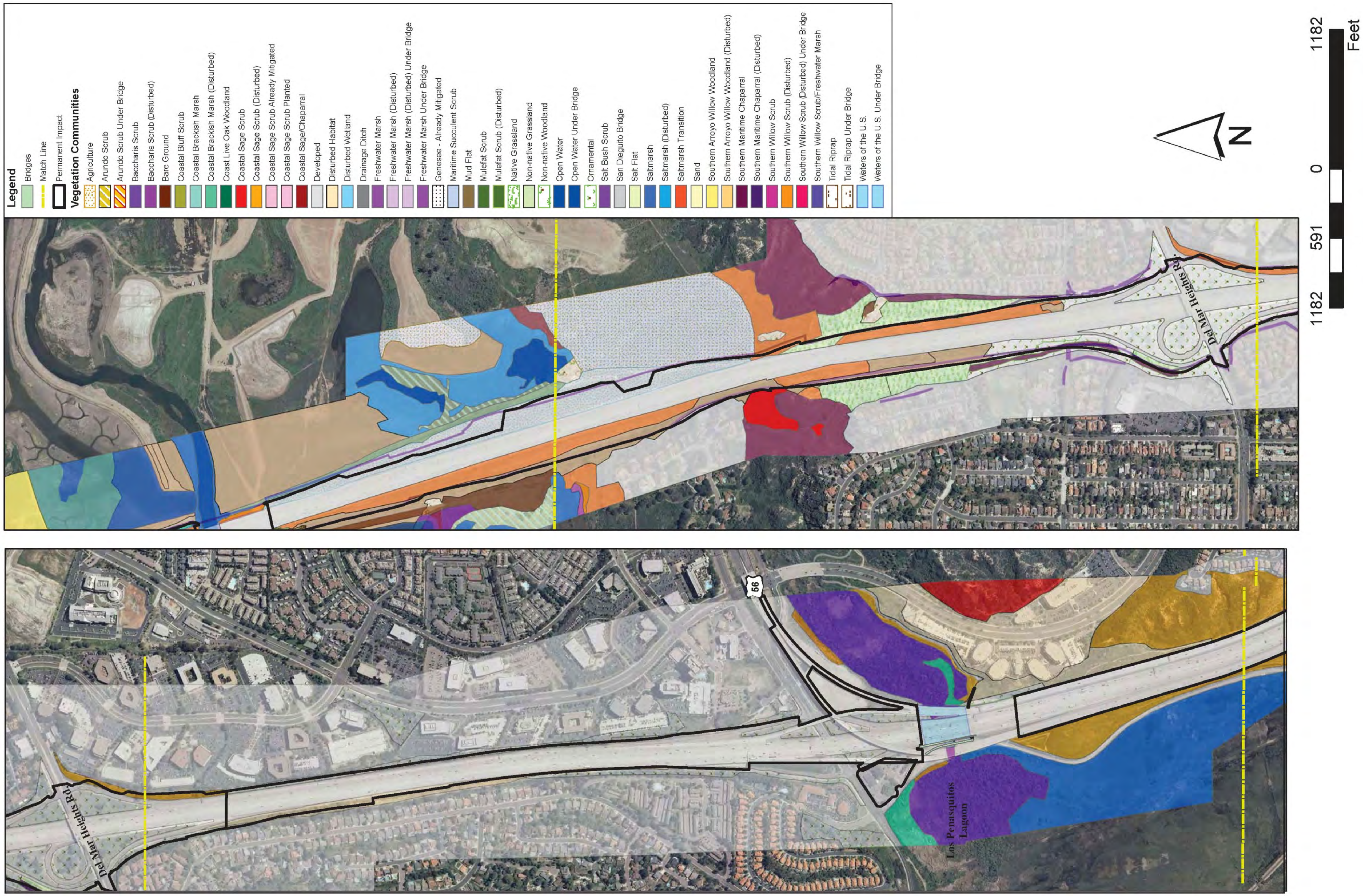


Figure 3-17.1c: Vegetation Communities

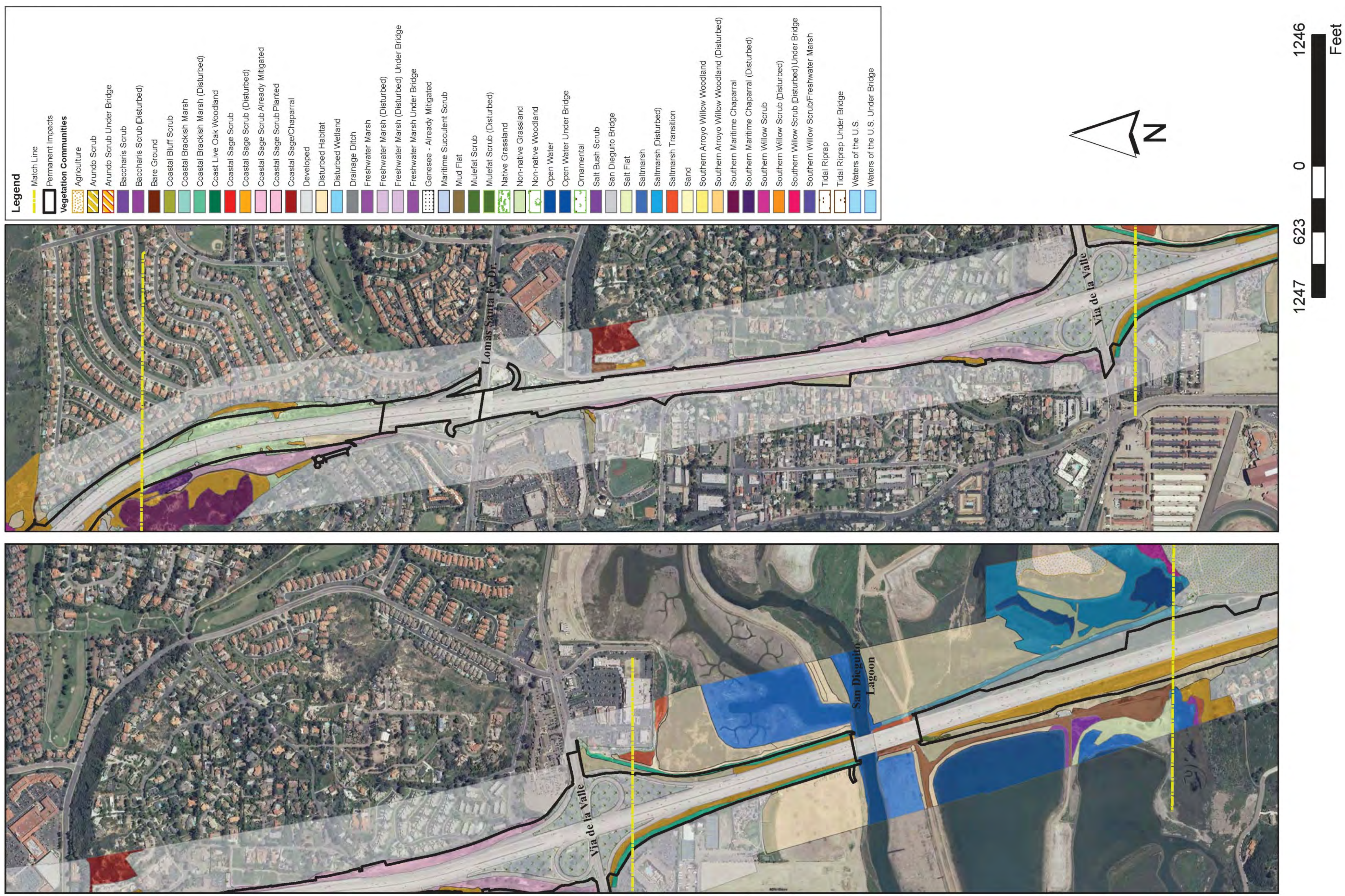
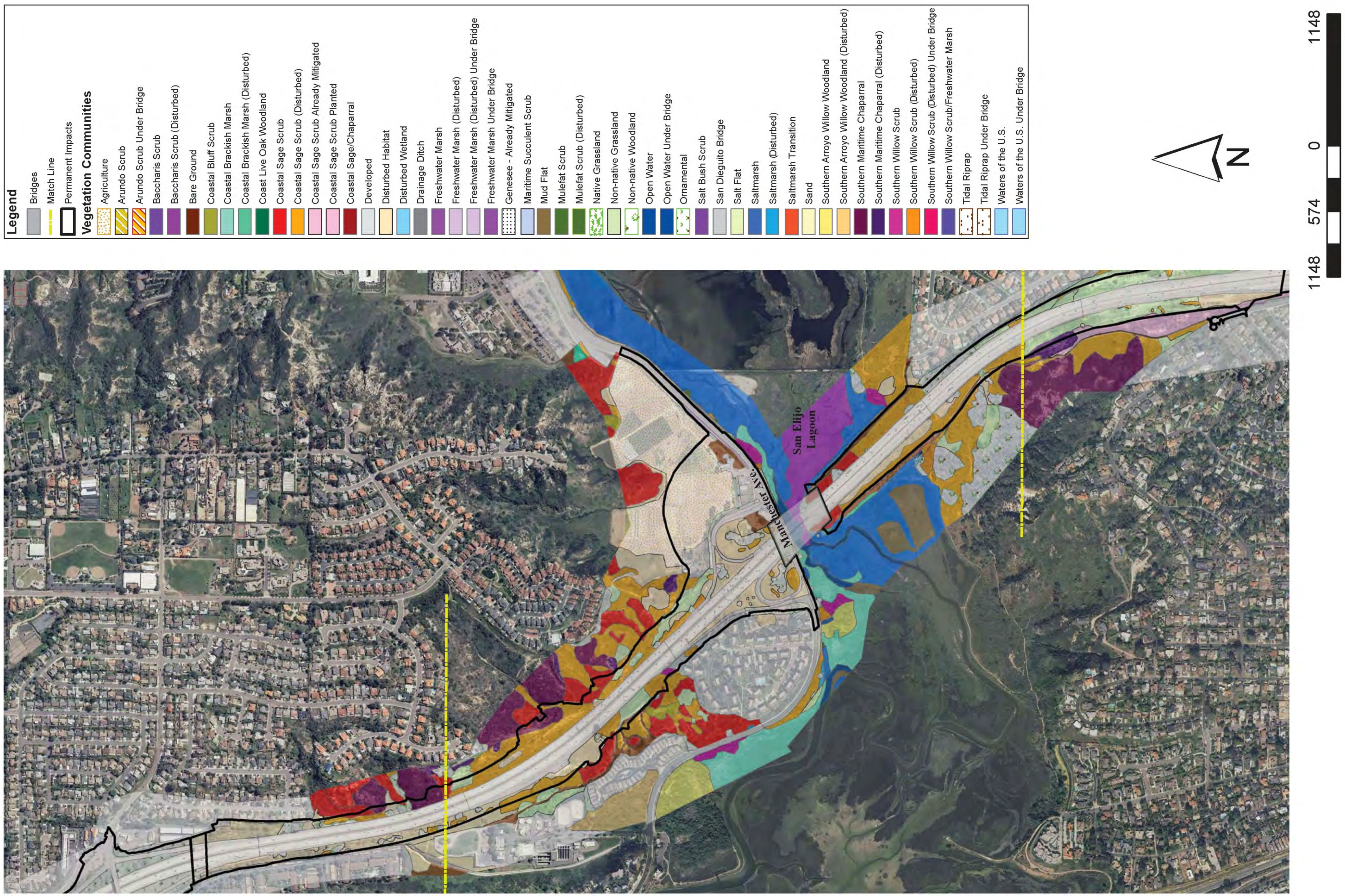


Figure 3-17.1d: Vegetation Communities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Bridges
Match Line
Permanent Impacts
Vegetation Communities
Agriculture
Arundo Scrub
Arundo Scrub Under Bridge
Baccharis Scrub
Baccharis Scrub (Disturbed)
Bare Ground
Coastal Bluff Scrub
Coastal Brackish Marsh
Coastal Brackish Marsh (Disturbed)
Coast Live Oak Woodland
Coastal Sage Scrub
Coastal Sage Scrub (Disturbed)
Coastal Sage Scrub Already Mitigated
Coastal Sage Scrub Planted
Coastal Sage/Chaparral
Developed
Disturbed Habitat
Disturbed Wetland
Drainage Ditch
Freshwater Marsh
Freshwater Marsh (Disturbed)
Freshwater Marsh (Disturbed) Under Bridge
Freshwater Marsh Under Bridge
Genesee - Already Mitigated
Maritime Succulent Scrub
Mud Flat
Mulefat Scrub
Mulefat Scrub (Disturbed)
Native Grassland
Non-native Grassland
Non-native Woodland
Open Water
Open Water Under Bridge
Ornamental
Salt Bush Scrub
San Dieguito Bridge
Salt Flat
Saltmarsh
Saltmarsh (Disturbed)
Saltmarsh Transition
Sand
Southern Arroyo Willow Woodland
Southern Arroyo Willow Woodland (Disturbed)
Southern Maritime Chaparral
Southern Maritime Chaparral (Disturbed)
Southern Willow Scrub
Southern Willow Scrub (Disturbed)
Southern Willow Scrub (Disturbed) Under Bridge
Southern Willow Scrub/Freshwater Marsh
Tidal Riprap
Tidal Riprap Under Bridge
Waters of the U.S.
Waters of the U.S. Under Bridge
N
1148
574
0
1148
Feet
San Elijo Lagoon
Manchester Ave.

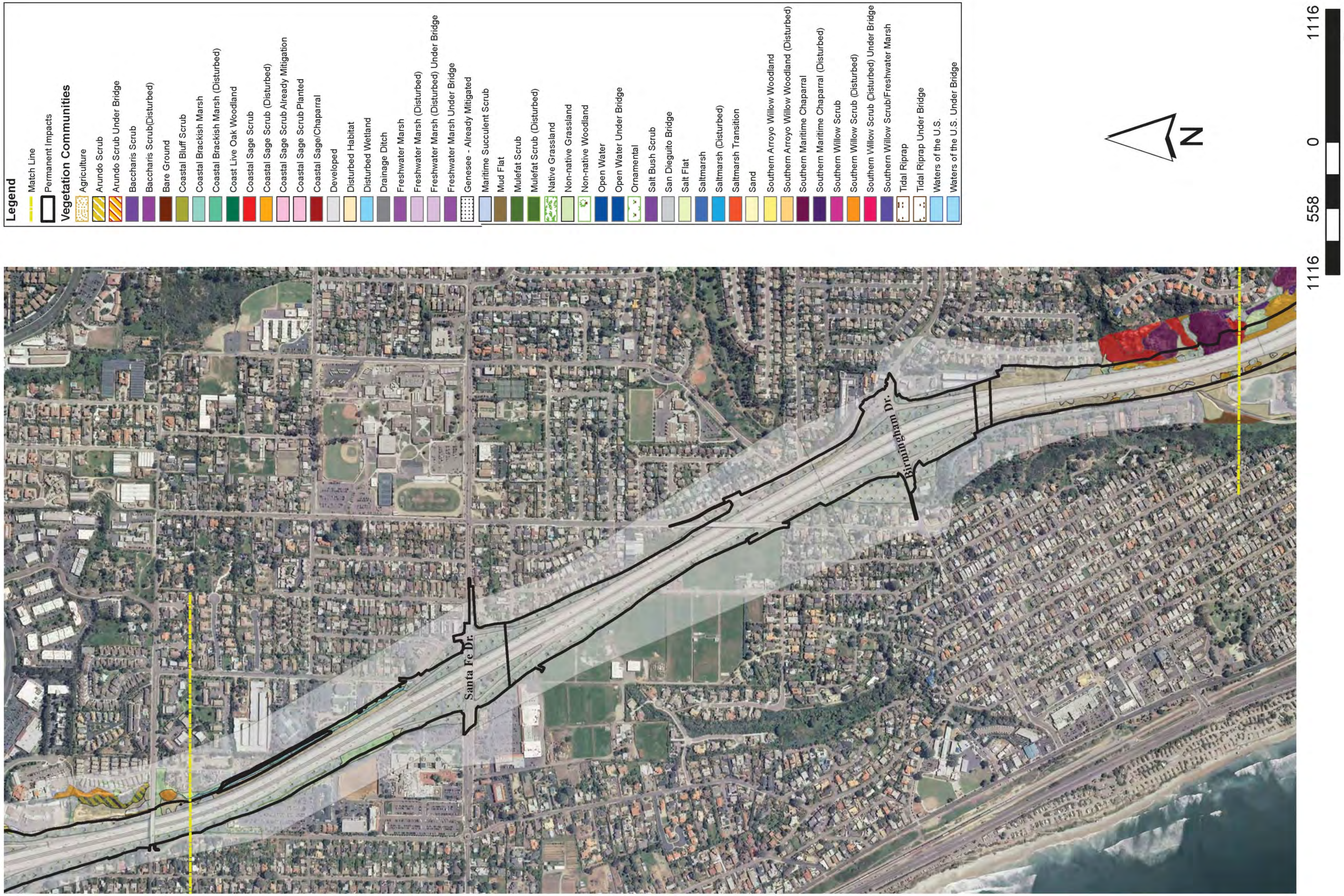


Figure 3-17.1f: Vegetation Communities

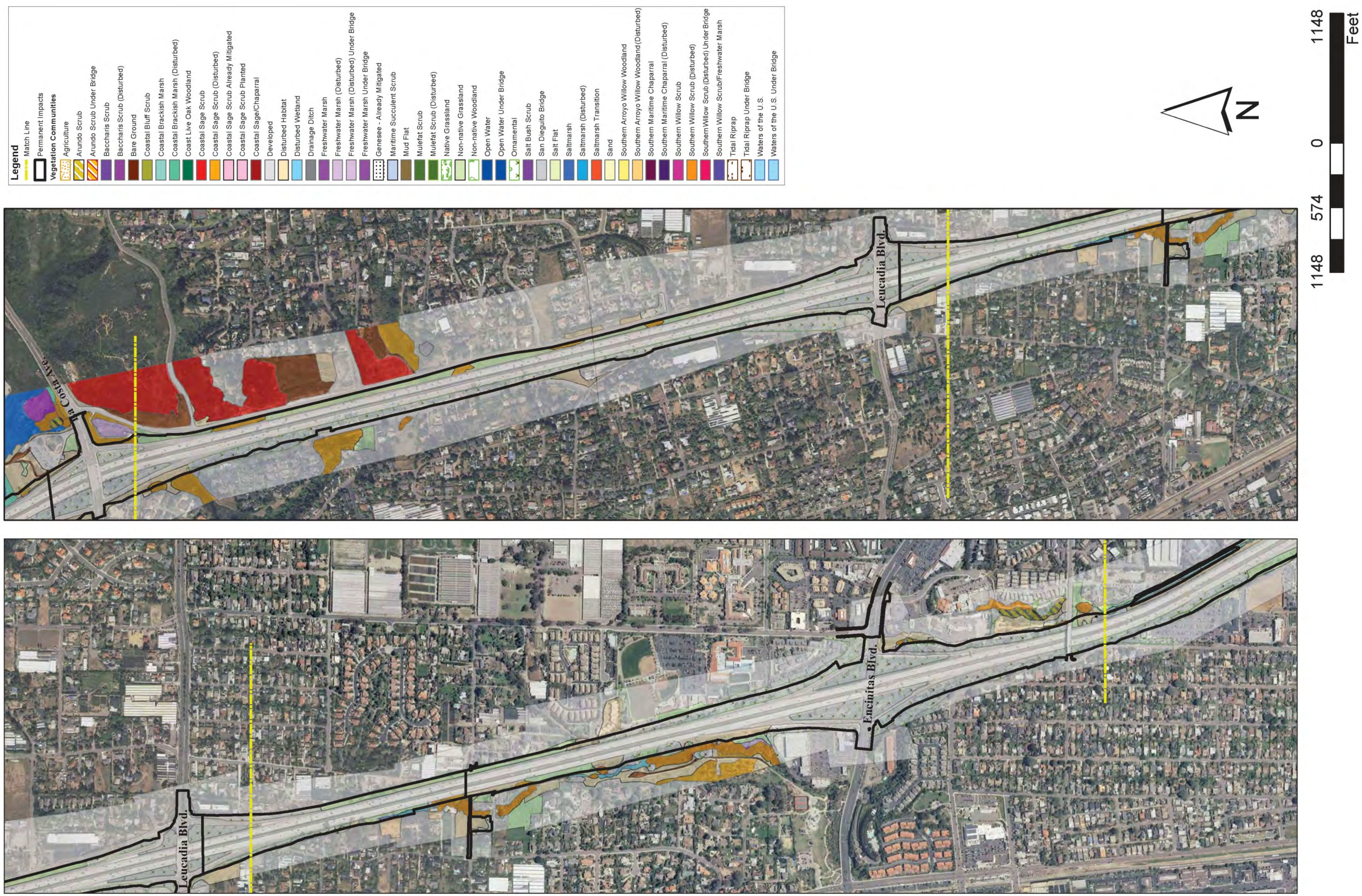


Figure 3-17.1g: Vegetation Communities

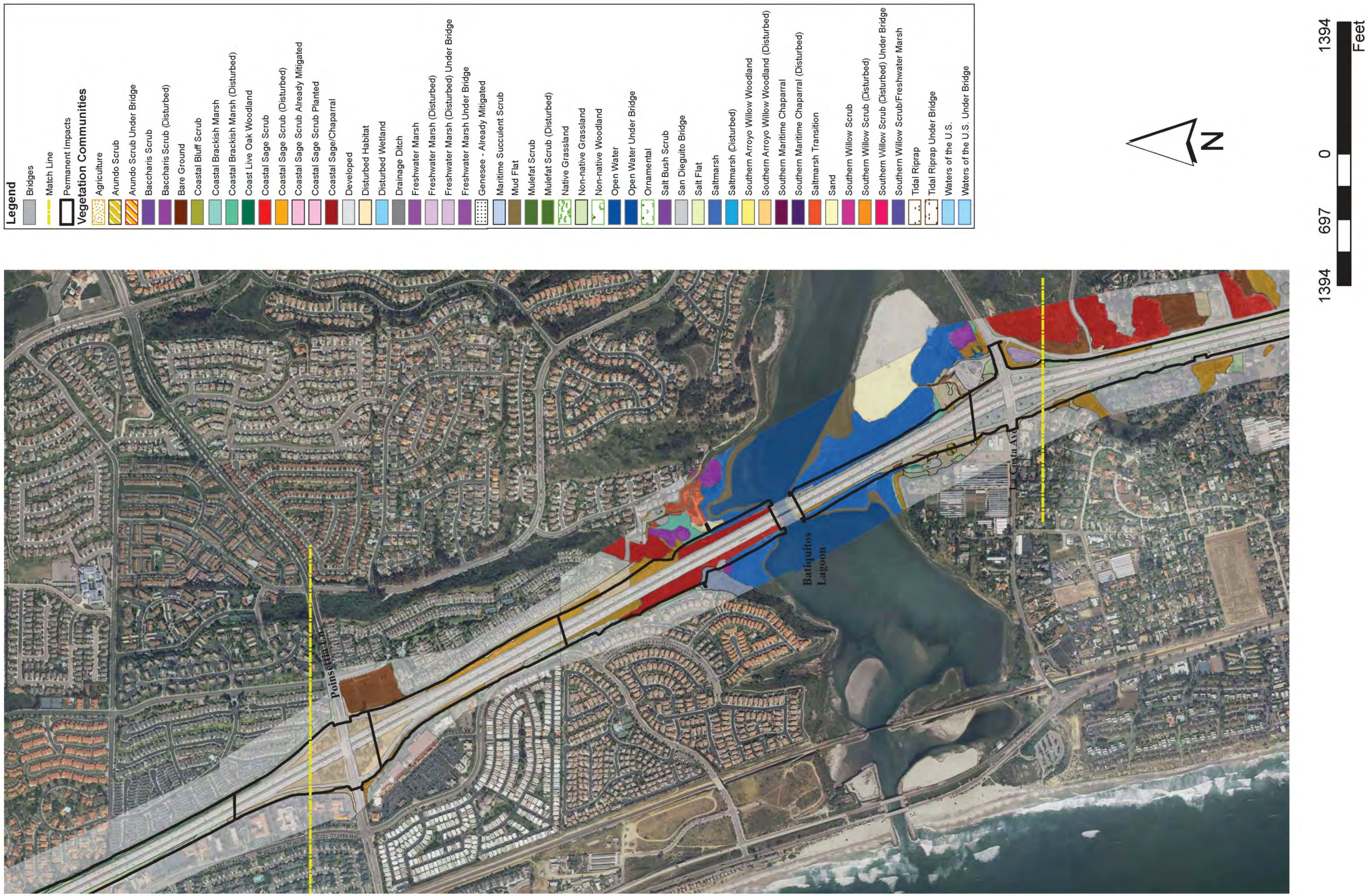
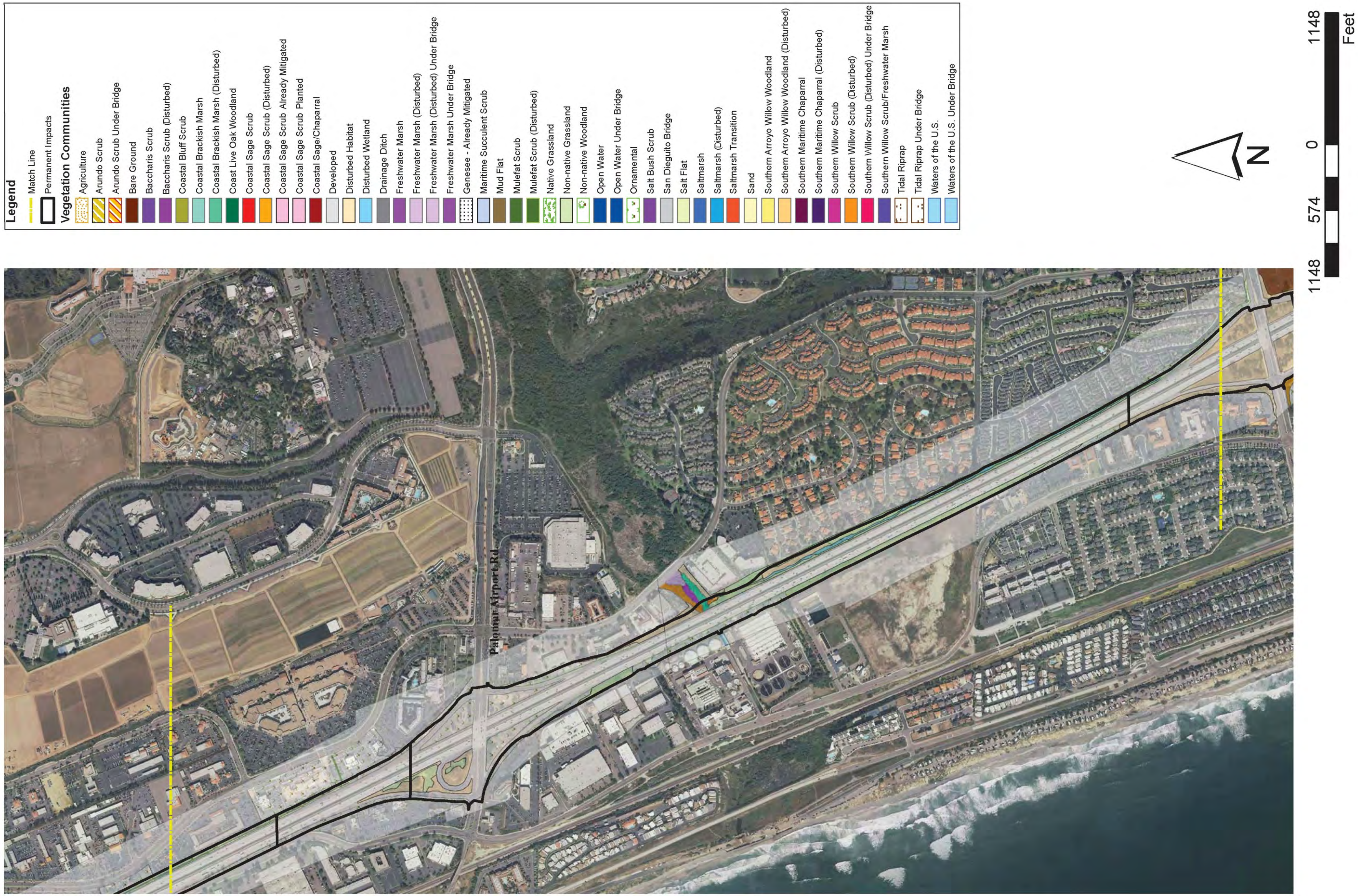


Figure 3-17.1h: Vegetation Communities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Match Line
Permanent Impacts
Vegetation Communities
Agriculture
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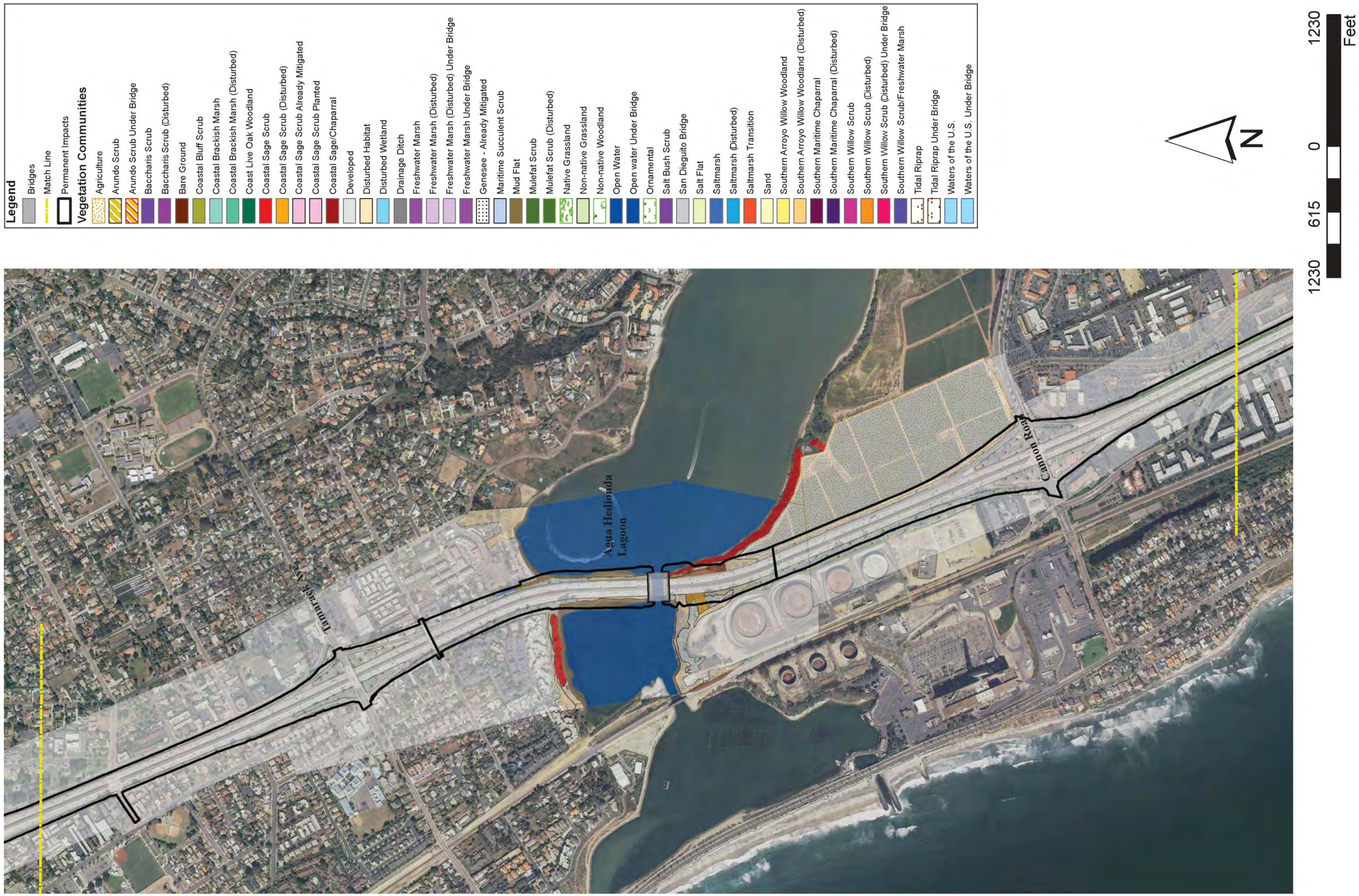
Arundo Scrub Under Bridge
Bare Ground
Baccharis Scrub
Baccharis Scrub (Disturbed)
Coastal Bluff Scrub
Coastal Brackish Marsh
Coastal Brackish Marsh (Disturbed)
Coast Live Oak Woodland
Coastal Sage Scrub
Coastal Sage Scrub (Disturbed)
Coastal Sage Scrub Already Mitigated
Coastal Sage Scrub Planted
Coastal Sage/Chaparral
Developed
Disturbed Habitat
Disturbed Wetland
Drainage Ditch
Freshwater Marsh
Freshwater Marsh (Disturbed)
Freshwater Marsh (Disturbed) Under Bridge
Freshwater Marsh Under Bridge
Genesee - Already Mitigated
Maritime Succulent Scrub
Mud Flat
Mulefat Scrub
Mulefat Scrub (Disturbed)
Native Grassland
Non-native Grassland
Non-native Woodland
Open Water
Open Water Under Bridge
Ornamental
Salt Bush Scrub
San Dieguito Bridge
Salt Flat
Saltmarsh
Saltmarsh (Disturbed)
Saltmarsh Transition
Sand
Southern Arroyo Willow Woodland
Southern Arroyo Willow Woodland (Disturbed)
Southern Maritime Chaparral
Southern Maritime Chaparral (Disturbed)
Southern Willow Scrub
Southern Willow Scrub (Disturbed)
Southern Willow Scrub (Disturbed) Under Bridge
Southern Willow Scrub/Freshwater Marsh
Tidal Riprap
Tidal Riprap Under Bridge
Waters of the U.S.
Waters of the U.S. Under Bridge
N
1148 574 0 1148
Feet
Palomar Airport Rd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Bridges
Match Line
Permanent Impacts
Vegetation Communities
Agriculture
Arundo Scrub
Arundo Scrub Under Bridge
Baccharis Scrub
Baccharis Scrub (Disturbed)
Bare Ground
Coastal Bluff Scrub
Coastal Brackish Marsh
Coastal Brackish Marsh (Disturbed)
Coast Live Oak Woodland
Coastal Sage Scrub
Coastal Sage Scrub (Disturbed)
Coastal Sage Scrub Already Mitigated
Coastal Sage Scrub Planted
Coastal Sage/Chaparral
Developed
Disturbed Habitat
Disturbed Wetland
Drainage Ditch
Freshwater Marsh
Freshwater Marsh (Disturbed)
Freshwater Marsh (Disturbed) Under Bridge
Freshwater Marsh Under Bridge
Genesee - Already Mitigated
Maritime Succulent Scrub
Mud Flat
Mulefat Scrub
Mulefat Scrub (Disturbed)
Native Grassland
Non-native Grassland
Non-native Woodland
Open Water
Open water Under Bridge
Ornamental
Salt Bush Scrub
San Dieguito Bridge
Salt Flat
Saltmarsh
Saltmarsh (Disturbed)
Saltmarsh Transition
Sand
Southern Arroyo Willow Woodland
Southern Arroyo Willow Woodland (Disturbed)
Southern Maritime Chaparral
Southern Maritime Chaparral (Disturbed)
Southern Willow Scrub
Southern Willow Scrub (Disturbed)
Southern Willow Scrub (Disturbed) Under Bridge
Southern Willow Scrub/Freshwater Marsh
Tidal Riprap
Tidal Riprap Under Bridge
Waters of the U.S.
Waters of the U.S. Under Bridge
N
1230
0
615
1230
Feet
Agua Hedionda Lagoon
Tamarack Ave.
Cannon Road

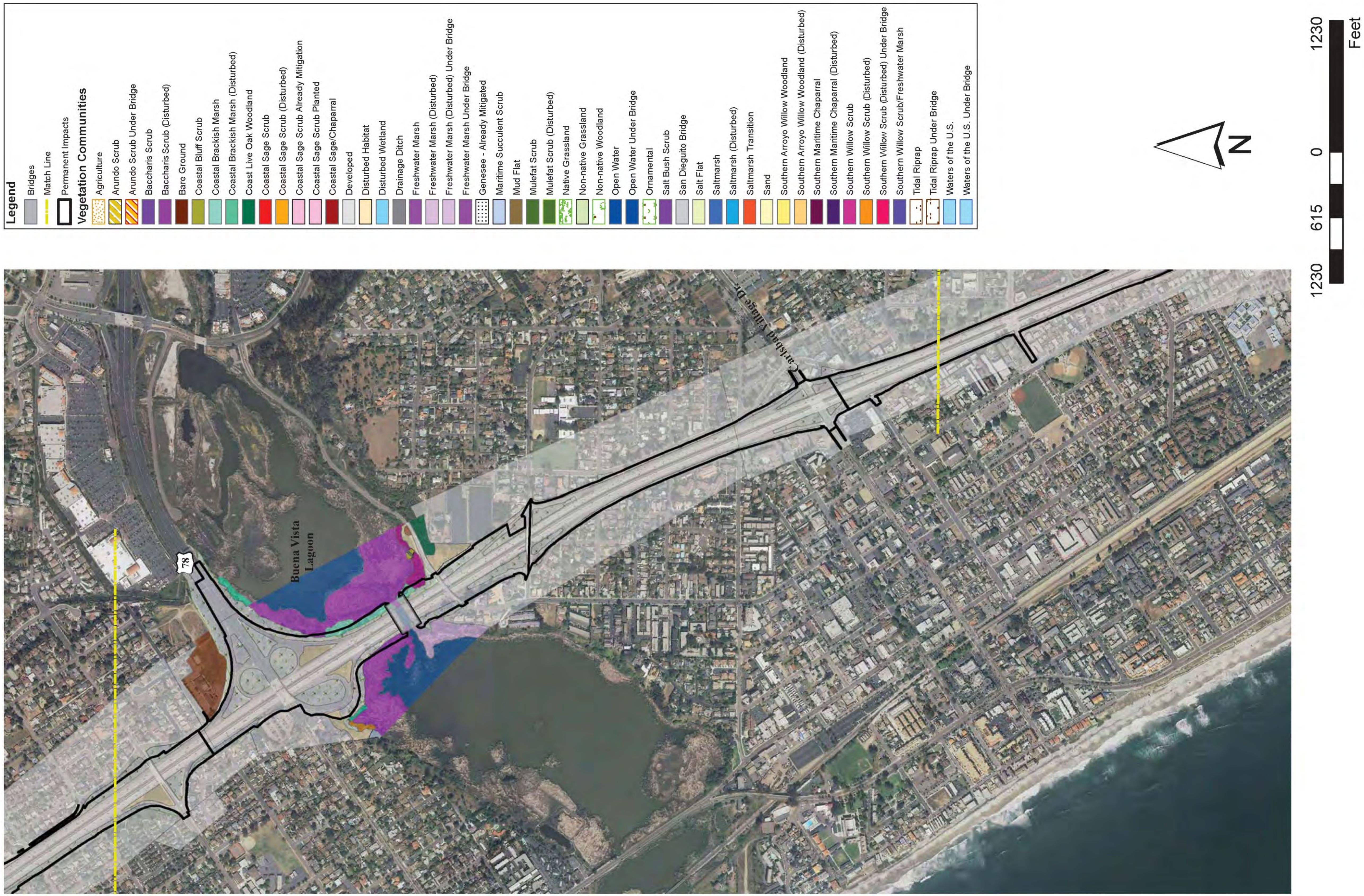


Figure 3-17.1k: Vegetation Communities

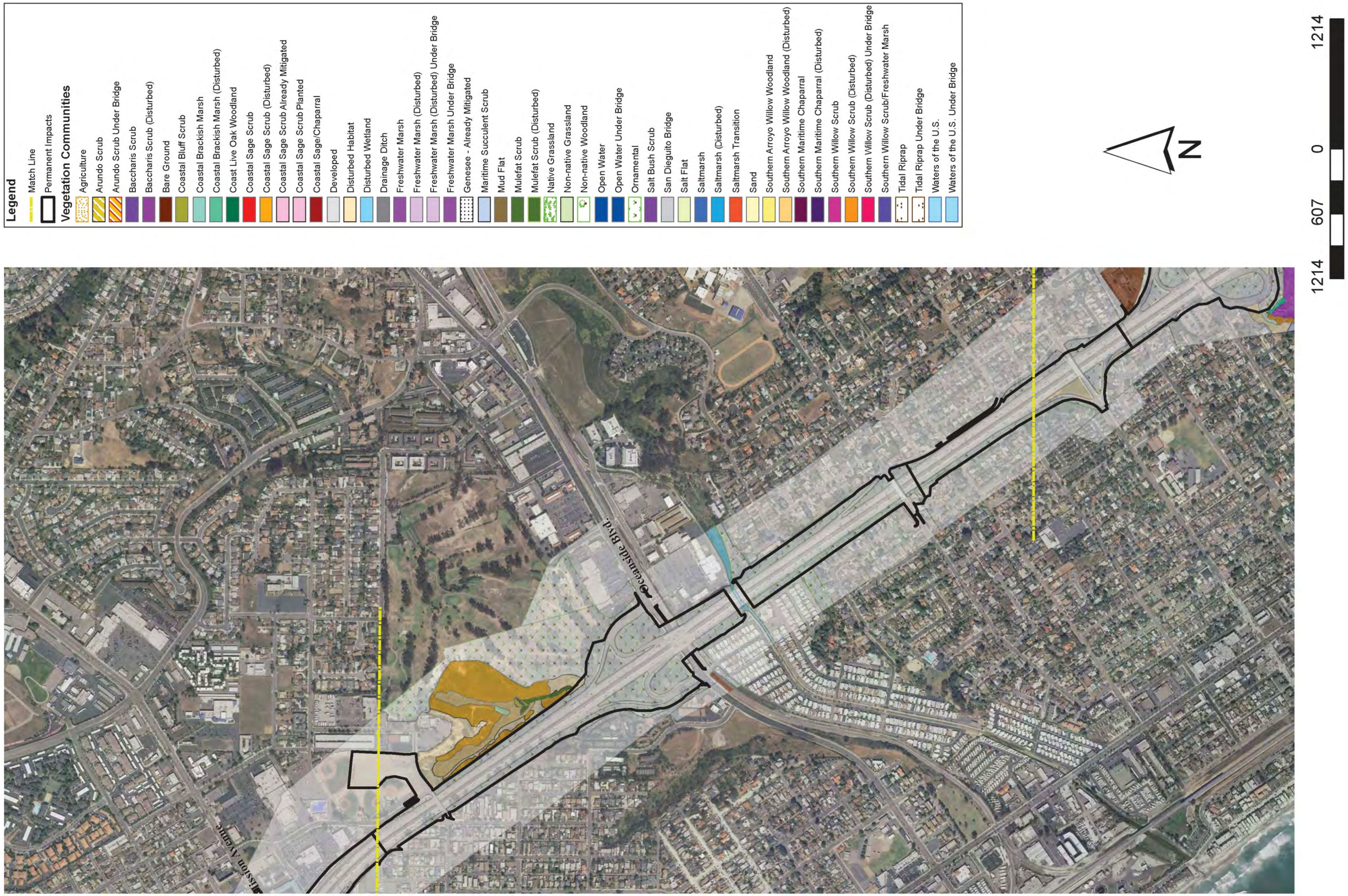


Figure 3-17.1l: Vegetation Communities

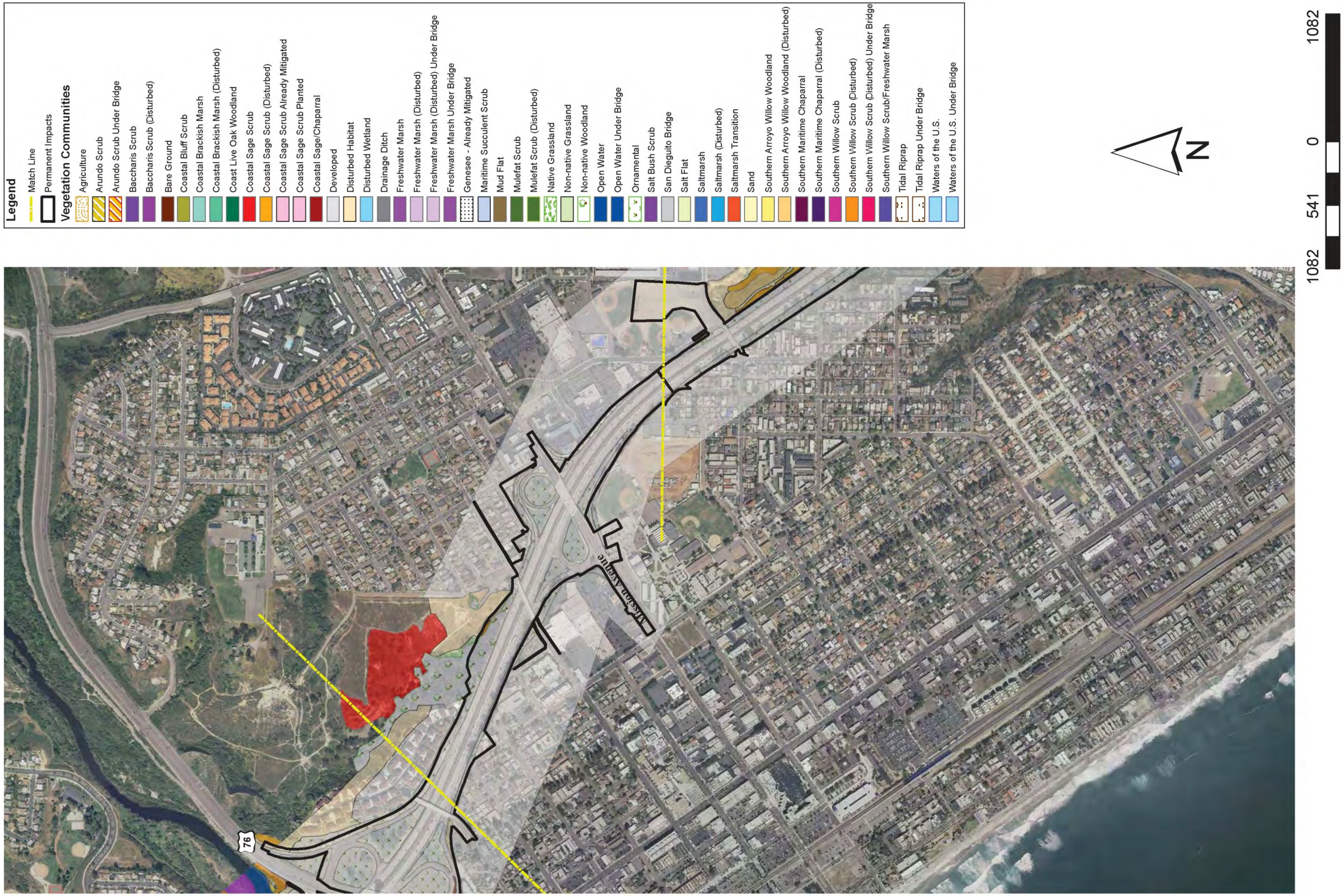
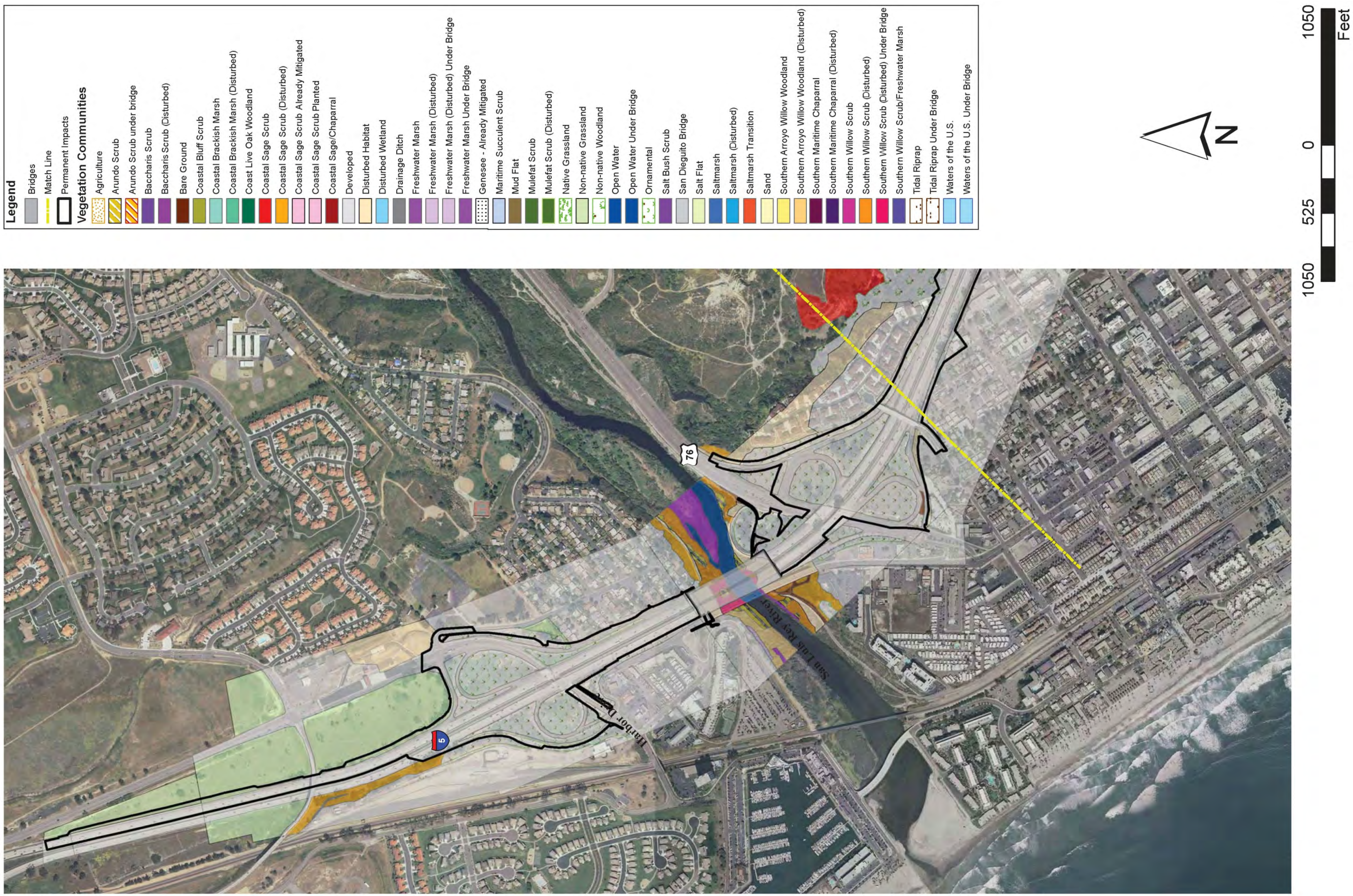


Figure 3-17.1m: Vegetation Communities


Legend
Bridges
Match Line
Permanent Impacts
Vegetation Communities
Agriculture
Arundo Scrub
Arundo Scrub under bridge
Baccharis Scrub
Baccharis Scrub (Disturbed)
Bare Ground
Coastal Bluff Scrub
Coastal Brackish Marsh
Coastal Brackish Marsh (Disturbed)
Coast Live Oak Woodland
Coastal Sage Scrub
Coastal Sage Scrub (Disturbed)
Coastal Sage Scrub Already Mitigated
Coastal Sage Scrub Planted
Coastal Sage/Chaparral
Developed
Disturbed Habitat
Disturbed Wetland
Drainage Ditch
Freshwater Marsh
Freshwater Marsh (Disturbed)
Freshwater Marsh (Disturbed) Under Bridge
Freshwater Marsh Under Bridge
Genesee - Already Mitigated
Maritime Succulent Scrub
Mud Flat
Mulefat Scrub
Mulefat Scrub (Disturbed)
Native Grassland
Non-native Grassland
Non-native Woodland
Open Water
Open Water Under Bridge
Ornamental
Salt Bush Scrub
San Dieguito Bridge
Salt Flat
Saltmarsh
Saltmarsh (Disturbed)
Saltmarsh Transition
Sand
Southern Arroyo Willow Woodland
Southern Arroyo Willow Woodland (Disturbed)
Southern Maritime Chaparral
Southern Maritime Chaparral (Disturbed)
Southern Willow Scrub
Southern Willow Scrub (Disturbed)
Southern Willow Scrub (Disturbed) Under Bridge
Southern Willow Scrub/Freshwater Marsh
Tidal Riprap
Tidal Riprap Under Bridge
Waters of the U.S.
Waters of the U.S. Under Bridge
N
1050
525
0
1050
Feet
76
San Luis Rey River
Harbor Dr
5

3.18 Wetlands and Other Waters

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.18.1 Regulatory Setting

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Federal Water Pollution Control Act, more commonly referred to as the CWA (33 USC 1344) is the primary law regulating wetlands and surface waters. One purpose of the CWA is to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. Waters of the U.S. include navigable waters, interstate waters, territorial seas, and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the CWA, a three-parameter approach is used that includes the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils subject to saturation/inundation). All three parameters must be present, under normal circumstances, for an area to be designated as a jurisdictional wetland under the CWA. A jurisdictional delineation was completed for the *I-5 NCC Project.* The Jurisdictional Delineation verification from the USACE was provided on October 20, 2009 (see Appendix N).

Section 404 of the CWA establishes a regulatory program that provides that discharge of dredged or fill material cannot be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. The Section 404 permit program is run by the USACE with oversight by the USEPA.

The USACE issues two types of 404 permits: Standard and General permits. There are two types of General permits: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to authorize a variety of minor project activities with no more than minimal effects.

There are two types of Standard permits: Individual permits and Letters of Permission. Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of the USACE's Standard permits. For Standard permits, the USACE decision to approve is based on compliance with USEPA's Section 404(b)(1) Guidelines (USEPA 40 Code of Federal Regulations [CFR] Part 230), and whether permit approval is in the public interest. The Section 404(b)(1) Guidelines were developed by the USEPA in conjunction with the USACE, and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative which would have less adverse effects. The Guidelines state that the USACE may not issue a permit if there is a least environmentally damaging practical alternative (LEDPA) to the proposed discharge that would have lesser effects on waters of the U.S., and not have any other significant adverse environmental consequences.

Caltrans, FHWA, USACE, USEPA, and USFWS entered into an MOU to integrate NEPA and the CWA for projects that have five ac or more of permanent impact to waters of the U.S. Under this

MOU, the signatory agencies agree to coordinate at three checkpoints with regard to a project's EIS: (1) purpose and need, (2) identification of range of alternatives, and (3) preliminary determination of the LEDPA and conceptual mitigation plan. The goal of the MOU process is to allow the USACE to more efficiently adopt the EIS for their Section 404 permit action.

The EO for the Protection of Wetlands (EO 11990) also regulates the activities of federal agencies with regard to wetlands. Essentially, this EO states that a federal agency, such as FHWA, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: (1) that there is no practicable alternative to the construction, and (2) that the proposed project includes all practicable measures to minimize harm.

At the State level, wetlands and waters are regulated primarily by the California Department of Fish and Wildlife (CDFW; previously California Department of Fish and Game), SWRCB, and RWQCBs. In certain circumstances, the CCC may also be involved. Sections 1600-1607 of the Fish and Game Code (CFG) require any agency that proposes a project that would substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify CDFW before beginning construction. If CDFW determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement would be required. CDFW jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands under jurisdiction of the USACE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from the CDFW.

The RWQCBs were established under the Porter-Cologne Water Quality Control Act to oversee water quality. The RWQCB also issues water quality certifications for impacts to wetlands and waters in compliance with Section 401 of the CWA. Please see *Section 3.10* for additional details.

3.18.2 Affected Environment

The wetland communities are described above in *Section 3.17*. Within those plant communities there may also be areas designated by regulation as having jurisdiction by the USACE and/or the CDFW and the CCC. The USACE regulates wetlands as defined in the USACE Wetlands Delineation Manual (USACE 1987) and waters of the U.S. as described above. By USACE definition wetlands are:

> Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in the saturated soil conditions.

Waters of the U.S. include natural drainages up to the limit of the ordinary high water mark, which is defined as the:

> Line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

By definition all USACE jurisdiction wetlands are waters of the U.S. However, not all waters of the U.S. are considered wetlands; therefore, non-wetland USACE jurisdictional areas are identified as other waters of the U.S. (*Figures 3-18.1a* through *3-18.1l*). On October 20, 2009, the USACE concurred with the submitted wetlands delineation (see Appendix N).

The CDFW only requires one of the three criteria that the USACE requires in the definition of a wetland. Pursuant to CFG Code 1602 a streambed alteration agreement is needed for projects which would:

> Divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake designated by the department in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit, use material from the streambeds designated by the department, or result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake designated by the department.

This generally includes all natural drainages, including any adjacent riparian habitat, but usually does not cover isolated wetlands.

The CCC defines wetlands similar to the CDFW, and CCC Administrative Regulations (Section 13577[b]) further define a wetland as:

> [L]and where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes, and shall also include those types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent or drastic fluctuations of surface water levels, wave action, water flow, turbidity or high concentrations of salt or other substance in the substrate. Such wetlands can be recognized by the presence of surface water or saturated substrate at some time during each year and their location within, or adjacent to, vegetated wetlands or deepwater habitats.

There are CDFW, CCC, and USACE jurisdictional wetlands throughout the BSA. CDFW and CCC wetlands are identified by habitat type, which are shown in *Figures 3-17.1a* through *3-17.1n* and are discussed in detail in *Section 3.17*. USACE jurisdiction wetlands and other waters of the U.S. are shown in *Figures 3-18.1a* through *3-18.1l*. The lagoons and their fringing habitats, rivers, creeks, and drainages are considered wetlands by one, two, or all three of the agencies. CCC and CDFW jurisdiction wetlands were primarily mapped based on habitats (see *Section 3.17*), while USACE jurisdiction wetlands were delineated based on the 1987 USACE Manual.

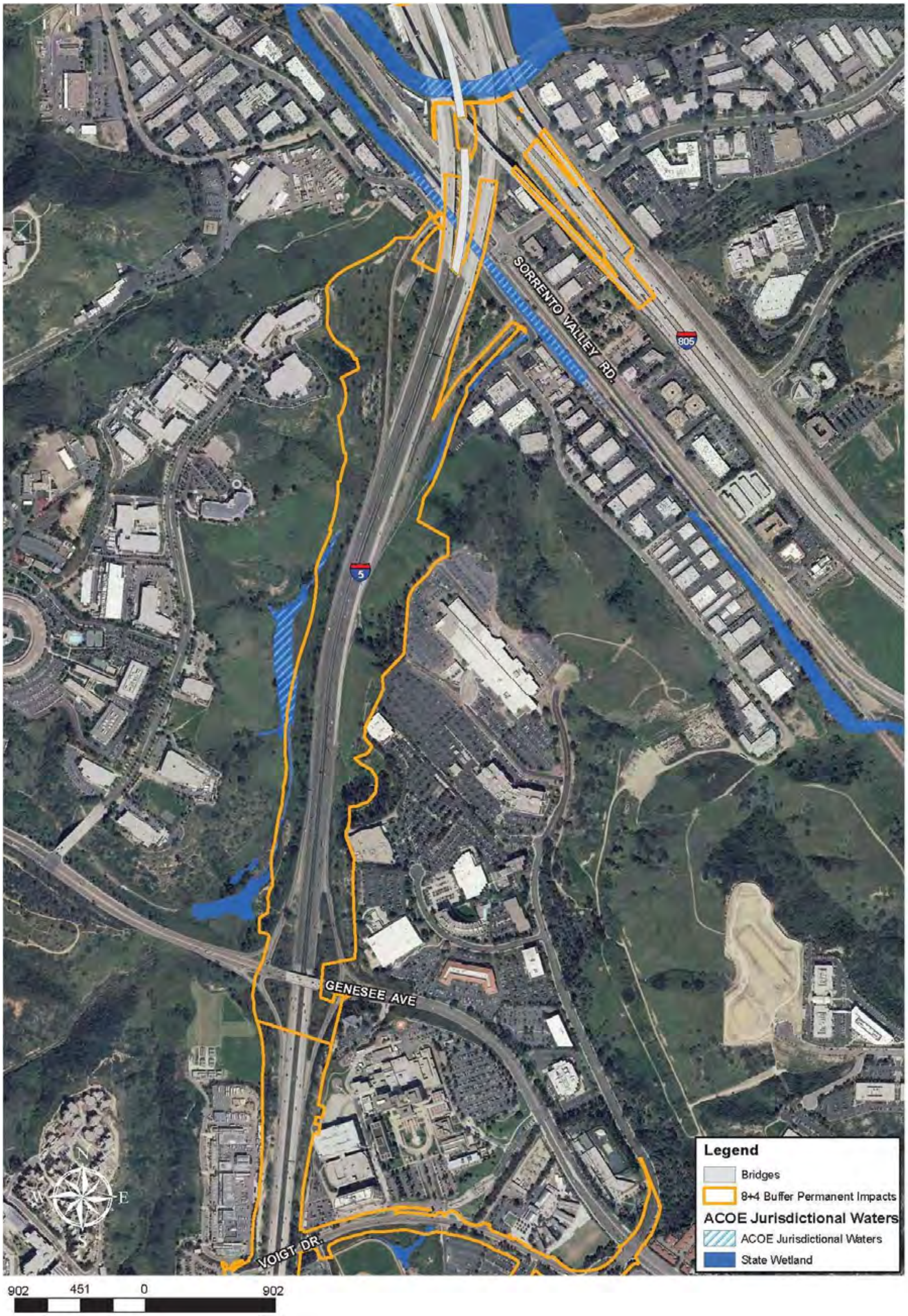


Figure 3-18.1a: USACE Jurisdictional Waters

Figure 3-18.1b: USACE Jurisdictional Waters

Figure 3-18.1c: USACE Jurisdictional Waters

Figure 3-18.1d: USACE Jurisdictional Waters

Figure 3-18.1e: USACE Jurisdictional Waters

Figure 3-18.1f: USACE Jurisdictional Waters

Figure 3-18.1g: USACE Jurisdictional Waters

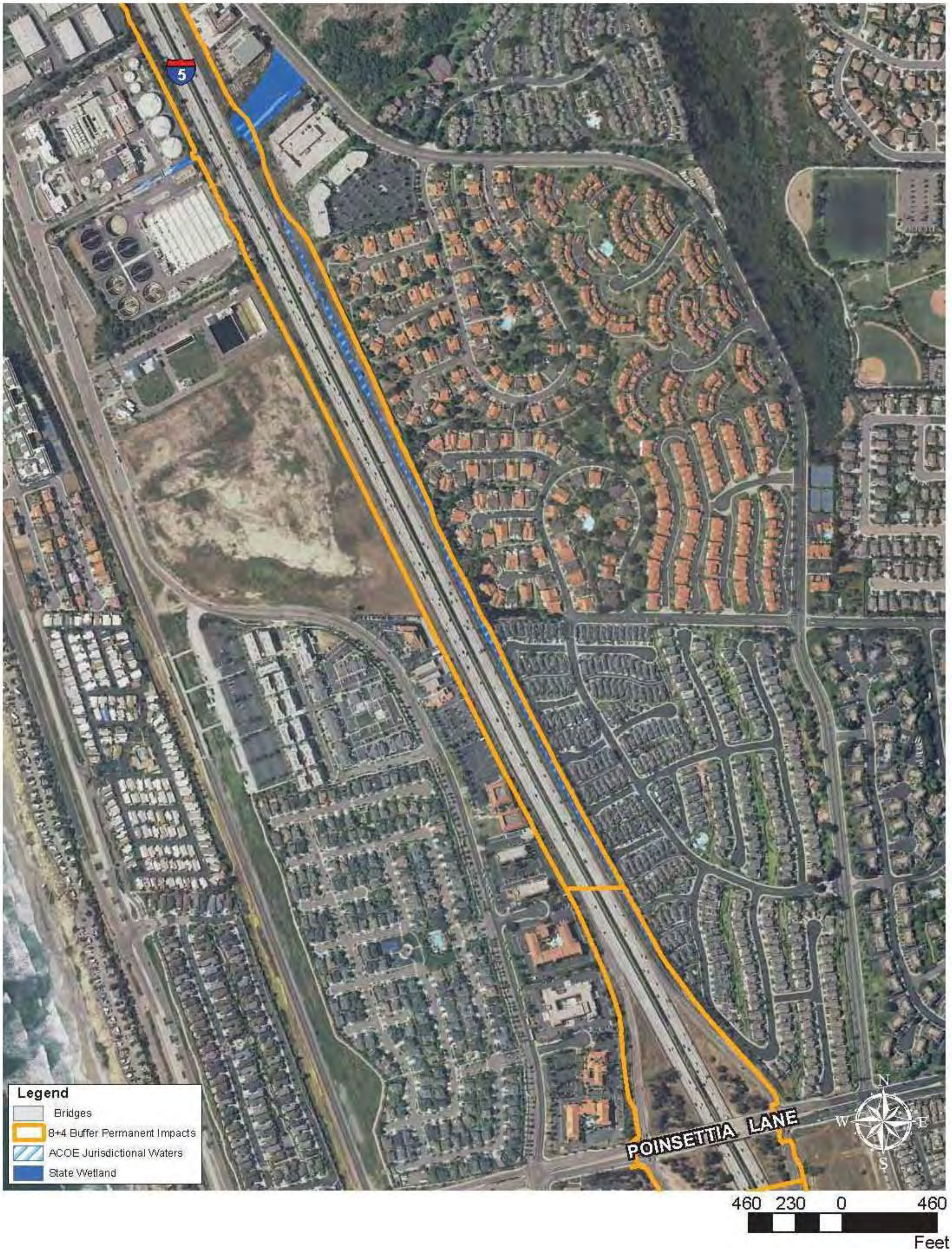


Figure 3-18.1h: USACE Jurisdictional Waters

Figure 3-18.1i: USACE Jurisdictional Waters

Figure 3-18.1j: USACE Jurisdictional Waters

Figure 3-18.1k: USACE Jurisdictional Waters

Figure 3-18.1l: USACE Jurisdictional Waters

Habitats by Watershed

Different types of wetlands and waters of the U.S. have been divided by watershed as identified from one high point of I-5 to the next high point and the body of water in between. For instance, San Elijo Lagoon watershed includes wetlands and non-wetland waters of the U.S. between Lomas Santa Fe Drive in the south to just south of the Santa Fe Road Interchange in the north. Each wetland/watershed provides unique functions and values ranging from water quality improvements by filtering nutrients and sediments from the water column, to flood relief, to wildlife habitats. The following 11 watersheds and their functions and values were identified in the project vicinity.

San Clemente Creek

A small wetland that is fed primarily by urban runoff flows into a canyon east of I-5 near Voigt Street. This small drainage has some willows and mulefat, as well as a number of invasive species. This wetland area provides a limited area of wildlife habitat as well as some water quality functions. From this canyon, the water flows through culverts until it ultimately empties into the drainage along Gilman Drive and finally into San Clemente Creek (*Figure 3-18.1a*).

Los Peñasquitos Lagoon

This watershed extends from the southern limits of the project on I-5 and I-805 to the Del Mar Heights Road Interchange. The watershed includes the following areas: Carroll Canyon/Sorrento Creek, Los Peñasquitos Creek, Carmel Creek, and Los Peñasquitos Lagoon (*Figures 3-18.1a* and *3-18.1b*). These wetlands provide important wildlife habitat for threatened and endangered species, migratory birds, large mammals, and many different wildlife species. These wetlands also provide flood relief by allowing high flows to spread out and enter the larger water courses. They also provide water quality improvements by slowing the flow of water and allowing sediment loads, nutrients, and toxins from dropping out and being absorbed by the vegetation.

San Dieguito Lagoon

This watershed extends from the Del Mar Heights Road Interchange to the Lomas Santa Fe Drive Interchange and includes all drainages along I-5 into the San Dieguito River and Lagoon (*Figure 3-18.1c*). The San Dieguito River and Lagoon provides similar wetland functions to Los Peñasquitos Lagoon. A large restoration project within this watershed began in 2006. The restoration project would restore land around the lagoon that was previously fill material. The wetland habitats adjacent to the right-of-way would have even greater wildlife value after the restoration is completed.

San Elijo Lagoon

The San Elijo Lagoon watershed extends from Lomas Santa Fe Drive to just south of the Santa Fe Road Interchange (*Figure 3-18.1d*). This watershed encompasses all of the drainages into San Elijo Lagoon. San Elijo Lagoon provides important wildlife habitat, flood relief, and water quality improvement similar to Los Peñasquitos Lagoon.

The lagoon supports light-footed clapper rail and least Bell's vireo (*Vireo bellii pusillus*), as well as California gnatcatchers (*Polioptila californica californica*) on the adjacent uplands. Water quality and flood relief are important functions of this lagoon as well.

Cottonwood Creek

The Cottonwood Creek watershed within this project extends from just south of the Santa Fe Drive Interchange to the Leucadia Boulevard Interchange (*Figures 3-18.1e* and *3-18.1f*). Cottonwood Creek is primarily channelized or underground near I-5. Several drainages feed into Cottonwood Creek from the east side of I-5 to the west side where the outlet has recently been restored to its mouth at the Pacific Ocean near Encinitas Boulevard. Cottonwood Creek and its tributary, Moonlight Creek, flow through a very urbanized section of Encinitas. Cottonwood Creek often flows through culverts and channels near I-5 and does not provide much flood relief, water quality improvement, or wildlife habitat until it flows west of I-5 into the newly created channels in Cottonwood Park. Moonlight Creek flows parallel to I-5 north of Encinitas Boulevard and feeds into Cottonwood Creek. Moonlight Creek has freshwater marsh and southern willow scrub habitat, which provides habitat to some riparian bird species, as well as providing some water quality and flood relief functions.

Batiquitos Lagoon

This watershed extends from Leucadia Boulevard north to Poinsettia Avenue (*Figures 3-18.1g* and *3-18.1h*). This area encompasses Batiquitos Lagoon and any drainages that feed the lagoon. Batiquitos Lagoon provides another important habitat for many wildlife species including threatened and endangered species. California least tern (*Sterna antillarum browni*), western snowy plover (*Charadrius alexandrines nivosus*), and light-footed clapper rail are all endangered species that use portions of the lagoon habitat. The large open water portions of Batiquitos Lagoon also provide important habitat for fish, waterfowl, and shorebirds. The slopes of the lagoons are important wildlife corridors for both large and small mammal movement. The lagoon also provides water quality functions and flood relief.

Encinas Creek

This watershed extends from Poinsettia Lane to Palomar Airport Road (*Figure 3-18.1h*). The Encinas Creek watershed includes the creek itself and a long earthen drainage parallel to I-5 that is fed mostly by urban and freeway runoff that then flows into the creek through a concrete channel. Encinas Creek flows from east to west under I-5. Encinas Creek is disturbed by many invasive plant species and has been channelized along some of its length. The long drainage parallel to I-5 is fed by urban and freeway runoff; it supports cattails and amphibians, as well as some bird species. Encinas Creek does provide some limited wildlife habitat, water quality functions, and flood relief. However, due to the disturbed nature of this creek, the function and value of the wetlands are limited compared to the watersheds that flow into lagoons.

Agua Hedionda Lagoon

This watershed extends from Palomar Airport Road to just north of Tamarack Avenue (*Figure 3-18.1i*). This area contains a concrete-lined drainage parallel to I-5 that has some freshwater marsh vegetation and carries primarily urban and freeway runoff. The developed area between Tamarack Avenue and Carlsbad Village Drive does not contain any wetlands or drainage ditches; therefore, this area is not included in any of the watersheds. Agua Hedionda Lagoon, near I-5, is primarily open water habitat with some mud flat and a small fringe of salt marsh vegetation. Agua Hedionda is fed by some small drainage ditches that capture urban runoff, but provide little wetland functions. Agua Hedionda Lagoon provides open water habitat for fish, waterfowl, and shorebirds. It also provides water quality and flood relief for areas upstream and downstream of the lagoon.

Buena Vista Lagoon

This watershed extends from Carlsbad Village Drive to north of California Street Interchange (*Figure 3-18.1j*). The lagoon itself contains the only wetland/waters of the U.S. within this watershed. Buena Vista Lagoon is a freshwater lagoon that for the most part is not connected to the ocean except through a system of tide gates. Buena Vista Lagoon is a combination of freshwater marsh, brackish marsh, and open water habitat that supports a variety of sensitive and migratory birds. The cattails in the marsh provide habitat and take up nutrients in the water that flows into the lagoon increasing water quality. Buena Vista does provide some flood relief due to its size; however, the tide gates mute the benefit in the western basin.

Loma Alta Creek

This watershed extends from north of the California Street Interchange north to Mission Avenue (*Figure 3-18.1k*). There are several concrete lined ditches that feed into this highly disturbed creek. In addition, there is a riparian area east of I-5 and north of Oceanside Boulevard that ultimately gets piped into this creek as well. The creek flow is fed by urban runoff and storm flows. The creek does provide a limited amount of water quality filtration and flood relief; however, due to its highly disturbed nature the benefit is minimal.

San Luis Rey River

This watershed extends from Mission Avenue north to the end of the project (*Figure 3-18.1l*). The San Luis Rey River is the main wetland within this watershed; however, there are some manmade drainage ditches that parallel I-5 near Vandergrift Boulevard overpass. The San Luis Rey River is one of the few truly perennial rivers in San Diego County. The San Luis Rey River, in the vicinity of I-5, is a combination of open water habitat, freshwater marsh, arundo scrub, and riparian that provides habitat for a variety of sensitive and common wildlife. The San Luis Rey River also plays an important role in flood relief and water quality improvements due to the filtering of water by freshwater marsh species. A recent project was undertaken by the City of Oceanside to remove a large quantity of arundo in the San Luis Rey River, upstream of I-5, to improve its ability to handle floodwaters.

3.18.3 Environmental Consequences

I-5 is an existing freeway that crosses six lagoons, a river, and some additional smaller drainages. The No Build alternative is the only alternative that would avoid the majority of the impacts to wetlands. Some of the projects that would go forward under the No Build scenario would involve wetland impacts. The build alternatives all are variations of widening the existing alignment. There is no way to avoid impacts to the wetlands entirely and still meet the purpose and need of the project. The alternatives which were not carried forward also impacted wetlands. The length of the proposed north-south project and the fact that the watersheds drain from east to west would make it impossible to avoid crossing any wetlands.

The four build alternatives were approved by the MOU regulatory agencies in NEPA 404 coordination. Efforts to minimize fill in the wetland examined using retaining walls; however, the liquefied soils at the lagoons would require very deep footings over 82 ft and would be prohibitively expensive. Varying bridge designs have been examined to enhance flow under the bridges to increase water quality in the eastern basins of the lagoons, as described in *Section 3.17* and shown in *Figures 3-18.2a* through *3-18.2g*. Caltrans, in conjunction with the USACE and restoration efforts at San Elijo Lagoon and Buena Vista Lagoon, is planning to build longer bridges over wider and deeper channels that would result in removing some of the existing fill at the lagoons. A longer bridge with a wider and deeper channel is also proposed at Batiquitos Lagoon. These channel modifications would be built as part of the *I-5 NCC Project*.

Table 3.18.1 describes the permanent and temporary impacts to USACE jurisdictional wetlands and other waters of the U.S. and State of California jurisdictional wetlands. *Figures 3-18.1a* through *3-18.1l* show the jurisdictional wetlands and waters of the U.S with the permanent impact area for the 8+4 Buffer alternative.

Impacts from each of the build alternatives to the lagoon habitats would slightly decrease the quality and quantity of habitat available for use by wildlife species, including migratory birds and listed species. There would also be effects to each of the lagoons' abilities to provide flood relief and water quality functions. These lagoons are very important to the health and well-being of the coastal habitats and species.

The smaller drainages would also be affected. Although these smaller drainages do not present the high quality habitat that the lagoons and San Luis Rey River provide, the build alternatives would result in placing several of these small wetlands and other waters of the U.S. into culverts, which would eliminate any potential for wildlife habitat, flood control, or water quality functions. Drainages feeding into Cottonwood Creek, Encinas Creek, and those parallel to I-5 north of Genesee Avenue, would have portions placed into culverts.

Table 3.18.1: Permanent and Temporary Impacts to Jurisdictional Waters of the U.S. and State

	10+4 Barrier	10+4 Buffer	8+4 Barrier	8+4 Buffer (Preferred Alternative)
	Ac	**Ac**	**Ac**	**Ac**
Permanent*				
Other Waters of the U.S. USACE	5.92	4.93	5.42	4.20
USACE Wetland	13.77	11.75	12.53	9.93
Total Waters of the U.S.	19.69	16.68	17.95	14.13
State Wetland	25.55	21.49	22.91	18.44
Wetland Re-established	2.52	2.52	2.52	2.52
Net Impact USACE Jurisdiction	**17.17**	**14.16**	**15.43**	**11.61**
Net Impact State Wetland	**23.03**	**18.97**	**20.39**	**15.92**
Temporary				
Other Waters of the U.S. USACE	9.17	7.84	8.24	6.31
USACE Wetland	10.96	10.14	10.66	8.51
Total Waters of the U.S.	**20.13**	**17.98**	**18.90**	**14.82**
State Wetland	**21.95**	**20.20**	**20.88**	**18.39**

*Note: Because USACE jurisdictional areas are a subset of CDFW jurisdictional areas, the total is not additive of all three categories.

The lagoon bridge optimization studies recommended widening and deepening the channels at San Elijo, Batiquitos, and Buena Vista Lagoons under I-5. In addition, the new bike facility over Carmel Creek would be a long bridge as opposed to the current small culverts. As a result, approximately 2.52 ac of wetland would be re-established. Therefore, the net impact for each alternative would be less due to the off-setting creation, resulting from the removal of fill.

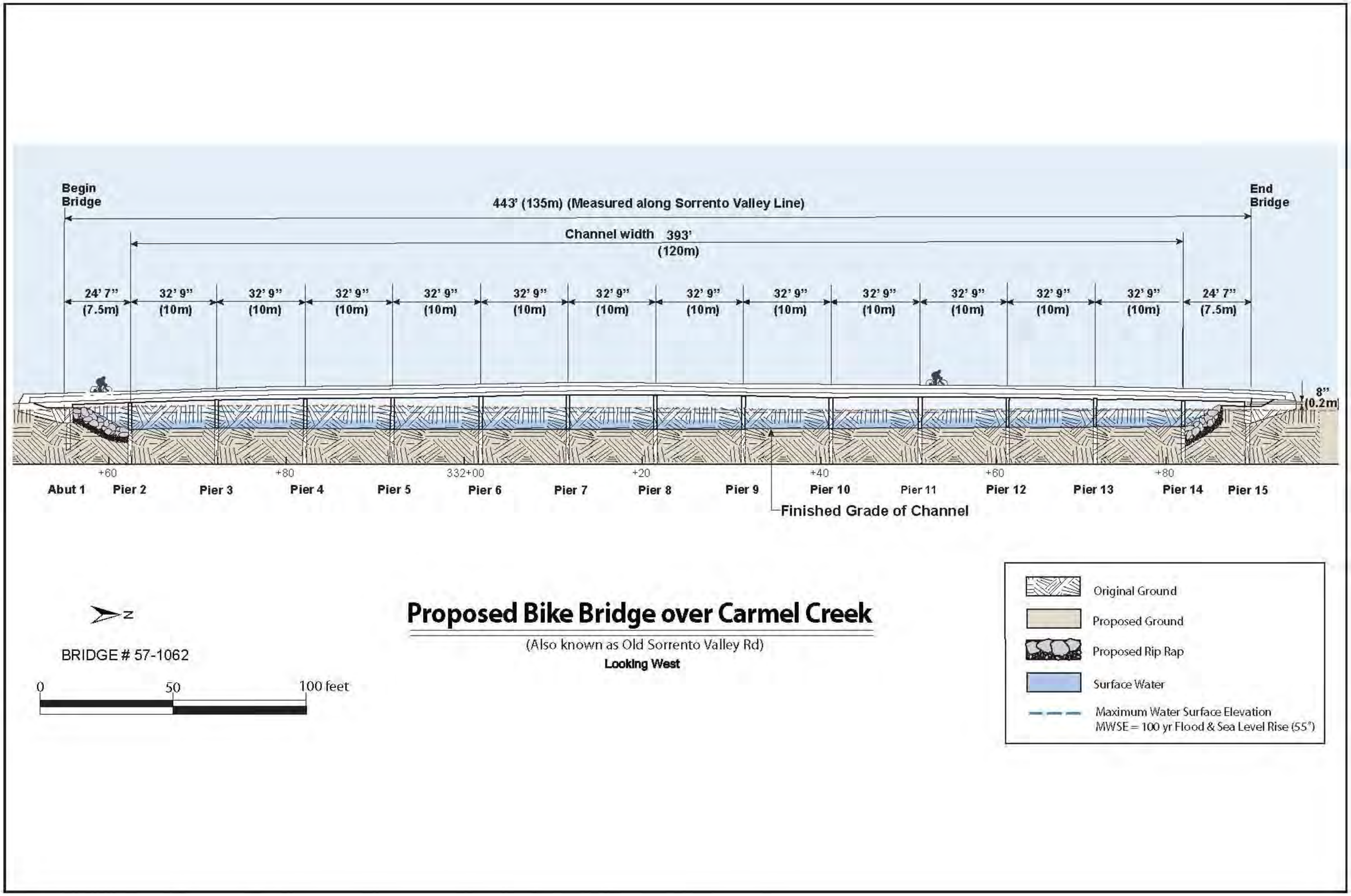


Figure 3-18.2a: Los Peñasquitos Lagoon: Cross-sections for the Existing I-5 Bridge and Proposed 8+4 Buffer (Carmel Creek)

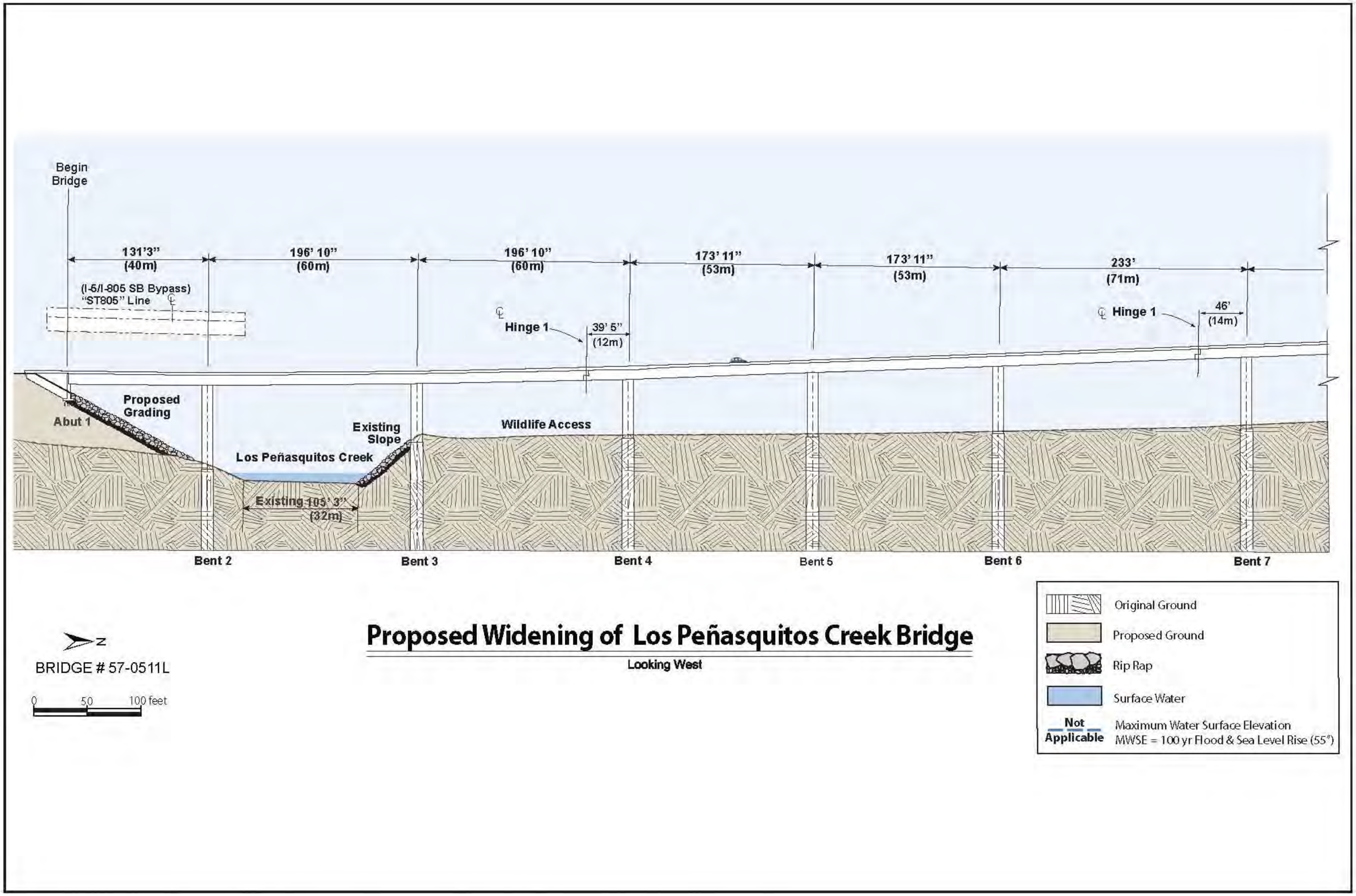


Figure 3-18.2b: Los Peñasquitos Lagoon: Cross-sections for the Existing I-5 Bridge and Proposed 8+4 Buffer (Los Peñasquitos Creek)

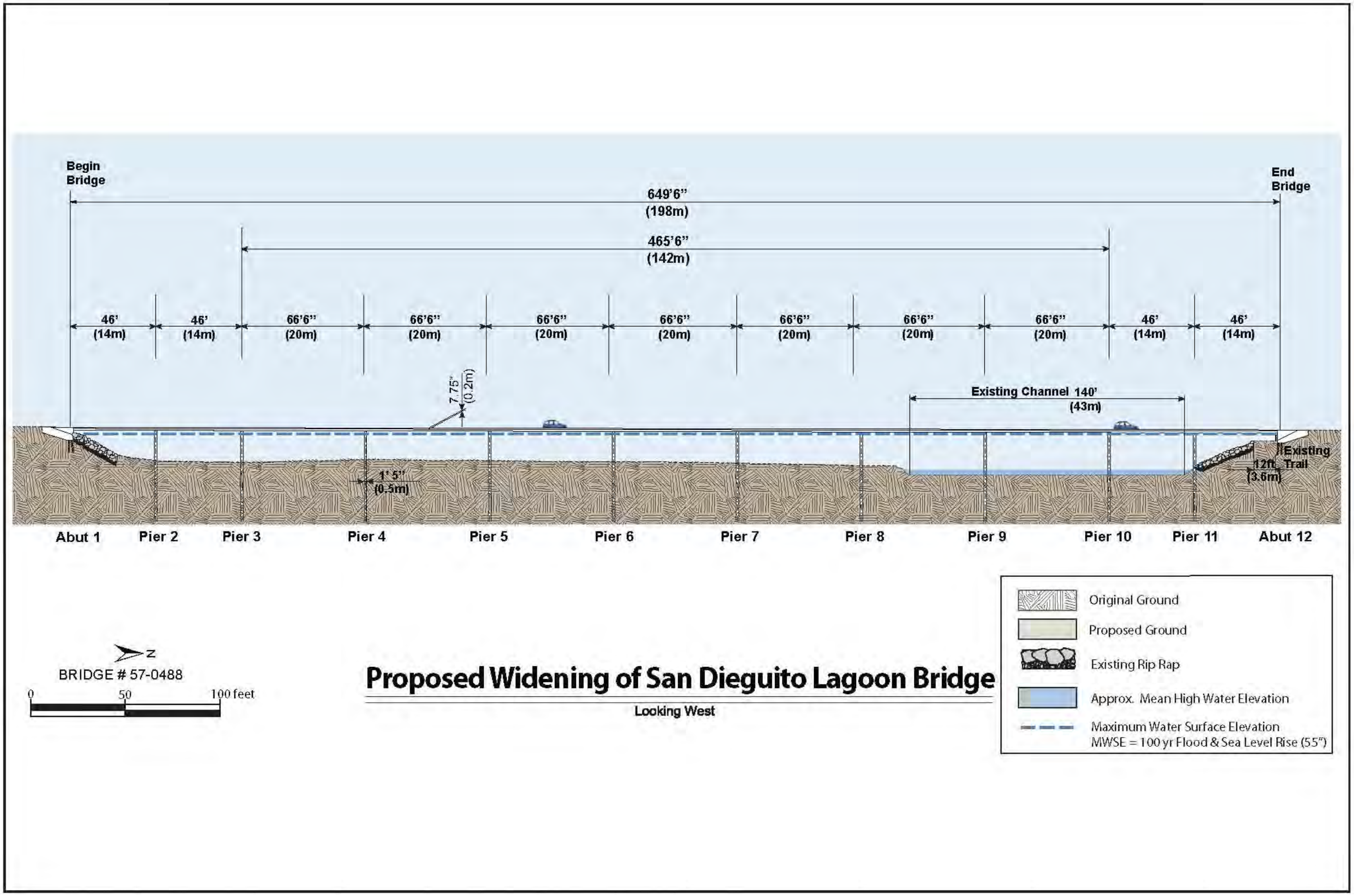


Figure 3-18.2c: San Dieguito Lagoon: Cross-sections for the Existing I-5 Bridge and Proposed 8+4 Buffer

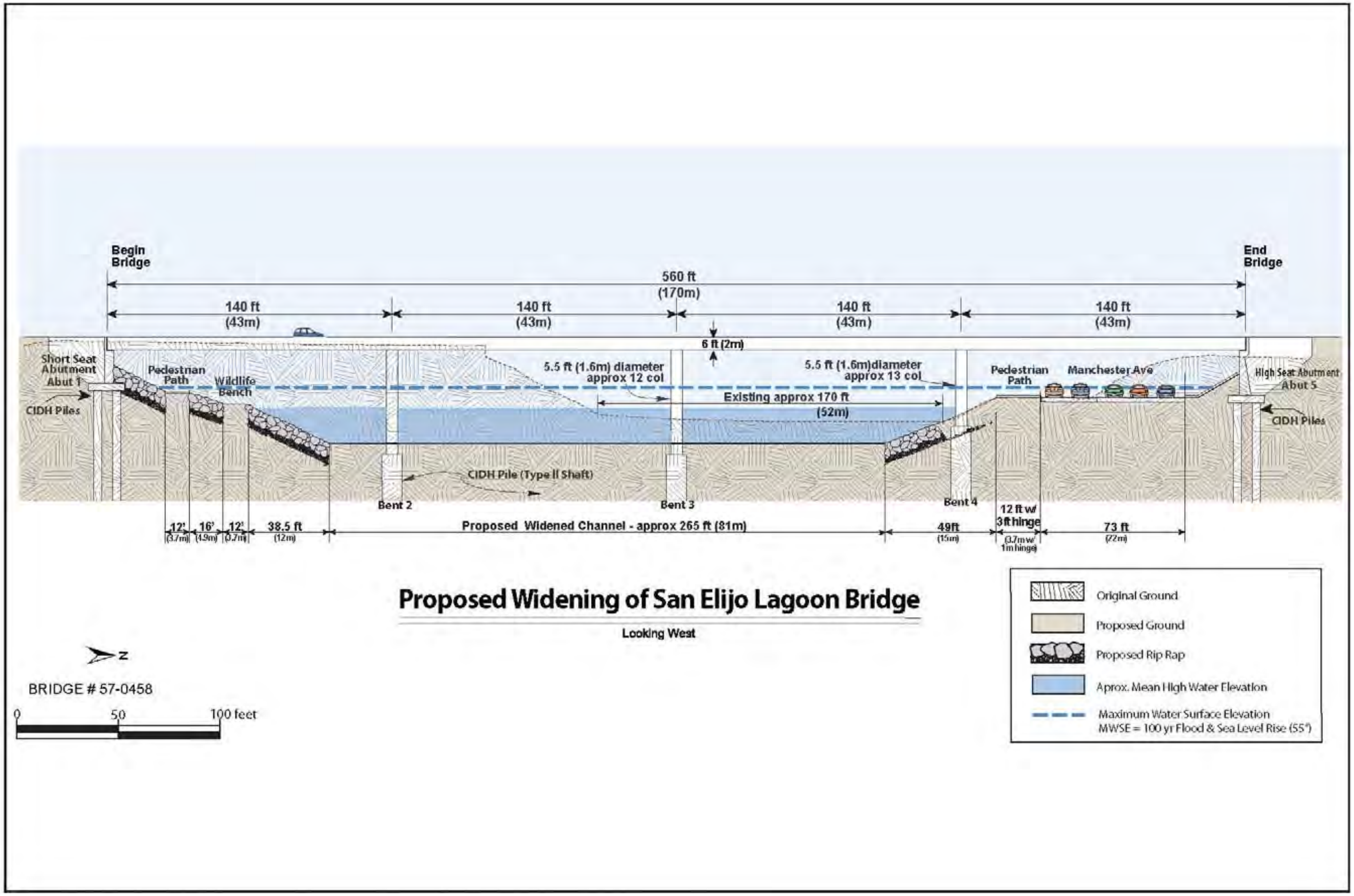


Figure 3-18.2d: San Elijo Lagoon: Cross-sections for the Existing I-5 Bridge and Proposed 8+4 Buffer

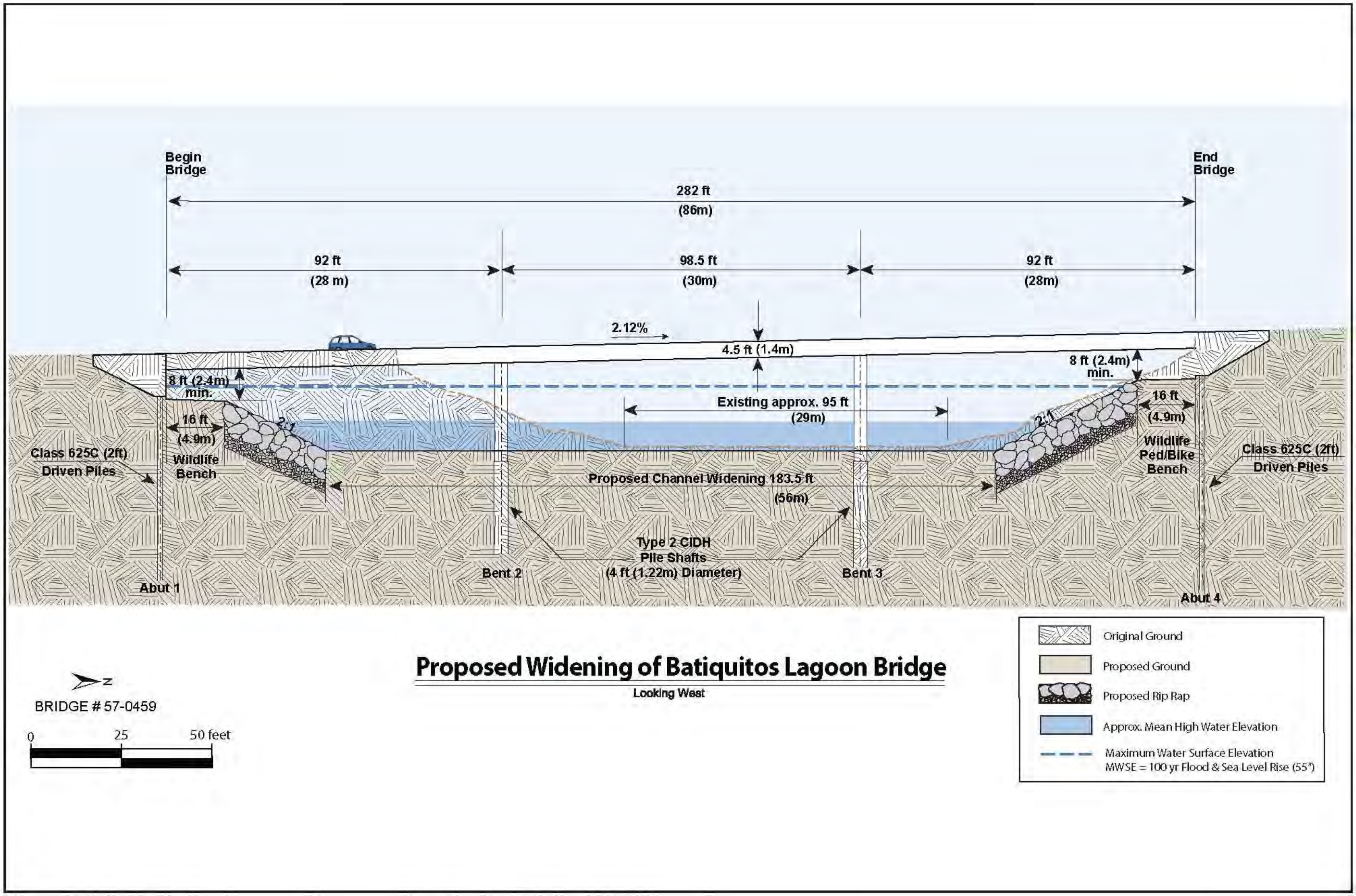


Figure 3-18.2e: Batiquitos Lagoon: Cross-sections for the Existing I-5 Bridge and Proposed 8+4 Buffer

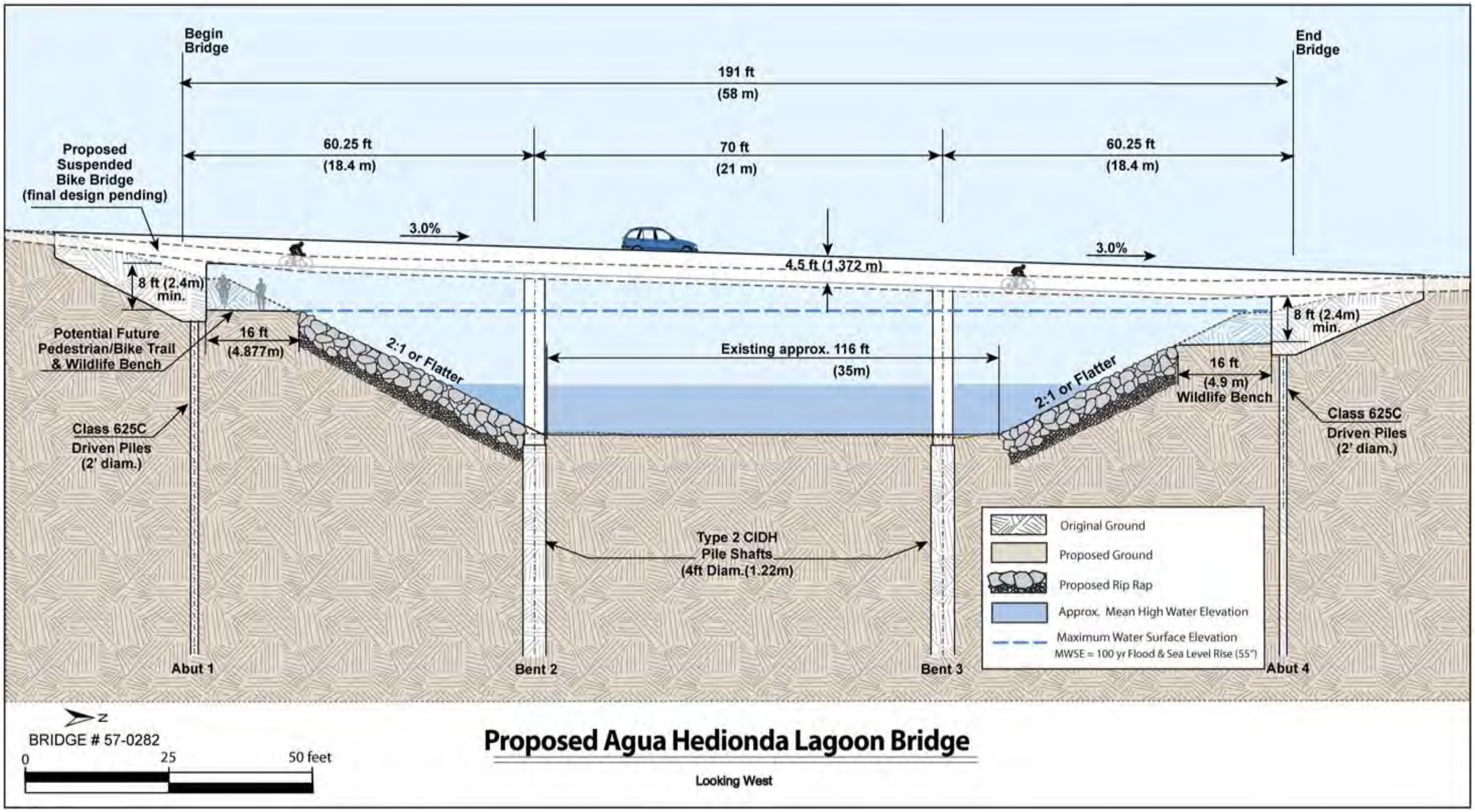


Figure 3-18.2f: Agua Hedionda Lagoon: Cross-sections for the Existing I-5 Bridge and Proposed 8+4 Buffer

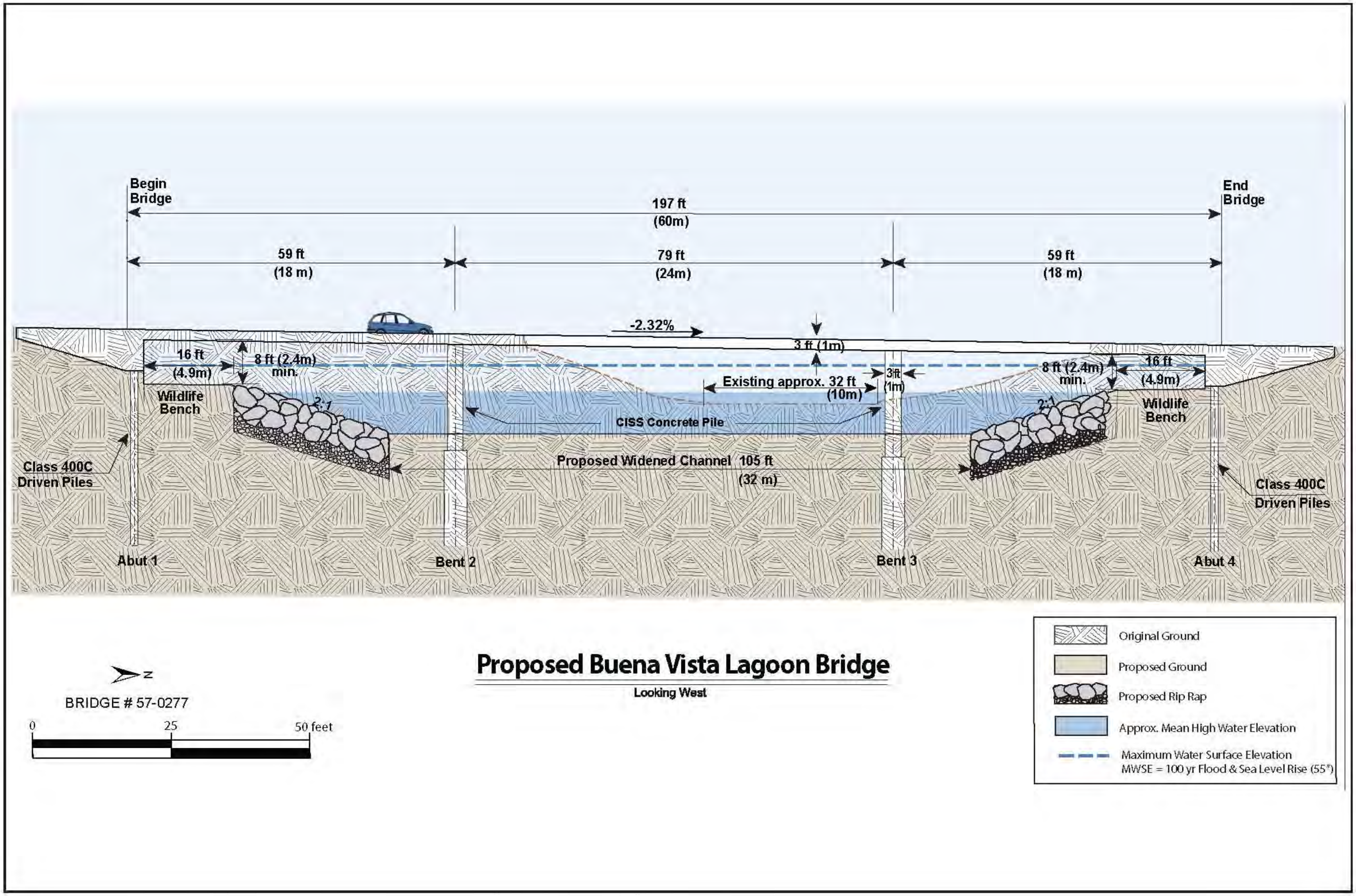


Figure 3-18.2g: Buena Vista Lagoon: Cross-sections for the Existing I-5 Bridge and Proposed 8+4 Buffer

Temporary impacts to waters of the U.S. and State wetlands would include the open water areas under each of the existing and proposed bridges (excluding the columns, which are considered permanent fill) where work would include demolishing the old bridge and constructing the new bridge. A channel would remain open in each of the lagoons during construction; however, the area could be impacted by barges, coffer dams, falsework, or other methods while constructing the bridges.

During the NEPA 404 meetings with the MOU resource agencies, the USACE has expressed an interest in disclosing the amount of impacts to jurisdictional habitat by watershed. The permanent impacts by watershed are listed in *Table 3.18.2*. There is little difference in the amount of impacts for each of the alternatives in many of the watersheds. The footprint is the same in the San Clemente, Los Peñasquitos, Loma Alta, and San Luis Rey watersheds (*Table 3.18.2*). The greatest lagoon impacts are to Agua Hedionda and Batiquitos due to the existing narrow fill slopes under the current I-5 alignment and the closer proximity of waters of the U.S. to the roadway (*Table 3.18.2*). As with the totals, the 8+4 Buffer alternative would have the fewest permanent impacts to USACE jurisdictional waters of the U.S. in each watershed.

Table 3.18.2: Permanent Impacts to USACE Jurisdictional Waters of the U.S. by Watershed

Watershed	Type	10+4 Barrier	10+4 Buffer	8+4 Barrier	8+4 Buffer (Preferred Alternative)
		Ac	Ac	Ac	Ac
San Clemente	Other Waters	0.00	0.00	0.00	0.00
	Wetland	0.01	0.01	0.01	0.01
Los Peñasquitos	Other Waters	0.11	0.11	0.11	0.11
	Wetland	0.44	0.44	0.44	0.44
San Dieguito	Other Waters	0.03	0.03	0.03	0.03
	Wetland	3.74	2.98	3.54	2.96
San Elijo	Other Waters	0.00	0.00	0.00	0.00
	Wetland	1.45	0.68	0.76	0.60
Cottonwood Creek	Other Waters	0.08	0.08	0.08	0.05
	Wetland	0.43	0.32	0.38	0.29
Batiquitos	Other Waters	0.27	0.27	0.27	0.24
	Wetland	4.93	4.58	4.65	2.89
Encinas	Other Waters	0.14	0.13	0.13	0.12
	Wetland	1.49	1.46	1.47	1.46
Agua Hedionda	Other Waters	5.20	4.22	4.71	3.56
	Wetland	0.00	0.00	0.00	0.00
Buena Vista	Other Waters	0.00	0.00	0.00	0.00
	Wetland	1.28	1.28	1.28	1.28
Loma Alta	Other Waters	0.07	0.07	0.07	0.07
	Wetland	0.00	0.00	0.00	0.00
San Luis Rey	Other Waters	0.02	0.02	0.02	0.02
	Wetland	0.00	0.00	0.00	0.00
TOTAL	Other Waters	5.92	4.93	5.42	4.20
	Wetland	13.77	11.75	12.53	9.93
	All	**19.69**	**16.68**	**17.95**	**14.13**

10+4 Barrier

The 10+4 Barrier alternative would have the most net permanent impacts to jurisdictional waters: 17.17 ac of waters of the U.S. and 23.03 ac of State wetlands (*Table 3.18.1*). Almost half of the permanent impacts to jurisdictional waters of the U.S. would occur in Batiquitos and Agua Hedionda Lagoons (*Table 3.18.2*). The 10+4 Barrier alternative would temporarily impact 20.13 ac of USACE jurisdictional waters of the U.S. and 21.95 ac of State wetlands (*Table 3.18.1*).

10+4 Buffer

The 10+4 Buffer alternative would have a net permanent impact to 14.16 ac of waters of the U.S. and 18.97 ac of State wetlands (*Table 3.18.1*). The largest impacts are within the Batiquitos and Agua Hedionda watersheds; however, the majority of the Batiquitos impacts are to wetlands, while the majority of the impacts to Agua Hedionda are to other waters of the U.S. (*Table 3.18.2*). The 10+4 Buffer alternative would have a total of 17.98 ac of temporary impacts to USACE jurisdictional waters of the U.S. and 20.20 ac of State wetlands associated with construction (*Table 3.18.1*).

8+4 Barrier

The 8+4 Barrier alternative would have a net permanent impact to 15.43 ac of waters of the U.S. and 20.39 ac of State wetlands (*Table 3.18.1*). The majority of the wetland impacts are to the Batiquitos watershed and the majority of the other waters of the U.S. impacts are to the Agua Hedionda watershed (*Table 3.18.2*). The 8+4 Barrier alternative would temporarily impact 18.90 ac of USACE jurisdictional waters of the U.S. and 20.88 ac of State wetlands (*Table 3.18.1*).

8+4 Buffer (Preferred Alternative)

Of the USACE jurisdictional waters of the U.S., the refined 8+4 Buffer alternative would have a net permanent impact to 11.61 ac of waters of the U.S., as well as 15.92 ac of State wetlands (*Table 3.18.1*). Temporary impacts total 14.82 ac to USACE waters of the U.S. and 18.39 ac to State wetlands for the refined 8+4 Buffer alternative.

No Build

The No Build alternative would not have any permanent impacts on the majority of these waters of the U.S. Some of the projects proposed to go forward with under the No Build scenario would impact some of the wetlands to a much lesser extent. In addition, some maintenance projects on existing culverts may be anticipated over time that would at least have some temporary impacts on wetlands. Without this project, which would replace the existing I-5 bridges, there is no option to lengthen bridges, remove some fill, or to enhance flow in the lagoons.

Indirect impacts to habitats and the species that utilize them can result from increased lighting, increased exposure to invasive species and trash or debris, edge effects, increased potential for pollution from storm water runoff, shading of aquatic habitat, and long-term increases in noise. I-5 is currently 8 to 10 lanes in width across the lagoons, and is already causing impacts from increased nighttime lighting, increased access from invasive species, and edge effects where habitats are bisected. Most of the remaining corridor has been developed for urban uses that produce many of the same impacts on native habitats. Many of the impacts associated with construction would be temporary, but direct. Those impacts that occur with long-term operation of the freeway would be permanent but indirect.

Potential indirect impacts resulting from the new pedestrian and bike facilities are discussed by lagoon in *Section 3.17.3*. Potential indirect impacts to waters of the U.S. and State wetlands could result from shading from the widened and/or lengthened bridges, discharges of storm water, and trash or debris. Indirect impacts also could result from roadway runoff causing erosion of the slopes and sedimentation within the wetlands. In the case of any build alternative, however, minimization measures would reduce these impacts to the maximum extent practicable (MEP). Any build alternative would employ BMPs to control adverse effects from runoff such as bioswales to slow and treat runoff, riprap to dissipate flows from culverts, and riprap to armor abutment slopes under lagoon bridges. Potential effects of the *I-5 NCC Project* related to runoff and BMPs to be employed by the project are discussed in *Section 3.10* of this EIR/EIS. Scour under the proposed longer bridges with wider channels at San Elijo, Batiquitos, and Buena Vista Lagoons should decrease following construction of these bridges.

The existing I-5 bridges already shade a portion of the aquatic habitats in the corridor. Additional shading of waters of the U.S. and State wetlands would occur as a result of widened and/or lengthened bridges over the lagoons, creeks, and San Luis Rey River. *Table 3.18.3* identifies additional areas that would be shaded due to increased bridge dimensions. The longer bridges proposed over San Elijo, Batiquitos, and Buena Vista Lagoons would result in establishment of new waters of the U.S; however, much of the new habitat would be shaded by the bridges.

Table 3.18.3: Additional Shading Indirect Impacts in USACE Waters of the U.S./State Wetlands by Watershed (Acres)

Watershed	10+4 Barrier	10+4 Buffer	8+4 Barrier	8+4 Buffer (Preferred Alternative)
San Clemente	0	0	0	0
Los Peñasquitos	0.33/0.35	0.33/0.35	0.33/0.35	0.33/0.35
San Dieguito	0.67/1.02	0.51/0.86	0.59/0.94	0.34/0.69
San Elijo	1.82/1.82	1.61/1.61	1.72/1.72	1.4/1.4
Cottonwood Creek	0	0	0	0
Batiquitos	0.63/0.63	0.5/0.5	0.57/0.57	0.37/0.37
Encinas	0	0	0	0
Agua Hedionda	0.58/0.58	0.47/0.47	0.53/0.53	0.37/0.37
Buena Vista	0.67/0.70	0.56/0.59	0.61/0.64	0.45/0.48
Loma Alta	0.11/0.11	0.11/0.11	0.11/0.11	0.11/0.11
San Luis Rey	0.40/0.41	0.40/0.41	0.40/0.41	0.40/0.41

Indirect impacts could result from roadway runoff and human activity from increased access to the wetlands and other waters of the U.S. As noted above, in the case of any build alternative, minimization measures would reduce these impacts to the MEP. This would include fencing to restrict access to wetlands and other waters of the U.S. from the roadway, trails, and use areas, and would employ BMPs to control adverse effects from runoff. Potential effects of the *I-5 NCC Project* related to runoff and BMPs to be employed by the project are discussed in *Section 3.10*.

Indirect impacts to waters of the U.S. and State wetlands would be mitigated through the REMP described in *Section 3.17.3*. The REMP is a comprehensive package of mitigation that includes no net loss mitigation for direct permanent impacts, and a suite of enhancements to mitigate for temporary, indirect, and temporal losses resulting from the project. The enhancements include funding a large scale lagoon restoration project, an endowment to maintain the inlets of Los Peñasquitos Lagoon and Batiquitos Lagoon, and preservation of some important upland parcels. In addition, providing longer bridges and wider channels at San Elijo, Batiquitos, and Buena Vista Lagoons would allow for greater tidal range, lower residence time, and carry greater fluvial flows to allow for better water quality in these lagoons.

LEDPA Identification

Permit and Coordination Summary

CWA Section 404 guidelines specify that a permit can be issued for a discharge of dredged or fill material to waters of the U.S. only if the discharge is determined to be the LEDPA (40 CFR §230.10 [a]). When a proposed project requires an individual permit for filling waters of the U.S., an analysis of alternatives must be completed. The LEDPA analysis is required for non-water dependent projects (essentially all surface transportation projects) that require filling of wetlands or other special aquatic sites; which are areas possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region. The LEDPA generally is the practicable alternative that either avoids waters of the U.S. or impacts the smallest area of waters.

No discharge of dredged or fill material shall be permitted if it: (a) causes or contributes to violations of any applicable State water quality standard; (b) jeopardizes the continued existence of species listed as endangered or threatened under the federal Endangered Species Act of 1973 (FESA), as amended, or results in the likelihood of the destruction or adverse modification of a habitat which is determined to be a critical habitat under the FESA; or (c) violates any requirement imposed to protect any marine sanctuary. Because a Section 404 permit can only be issued for the LEDPA, Section 404 compliance usually requires a more detailed and specific analysis of the aquatic impacts of each alternative.

The evaluation of alternatives must consider a reasonable range of options that could fulfill the project purpose and need with focus on projects that avoid or minimize fill, and the No Build alternative. Reasonable alternatives are those that "are practical or feasible from the technical and economic standpoint and use common sense, rather than simply desirable from the standpoint of the applicant." It may be presumed that there are upland alternatives available and that these upland sites are less environmentally damaging. An alternative with fewer impacts to aquatic resources than the Preferred Alternative may be eliminated by demonstrating that it has other overriding severe environmental impacts or does not answer project purpose and need.

As described in *Section 3.18.2*, the 404 MOU integration process requires checkpoints at three project milestones during ongoing coordination efforts. These checkpoints are:

- Purpose and need
- Identification of the range of alternatives (including consideration of the criteria used to select and analyze the range of alternatives to be studied)
- LEDPA determination and preparation of a Conceptual Mitigation Plan

The following federal and state permits and approvals would be required to implement the proposed action:

- Section 7 Consultation for Threatened and Endangered Species with USFWS
- Section 404 Permit for dredged and fill waters of the U.S. from the USACE
- Section 1602 Streambed Alteration Agreement with CDFW
- Section 401 Permit for Water Quality Certification

As described in *Section 5.4, NEPA – Section 404 Integration Process*, federal agency coordination began in 2004. FHWA and Caltrans sought and received concurrence for the project purpose and need and project alternatives from the USFWS, USACE, NOAA/NMFS, and USEPA. This coordination included CDFW (then California Department of Fish and Game), CCC, and RWQCB. These letters are located in *Chapter 5*.

After circulation of the Draft EIR/EIS and Supplemental Draft EIR/EIS, project planning continued; including additional extensive coordination with the resource agencies regarding potential project impacts and appropriate project minimization and mitigation. In letters to USFWS, USACE, NMFS, and USEPA dated April 29, 2013, Caltrans asked for concurrence on the selection of the refined 8+4 Buffer alternative as the preliminary Preferred Alternative and LEDPA. All four of the federal agencies concurred with Caltrans' selection: USFWS in a letter dated June 18, 2013; USEPA in a letter dated June 10, 2013; NMFS in a letter dated May 28, 2013; and USACE in a letter dated July 15, 2013.

Identification of the LEDPA

A full aquatic avoidance alternative is not possible. As described in *Section 1.4* and the "Wetlands Only Practicable Finding," below, the 2050 RTP and previous Major Investment Study (MIS)[1] state that the North Coast Corridor has limited transportation alternatives other than I-5. These alternative transportation modes are being reviewed and developed in separate environmental documentation. As shown in these studies, alternative transportation modes being evaluated as part of a multimodal solution to North Coast Corridor transportation shortfalls would not eliminate need for an improved I-5. Even with proposed full double-tracking of the rail line and increasing the number and capacity of the trains, the 2030 daily projection of riders is fewer than 30,000; substantially less than the projected increase over baseline conditions of 79,600 to 131,240 vehicles per day on I-5 North Coast Corridor segments under no build conditions. The arterial street system is also inadequate to provide a viable alternative to I-5, partially due to its disjointed and non-contiguous state. A new north-south transportation corridor was examined as part of SANDAG's NCTS; however, it was rejected due to substantial environmental impacts and community opposition.

As a result, the congestion analysis for I-5 within the North Coast Corridor identifies build alternatives as the only practicable alternatives to maintain or improve future traffic conditions when compared to existing conditions.

CWA Section 404(b)(1) analysis (located in Appendix M) shows compliance with the law. Because each of the build alternatives would result in some aquatic resource loss, the practicable alternative with the least damage to aquatic resources must be selected as the

[1] The goals of the MIS included provision of the full range of transportation modal alternatives that would: (1) promote and provide incentives for ridesharing and alternative modes, (2) accommodate regional and interregional freight movements, and (3) mitigate environmental impacts, among others.

LEDPA, unless that alternative has other significant adverse environmental consequences. The location of I–5 is fixed because this is an existing freeway and the freeway crosses several lagoons, creeks, and other drainages. There is, therefore, no way to avoid all wetland impacts. The focus was minimizing impacts to wetlands and other waters of the U.S. Recent focus has been on continued avoidance and minimization of impacts that would occur with project implementation.

Impacts associated with all the build alternatives would be mitigated. The least environmentally damaging of the analyzed alternatives would be the 8+4 Buffer alternative, especially with the design refinements described in this Final EIR/EIS. The refined 8+4 Buffer alternative also would have the fewest net permanent impacts (in number and acreage) on resources overall, including the fewest impacted ac of waters of the U.S. (11.61 ac for the Preferred Alternative v. up to 17.17 ac for the 10+4 Barrier alternative) and State wetlands (15.92 ac for the Preferred Alternative v. up to 23.03 ac for the 10+4 Barrier alternative).

3.18.4 Avoidance, Minimization, and/or Mitigation Measures

Impacts to wetlands have been minimized to the extent practicable through project design and identification of the refined 8+4 Buffer alternative as the Preferred Alternative. All impacts to wetlands could not be avoided, however, due to the existing alignment crossing six lagoons, other drainages, and a river. The following conservation measures are proposed to further minimize impacts to wetlands. Additional minimization measures and compensatory mitigation are discussed in *Section 3.17.3. The* complete suite of minimization and compensatory mitigation measures are also provided in the project Environmental Commitments Record ([ECR] located in Appendix D).

- Bioswales/detention basins would be placed in the loop ramps, and bioswales would be placed on slopes (i.e., not at base of slope within lagoons), as appropriate to treat runoff from the freeway.

Remaining impacts to waters of the U.S. and waters of the State would be mitigated on a corridor-wide basis through the proposed North Coast Corridor REMP and as described in the ECR.

Wetlands Only Practicable Finding

As noted in *Section 3.18.1,* the EO for the Protection of Wetlands (EO 11990) regulates the activities of federal agencies such that the FHWA cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds that: (1) there is no practicable alternative to the construction, and (2) the proposed project includes all practicable measures to minimize harm.

Identification of the need for improvements along this portion of I-5 has been the subject of rigorous review, as summarized in *Section 1.4.1* of this Final EIR/EIS. In brief, by the late 1980s, traffic congestion on I-5 became an issue of regional concern, and in the early 1990s, Caltrans conducted an operational study of I-5 from I-805 to Camp Pendleton to assess long-range highway needs to the year 2015. The geographic and population constraints on I-5, as well as nearby coastal rail facilities and parallel arterials, led transportation agencies to the conclusion that a corridor-level study was needed to address the long-range needs of this multimodal transportation corridor and that long-range planning would be likely to require multiple transportation options rather than focusing on a single form of transportation.

Between 1995 and 1997, Caltrans, SANDAG, and other stakeholders conducted scoping meetings; and from 1997 to 2000, Caltrans and SANDAG completed a number of studies summarized in the 2000 SANDAG North Coast Transportation Study (NCTS); in order to develop the MIS for the corridor, as prescribed by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. That study screened options for addressing transportation shortfalls and improving all forms of transportation from SR-52 in the northern portion of the City of San Diego to the Orange County line; including freeways, railways, freight movement, and other forms (such as monorail, ferry service, reversible car pool lanes, etc.). The MIS identified transportation deficiencies within the study area and recommended long-range improvements for highways, bus transit, passenger and freight rail, commuter rail transit, and arterials/roads to address corridor travel demands to the year 2020. The recommended highway program included HOV lanes for the length of the study area, along with general purpose lanes from Del Mar Heights Road to north of Oceanside. In addition, double-tracking the rail line was recommended to help provide an efficient commuting alternative to the freeway.

The North Coast Corridor has limited transportation alternatives other than I-5. The arterial street system is also inadequate to provide a viable alternative to I-5, and a new north-south transportation corridor examined as part of SANDAG's NCTS was rejected due to substantial environmental impacts and community opposition. Bridging all wetlands within the corridor is infeasible. Therefore, impacts to wetlands could not be avoided. As described in *Chapter 1* of this Final EIR/EIS, improvements to I-5 have been identified as necessary.

The build alternatives to improve existing I-5 that are addressed in this Final EIR/EIS were developed by a multi-disciplinary team to achieve the project purpose and need while avoiding or minimizing environmental impacts. The Preferred Alternative is identified as resulting in the smallest impact footprint of the evaluated build alternatives (see LEDPA discussion above). This smaller impact footprint incorporates both the narrowest bridge option, as well as lengthening of three lagoon bridges and increasing the channel cross sections (San Elijo, Batiquitos, and Buena Vista), which moves the north and/or south bridge abutments further from flow areas. Complete avoidance is not possible due to existing I-5 traversing the lagoons and drainages addressed in this section, combined with abutting land uses and the diminishing amount of improvement obtained relative to required additional costs for further lengthening.

Based on the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use.

3.19 Plant Species

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.19.1 Regulatory Setting

The USFWS and California Department of Fish and Wildlife (CDFW; previously California Department of Fish and Game) have regulatory responsibility for the protection of special-status plant species. "Special-status" species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are afforded varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or threatened under FESA and/or the California Endangered Species Act (CESA). Please see *Section 3.21, Threatened and Endangered Species,* in this document for detailed information regarding these species.

This section of the document discusses all the other special-status plant species, including CDFW species of special concern, USFWS candidate species, and California Native Plant Society (CNPS) rare and endangered plants.

The regulatory requirements for FESA can be found at USC 16, Section 1531, et seq. See also 50 CFR Part 402. The regulatory requirements for CESA can be found at California Fish and Game Code Section 2050, et seq. Caltrans projects are also subject to the Native Plant Protection Act, found at Fish and Game Code Section 1900-1913, and CEQA PRC Sections 2100-21177.

3.19.2 Affected Environment

This section is based upon the NES (June 2008), and Manchester Avenue / I-5 Interchange Project NES Report (January 2004), which are incorporated by reference. Sensitive plant species with the potential to occur in the BSA but that were not observed are described in the NES. The section below discusses sensitive plant species observed within the BSA; these species are shown on *Figures 3-19.1a* through *3-19.1f*.

Adolphia californica Wats — CNPS List 2
California adolphia
Rhamnaceae (buckthorn family)

The California adolphia is a deciduous shrub that occurs in chaparral, CSS, and in clay soils in valley and foothill grasslands. It flowers from December through April and is being affected by development and grazing. Adolphia was found on both sides of the slopes of I-5 near San Elijo Lagoon (*Figure 3-19.1d)*.

Atriplex pacifica Nelson — CNPS List 1B
south coast saltscale
Chenopodieae (goosefoot family)

South coast saltscale is a rare plant found in coastal southern California and the Channel Islands between 0 and 450 ft in elevation. This species occurs in coastal bluff scrub, playas, CSS, and coastal sand dunes. It is an annual herbaceous species that blooms from March through October. Approximately 100 individuals were observed along a dirt road northwest of the I-5 / Manchester Avenue Interchange (*Figure 3-19.1e*).

Ceanothus verrucosus Nutt. — CNPS List 2
Wart-stemmed ceanothus
Rhamnaceae (buckthorn family)

This species occurs in chaparral communities on dry hills and mesas to a maximum elevation of 1000 ft in Riverside and San Diego counties as well as in Baja California. It blooms from January to April. It is considered threatened by development. This species was found in southern maritime chaparral north and south of San Elijo Lagoon; it is also known from slopes between Del Mar Heights and San Dieguito and around Batiquitos Lagoon (*Figures 3-19.1b* and *3-19.1d*).

Centromadia parryi (E. Greene) spp. *australis* (Keck) B.G. Baldwin — CNPS List 1B
southern tarplant
Asteraceae (sunflower family)

Southern tarplant is a rare plant found on the margins of marshes, grasslands, and vernal pools. It blooms from May to November. This species is threatened by development. Southern tarplant occurs along the dirt access road east of I-5 and north of the San Dieguito River (*Figure 3-19.1c*).

Chaenactis glabriuscula DC var. *orcuttiana* (E. Greene) H.M. Hall — CNPS List 1B
Orcutt's pincushion
Asteraceae (sunflower family)

Orcutt's pincushion is a rare, annual herb that is found in coastal dunes and coastal bluff scrub between an elevation of 10 and 328 ft. This species occurs in coastal southern California and is threatened by coastal development. Approximately 4,700 individuals were observed within the BSA around San Elijo Lagoon on both sides of I-5 (*Figures 3-19.1d* and *3-19.1e).*

Comarostaphylis diversiloba (Parry) Greene ssp. *diversiloba* — CNPS List 1B
summer holly
Ericaceae (heath family)

Summer holly is an evergreen shrub found in chaparral communities from Orange County to Baja California. It flowers April through June. It is threatened by development and gravel mining. Summer holly was observed north of San Elijo Lagoon on the southbound slopes of I-5 (*Figure 3-19.1d*).

Coreopsis maritima (Nutt.) Hook.f — CNPS List 2
sea dahlia
Asteraceae (sunflower family)

Sea dahlia is a perennial herbaceous plant found in coastal bluff scrub and CSS in San Diego County and Baja California. This species is considered rare and threatened by coastal development. It flowers between March and May. Approximately 389 individual sea dahlia plants were observed in the BSA, primarily north of Manchester Avenue on both sides of I-5 (*Figures 3-19.1d* and *3-19.1e*).

Ferocactus viridescens (T. & G.) Britt. & Rose — CNPS List 2
coast barrel cactus
Cactaceae (cactus family)

The coast barrel cactus is found in chaparral, CSS, valley and foothill grasslands, and in areas around vernal pools. It is a stem succulent scrub that flowers from May through June. It is seriously threatened by urbanization, off-road vehicles, and horticultural collecting. Coast barrel cactus were found on the slopes northwest of the I-5 / Genesee Avenue Interchange, on the slopes on both sides of I-5 near San Elijo Lagoon, and west of I-5 on the northern slopes of Batiquitos Lagoon (*Figures 3-19.1a* and *3-19.1d* through *3-19.1f*).

Lessingia filaginifolia var. linifolia Hall — CNPS List 1B
Del Mar Mesa sand aster
Asteraceae (sunflower family)

This plant is endemic to San Diego County and is generally associated with CSS or chaparral on sandstone substrates. This species is found between Carlsbad and San Diego Bay on the coast. Del Mar sand aster was proposed for federal listing as threatened (58 Federal Register 51302), but the proposed rule was withdrawn based on information indicating that this species is no longer recognized as taxonomically distinct (61 Federal Register 52402). Regardless of the current taxonomic treatment, the CNPS still designates it as rare, threatened, or endangered. Over 2,000 individuals were observed within the BSA, between Del Mar Heights Road and Birmingham Drive Exit along the upper slopes on both sides of I-5 (*Figures 3-19.1c* through *3-19.1e*).

Pinus torreyana Carr. ssp. *torreyana* — CNPS List 1B
Torrey pine
Pinaceae (pine family)

The Torrey pine is an evergreen tree found in sandstone soils in coastal coniferous forest and chaparral communities in San Diego County. It is in cultivation; native plants probably number less than 9,000. It is threatened by development. There are planted Torrey pines along much of the I-5. Some of the Torrey pines near San Elijo Lagoon may be native occurrences (*Figure 3-19.1e*).

Quercus dumosa Nutt. CNPS List 1B
Nuttall's scrub oak
Fagaceae (oak family)

The species occurs sporadically in coastal chaparral and sage scrub communities with a relatively open canopy. This species is considered to have a limited number and is restricted to coastal California communities. Nuttall's scrub oak is considered rare within the region by the CNPS. In the BSA, several plants were observed at the top of the north and southbound slopes, just north of Del Mar Heights Road and on upper slopes near San Elijo Lagoon (*Figures 3-19.1b* through *3-19.1e*).

Suaeda esteroa W. Ferren & S. Whitmore CNPS List 1B
Estuary seablite
Chenodiaceae (goosefoot family)

Estuary seablite occurs from Santa Barbara County south to Baja California. It is found in coastal salt marshes and blooms from July through October. This species was found in the high salt marsh around San Dieguito, Batiquitos, and Agua Hedionda Lagoons.

3.19.3 Environmental Consequences

Each of the build alternatives would have similar impacts to sensitive plant species. Several individuals of different sensitive species listed by the CNPS and/or federal or State species of concern would be impacted by each of the build alternatives. Del Mar sand aster, Nuttall's scrub oak, Orcutt's pincushion, sea dahlia, wart-stemmed ceanothus, coast barrel cactus, southern tarplant, and Torrey pine would be impacted by each of the alternatives (*Table 3.19.1*).

Table 3.19.1: Sensitive Plant Species Impacted by Each Alternative

Species	10+4 Barrier	10+4 Buffer	8+4 Barrier	8+4 Buffer (Preferred Alternative)
Coast barrel cactus	16	7	16	7
Nuttall's scrub oak	7	7	7	5
Del Mar sand aster	763	704	704	694
Orcutt's pincushion	1312	1222	996	869
Sea dahlia	22	22	22	20
Southern tarplant	10	10	10	10
Torrey pine	10	10	10	10
Wart-stemmed ceanothus	10	4	4	4

Due to the varying amounts of fill and exact alignment of each alternative, the number of potentially impacted sensitive plants differs for each of the alternatives, not necessarily in reference to the amount of habitat potentially impacted. Other than large numbers of Del Mar sand aster and Orcutt's pincushion, there are few impacts to sensitive plants. The Torrey pines that would be impacted are planted within the right-of-way and are not naturally occurring. There would be no impacts to sensitive plants from the No Build alternative.

3.19.4 Avoidance, Minimization, and/or Mitigation Measures

Avoidance has been an ongoing design goal throughout project development, starting with the identification of four build alternatives of varying width. Since circulation of the Draft EIR/EIS, the smallest of the four build alternatives (the refined 8+4 Buffer alternative) has been identified as the LPA, as discussed in the August 2012 Supplemental Draft EIR/EIS. The refined 8+4 Buffer alternative has now also been identified as the Preferred Alternative. As the smallest of the potential build alternatives, minimization and avoidance of native plant species, as possible, would continue through final design.

As mitigation, seed would be collected or plants would be salvaged to the extent practicable in the impact areas. Salvaged plants and seed would be planted in mitigation sites, on revegetated new slopes, or in revegetated areas that were temporarily impacted. The majority of these species could potentially be salvaged or mitigated by planting in an off-site preserve. Del Mar sand aster seed was successfully collected for the Del Mar Auxiliary Lane project and reseeded on the mitigation site.

The REMP detailed in *Section 3.17* would be implemented to mitigate for impacts to sensitive habitats, plants, and wildlife. The REMP has been developed to identify compensatory mitigation opportunities to address these unavoidable impacts, and to implement projects that benefit existing natural resources that exceed standard ratio-based compensatory mitigation programs. Additional avoidance and minimization measures for listed species are provided in *Section 3.21*. The full suite of measures is also provided in the project ECR.

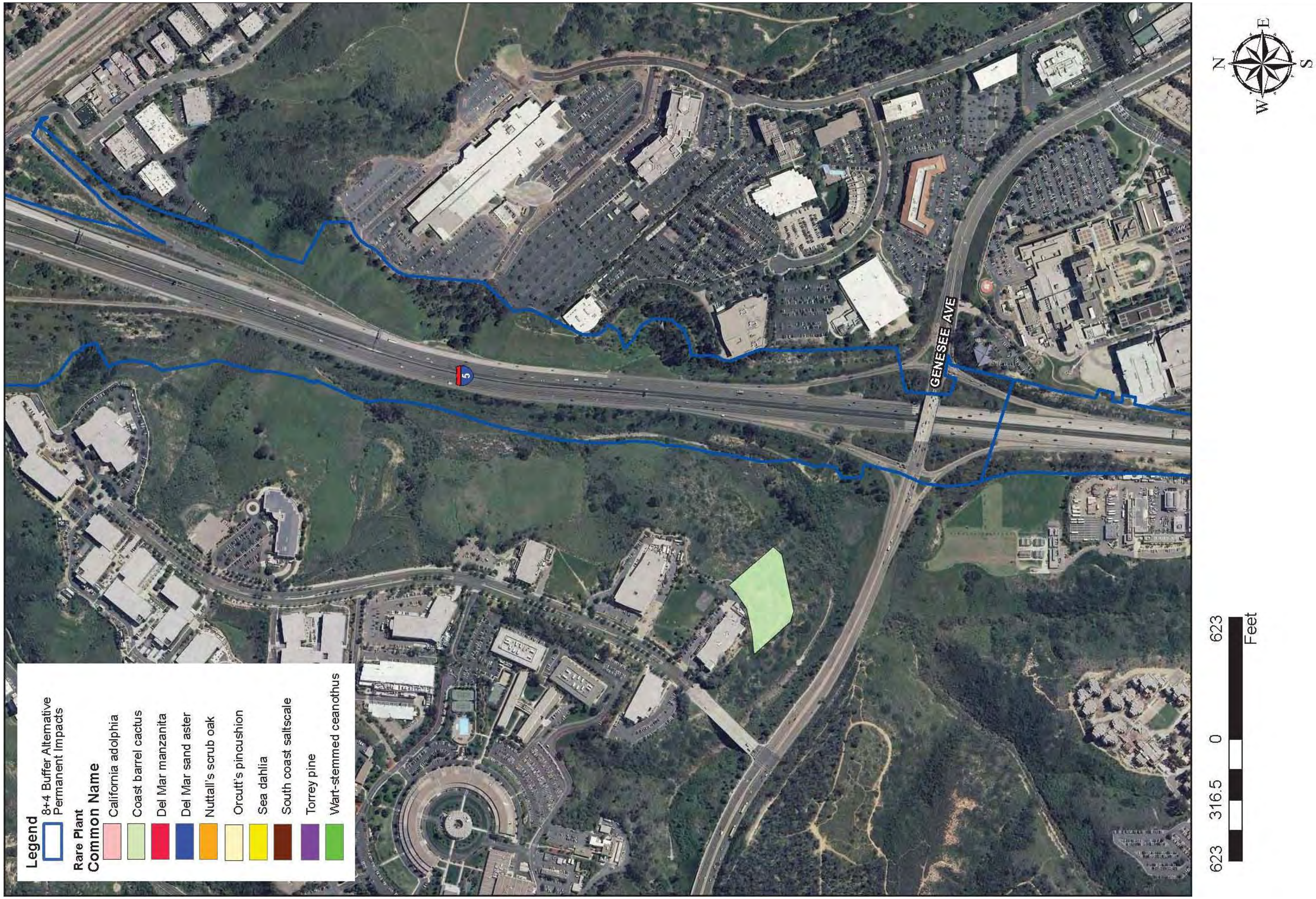


Figure 3-19.1a: Sensitive Plant Locations

Figure 3-19.1b: Sensitive Plant Locations

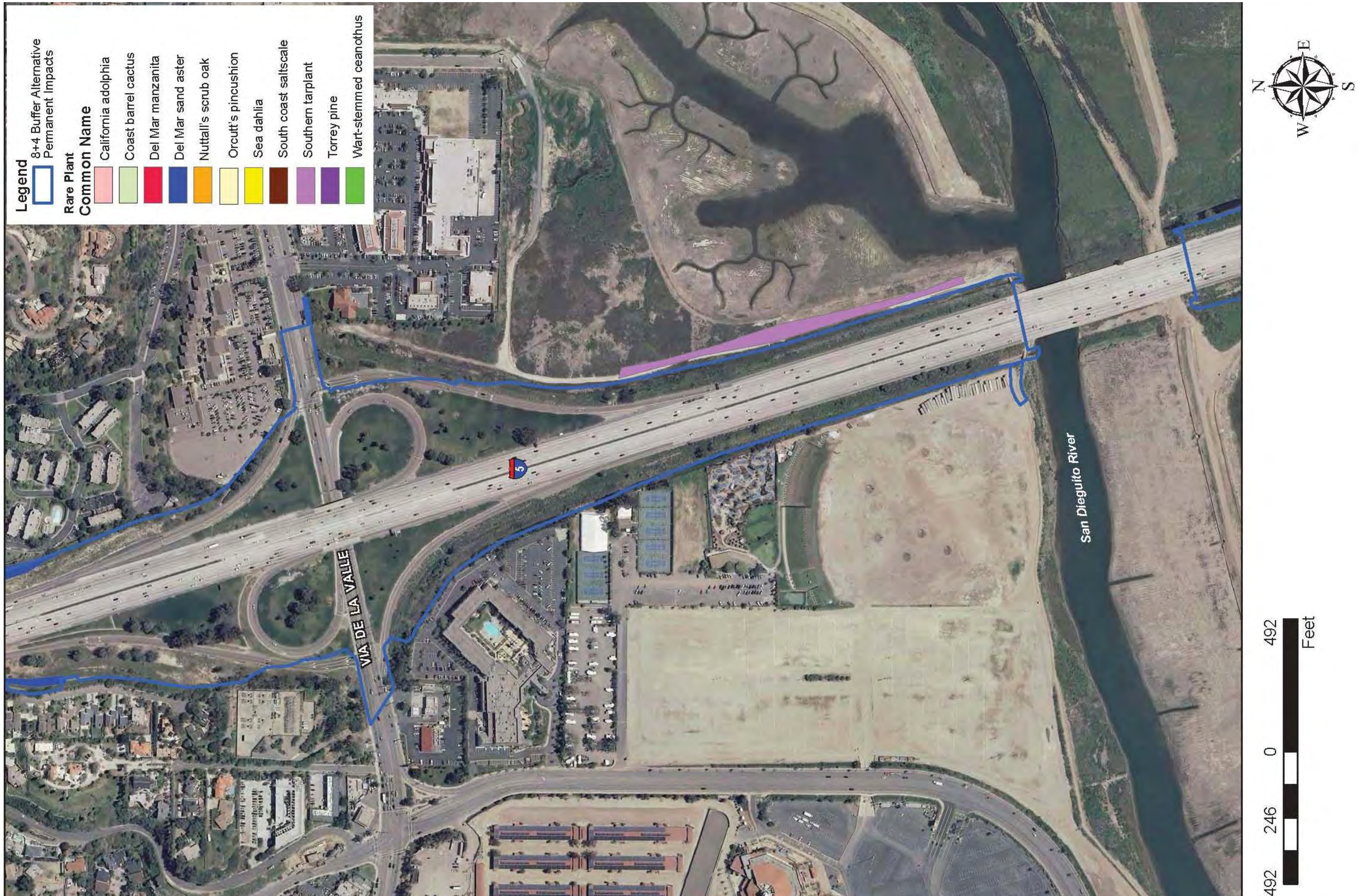


Figure 3-19.1c: Sensitive Plant Locations

Figure 3-19.1d: Sensitive Plant Locations

Figure 3-19.1e: Sensitive Plant Locations

Figure 3-19.1f: Sensitive Plant Locations

3.20 Animal Species

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.20.1 Regulatory Setting

Many State and federal laws regulate impacts to wildlife. The USFWS, National Oceanic and Atmospheric Administration (NOAA), and the California Department of Fish and Wildlife (CDFW; previously California Department of Fish and Game) are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with animals not listed or proposed for listing under CESA or FESA. Species listed or proposed for listing as threatened or endangered are discussed in *Section 3.21, Threatened and Endangered Species*. All other special-status animal species are discussed here, including CDFW fully protected species and species of special concern, and USFWS or NOAA Fisheries Service candidate species.

Federal laws and regulations pertaining to wildlife include the following:

- National Environmental Policy Act
- Migratory Bird Treaty Act
- Fish and Wildlife Coordination Act
- Marine Mammal Protection Act
- Magnuson-Stevens Fishery Conservation and Management Act

State laws and regulations pertaining to wildlife include the following:

- California Environmental Quality Act
- Sections 1601 – 1603 of the California Fish and Game Code
- Section 4150 and 4152 of the California Fish and Game Code
- Section 3511 of the California Fish and Game Code

The Magnuson-Stevens Fishery Conservation and Management Act of 1976, was established to conserve and manage fishery resources found off the coast, as well as anadromous species and Continental Shelf fishery resources of the United States, by exercising (a) sovereign rights for the purposes of exploring, exploiting, conserving, and managing all fish within the exclusive economic zone established by Presidential Proclamation 5030, dated March 10, 1983, and (b) exclusive fishery management authority beyond the exclusive economic zone over such anadromous species, Continental Shelf fishery resources, and fishery resources in special areas.

Essential Fish Habitat (EFH) is identified in the Magnuson-Stevens Fishery Conservation and Management Act as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." EFH has been identified for four groups of fish: Pacific salmon, Pacific groundfish, coastal pelagic species, and highly migratory species. The Pacific salmon group does not include southern steelhead trout (*Oncorhynchus mykiss*), which is protected and addressed in *Section 3.21*. Pacific groundfish and the coastal pelagic group both have EFH within the I-5 BSA. The Pacific groundfish group includes 82 bottom-dwelling species that may occur within some of the coastal lagoons. The coastal pelagic species group includes northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinops sagax*), Pacific mackerel (*Scomber japonicus*), and jack mackerel (*Trachurus symmetricus*).

3.20.2 Affected Environment

This section is based upon the NES (June 2008), Manchester Avenue / I-5 Interchange Project NES Report (January 2004); I-5 Widening Project Pacific Pocket Mouse Habitat Analysis and Trapping Program, San Diego County, California (June 2003), I-5 Lagoons Marine Resource Investigation (June 2006); and Presence/Absence Surveys for Wandering Skipper (September 2012), which are incorporated by reference. Sensitive animal species with the potential to occur in the BSA, but that were not observed, are described in the NES. This section discusses sensitive wildlife species observed within the BSA (see *Table 3.20.1*); these species are shown on *Figures 3-20.1a* through *3-20.1g,* located at the end of this section.

Due to the length of the project and the fact that it crosses six lagoons and a major river, a large number of sensitive non-listed wildlife species were observed within the BSA. Many of the bird species that stop at the lagoons during their migration have some sensitivity status, primarily in their breeding grounds, and virtually all species of birds observed in the BSA are considered migratory.

Focused presence/absence surveys for the wandering skipper butterfly (*Panoquina errans*), a species considered sensitive under the Multiple Habitat Conservation Program (MHCP), were completed in summer 2012 at the request of the USFWS. Wandering skipper were detected at San Dieguito, San Elijo, Batiquitos, and Buena Vista Lagoons within the BSA.

The white-tailed kite (*Elanus caeruleus*), a California Fully Protected (CFP) Species and State Species of Special Concern (SSC), was occasionally observed foraging over the BSA, usually over the agricultural fields. No nest sites were observed or are known to exist within the BSA.

Not all sightings were mapped, such as herons, egrets, and many raptors that were commonly observed in the BSA (*Figures 3-20.1a* through *3-20.1g*). Most of these species were found in and around the lagoon and associated upland habitats.

3.20.3 Environmental Consequences

Many of the sensitive animal species observed within the lagoons and upland habitats likely occur more frequently than observed. Any impacts to CSS, southern maritime chaparral, and/or maritime succulent scrub have the potential to impact the San Diego horned lizard (*Phrynosoma coronatum blainvillei)*, Coronado Island skink (*Eumeces skiltonianus interparietalis)*, orange-throated whiptail (*Cnemidophorus hyperythrus)*, rufous-crowned sparrow (*Aimophila ruficeps canescens)*, raptors, loggerhead shrike (*Lanius ludovicianus)*, desert woodrat (*Neotoma lepida intermedia)*, and San Diego pocket mouse (*Perognathus fallax fallax)*. The point location where the rufous-crowned sparrow was observed falls within the permanent impact footprint for all four build alternatives. Two locations of San Diego pocket mouse near San Elijo Lagoon would be impacted by all of the build alternatives.

The least bittern was observed in the drainage parallel to I-5 near San Dieguito Lagoon. This area is within the permanent impact footprint for all four build alternatives.

Many bird species that migrate along the Pacific flyway use the lagoons to stop over and forage. Several of these bird species are considered sensitive at their breeding grounds, but not necessarily along their migration routes, including the white pelican, long-billed curlew, and double crested cormorant. Construction for any of the I-5 build alternatives would result in an incremental loss of foraging habitat along the freeways; however, it would not impact these birds' nesting grounds.

Wandering skipper were identified within the permanent and temporary impact areas along the edge of salt marsh at San Dieguito, San Elijo, Batiquitos, and Buena Vista Lagoons. Construction of any of the alternatives would impact a portion of the habitat they occupy in these lagoons.

Although no bat species were observed or detected within the project limits, there is a potential that some species may sporadically use the lagoon bridges.

Several projects that may go forward under the No Build alternative may have impacts to habitats that may support some of these sensitive animal species.

Table 3.20.1: Sensitive Animal Species Observed within the Study Area

Scientific Name	Common Name	Status	General Habitat Description	Rationale
Panoquina errans	Wandering skipper butterfly	MHCP	Salt marsh habitat with tidal flows and saltgrass	A few individuals were observed at San Dieguito, San Elijo, Batiquitos, and Buena Vista Lagoons
Phrynosoma coronatum blainvillei	San Diego horned lizard	SSC	Prefers friable, rocky, or shallow sandy soils in CSS, and chaparral in arid and semi-arid climates.	At least one individual caught near Del Mar Heights Road during small mammal trapping. More likely to occur within the BSA.
Eumeces skiltonianus interparietalis	Coronado Island skink	SSC	Prefers mesic pockets within habitats including CSS, chaparral, oak woodlands, pinon-juniper, and riparian woodlands.	At least one individual observed at southern end of BSA near the 5/805 merge. Others potentially throughout the BSA.
Cnemidophorus hyperythrus	Orange-throated whiptail	SSC, SP	Prefers washes and other sandy areas with patches of brush and rocks for cover. Habitats include low-elevation CSS, chaparral, and valley-foothill hardwood forests.	Observed during general wildlife surveys in CSS.
Thamnophis hammondii	Two-striped garter snake	SSC	Occurs in or near permanent fresh water, usually along streams with rocky beds bordered by willow and other riparian vegetation.	Observed during general wildlife surveys near San Dieguito River.

Table 3.20.1 (cont.): Sensitive Animal Species Observed within the Study Area

Scientific Name	**Common Name**	**Status**	**General Habitat Description**	**Rationale**
Pelecanus erythrorhynchos	American white pelican	SSC	Inhabits lakes, ponds, and coastal waters.	Observed in San Elijo, Batiquitos, and Buena Vista lagoons during general wildlife surveys.
Phalacrocorax auritus	Double-crested cormorant	SSC	Found near fresh and saltwater near coastline, inshore waters, beaches, inland rivers, and lakes.	Observed in lagoons during general wildlife surveys.
Ixobrychus exilis	Least bittern	SSC	Inhabits fresh and brackish water marshes, usually near open water sources, and desert riparian habitats.	Observed in San Dieguito and in San Elijo Lagoons.
Ardea herodias	Great blue heron	SSC	Found in fresh and saltwater emergent wetlands and estuaries. Less common along rivers, in croplands, pastures, and foothill ponds.	Observed in lagoons during general wildlife surveys. Some nesting habitat may be present at San Elijo Lagoon.
Casmerodius albus	Great egret	SSC	Common to freshwater and saltwater marshes, swampy woods, ponds, lagoons, estuaries, mangroves, streams, lakes, and ponds.	Observed in lagoons during general wildlife surveys.
Pandion haliaetus	Osprey	SSC	Prefers the coast and lakes in the coastal lowlands and rarely lakes in the foothills and mountain areas.	Observed at Batiquitos and San Dieguito lagoons.
Elanus leucurus majusculus	White-tailed kite	FP	Inhabits riparian or oak woodland adjacent to grassland or open fields where it hunts rodents.	Observed at San Dieguito and San Elijo lagoons during general wildlife surveys.
Circus cyaneus	Northern harrier	SSC	Occurs throughout San Diego County in grasslands and agricultural fields during migration and in winter.	Observed at San Dieguito Lagoon.
Accipiter striatus	Sharp-shinned hawk	SSC	Occupies woodlands and a variety of habitats surrounding those wooded areas, and requires a certain amount of dense cover.	Observed during general wildlife surveys.
Accipiter cooperii	Cooper's hawk	SSC	Uncommon migrant and winter visitor to woodlands, parks, and residential areas.	Observed during general wildlife surveys.
Numenius americanus	Long-billed curlew	SSC	Can be found on sandy beaches on marine and estuarine shores, salt pond levees, and the shores of large alkali lakes. Requires sandy or gravelly soils for nesting.	Observed feeding in mudflats within the lagoons during general wildlife surveys.

Table 3.20.1 (cont.): Sensitive Animal Species Observed within the Study Area

Scientific Name	Common Name	Status	General Habitat Description	Rationale
Eremophila alpestris actia	California horned lark	SSC	Inhabits sandy ocean or bay shores, grasslands, and open scrublands and woodlands with low, sparse vegetation.	Present on revegetating slopes of the new auxiliary lane on the NB side of I-5, south of San Dieguito River.
Lanius ludovicianus	Loggerhead shrike	FSC, SSC	Inhabits agricultural lands, desert wash, desert scrub, grasslands, and beaches with scattered bushes. Requires open ground for foraging, preferably near scattered bushes and low trees that provide nest sites and perches.	Observed at the Racetrack View Mitigation Site west of I-5. High probability to occur in other areas based on historical location data and presence of suitable habitat within the BSA.
Dendroica petechia	Yellow warbler	SSC	Occupies marshes, swamps, streamside groves, willow and alder thickets, open woodlands with thickets, and orchards.	Observed during general wildlife surveys in riparian areas.
Aimophila ruficeps canescens	Southern California rufous-crowned sparrow	SSC	Uncommon to fairly common localized resident of sage scrub on steep rocky slopes.	Observed during general wildlife surveys at San Dieguito Lagoon.
Perognathus fallax fallax	Northwestern San Diego pocket mouse	SSC	Habitats include CSS, chaparral, oak woodlands, and annual grasslands.	Captured during trapping studies on the slopes south of San Dieguito Lagoon, and around San Elijo Lagoon.
Neotoma lepida intermedia	San Diego desert woodrat	SSC	Occupies rocky habitats in association with chaparral and CSS.	Captured during trapping studies south of San Dieguito Lagoon.

[1]**Status Key**
FSC Federal Species of Concern
FP State of California fully protected
SP State of California protected
SSC State of California Species of Concern
MHCP Multiple Habitat Conservation Plan

Essential Fish Habitat

The Pacific groundfish Fishery Management Plan covers over 82 species of bottom-dwelling fish such as rockfish, flatfish, sole, and skate. EFH for Pacific groundfish is defined as water and substrate along the entire Pacific coast line that is less than or equal to 11480 ft deep shoreward to the mean higher high water (MHHW) line. The coastal lagoons fall within this range. Therefore, Pacific groundfish have a potential to occur in San Dieguito, San Elijo, Batiquitos, Agua Hedionda Lagoons, and possibly the San Luis Rey River within the Study Area. These groundfish species also may inhabit Los Peñasquitos Lagoon; however, saltwater influence does not reach I-5 and project impacts on this lagoon would only be indirect. Pacific groundfish may occur within any of the deeper waters of the lagoons within the project area.

The coastal pelagic species group includes northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinops sagax*), Pacific mackerel (*Scomber japonicus*), and jack mackerel (*Trachurus symmetricus*). Although not captured during eelgrass and fish sampling in the lagoons, northern anchovy, Pacific sardine, and jack mackerel have a potential to occur in San Dieguito, San Elijo, Batiquitos, and Agua Hedionda Lagoons, and possibly the San Luis Rey River within the project area. These coastal pelagic species also may inhabit Los Peñasquitos Lagoon. As noted above, saltwater influence does not reach I-5 and project impacts on this lagoon would only be indirect. Coastal pelagic fish species are most likely to occur in the open water at Batiquitos and Agua Hedionda Lagoons, which are continuously open to the ocean.

The open water in all these lagoons, and potentially in the San Luis Rey River, provides EFH. Replacement and construction of the bridges in these lagoons and river may adversely affect EFH. The construction of new bridge pilings, fill placed along the abutments, and demolition of the bridges to be replaced could have direct impacts to EFH. Shading by the wider bridges and increased runoff from the wider roadway could have indirect impacts to the EFH. During construction of the bridges, falsework and some kind of work platform may be used which could have a temporary impact to the EFH. All four build alternatives would have an impact to the EFH. Conservation measures to minimize these impacts are discussed below. Lengthening the bridges at San Elijo and Batiquitos Lagoons would increase EFH near the bridges and would also allow for increased tidal range and fluvial transport, and decreased residence times, which would benefit EFH.

Caltrans has coordinated with NOAA/NMFS on EFH. An assessment of impacts to EFH pursuant to the Magnuson-Stevens Fishery Conservation and Management Act was sent to the NMFS on October 24, 2012. An initial response provided on December 12 opened a dialogue, with Caltrans providing additional information on January 3, 2013. The information provided on January 3, 2013 satisfied the EFH consultation requirement by adequately incorporating NMFS EFH conservation recommendations. See also *Chapter 5* of this Final EIR/EIS.

3.20.4 Avoidance, Minimization, and/or Mitigation Measures

Avoidance has been an ongoing design goal throughout project development, starting with the identification of four build alternatives of varying width. Since circulation of the Draft EIR/EIS, the smallest of the four build alternatives (the refined 8+4 Buffer alternative) was identified as the LPA in the August 2012 Supplemental Draft EIR/EIS and has now also been identified as the Preferred Alternative. As the smallest of the potential build alternatives, efforts at minimization and avoidance of native animal species, as possible, would continue through final design.

Conservation measures and compensatory mitigation for impacts to sensitive wildlife and habitats, including birds, EFH, and ESAs, are discussed in *Section 3.17.3*. *Section 3.17.3* includes measures that specify timing for vegetation removal relative to nesting birds and restrictions on permanent project lighting, which would minimize effects to sensitive birds. Measures listed in *Section 3.17.3* concerning minimizing sediment entering the lagoon and habitat protection would minimize effects to EFH. *Section 3.21* provides measures to minimize effects to sensitive fish species during construction, including pre-construction relocation requirements for tidewater goby, noise reduction measures, maintaining a channel for fish movement in the lagoons and San Luis Rey River, and appointment of a USFWS-approved Biological Monitor to address protection of sensitive species. As also specified in *Section 3.21*, permanent and temporary impacts to gnatcatchers, rails, gobies, manzanita, and critical habitat for the gnatcatcher and goby resulting from the *I-5 NCC Project* would be offset through habitat establishment, restoration, and preservation/enhancement.

In addition to these measures, the REMP (detailed in *Section 3.17*) has been developed to identify compensatory mitigation opportunities to address unavoidable impacts to sensitive habitats, plants, and wildlife, and to implement projects that benefit existing natural resources that exceed standard ratio-based compensatory mitigation programs.

The following are proposed measures to avoid or minimize project-related impacts to sensitive animal species. A full listing of minimization and compensatory mitigation measures is provided in the project ECR.

- To minimize impacts to migratory birds, construction would not occur in more than two lagoons at any one time.

- Exclusion devices would be installed on bridge drain holes and ledges during the non-breeding season (September 1 through February 15) to stop swallows, swifts, and any other birds or bats from nesting on or within bridges to be demolished.

- Erosion and sediment control devices used for the proposed project, including fiber rolls and bonded fiber matrix, would be made from biodegradable materials such as jute, with no plastic mesh, to avoid creating a wildlife entanglement hazard.

- Cationic polymers will not be used for dust control (cationic polymers are attracted to the hemoglobin in fish gills and can cause suffocation at relatively low concentrations).

- Project personnel would be prohibited from bringing domestic pets to construction sites to ensure that domestic pets do not disturb or depredate wildlife in adjacent habitats.

- Eelgrass surveys would be completed at all lagoons with the exception of Buena Vista prior to bridge construction. In lagoons where eelgrass is identified in proximity to I-5 improvements, eelgrass surveys would continue during and after construction, and mitigation would be implemented in accordance with the Resource Enhancement and Mitigation Program (REMP; referred to as the Resource Enhancement Program [REP] in the Supplemental Draft EIR/EIS; included as Appendix P).

- *Caulerpa* surveys would be completed before and after construction at each of the lagoons to ensure there is no infestation within the project limits. If *Caulerpa* is found, measures would be implemented to eradicate it from the area.

Figure 3-20.1a: Sensitive Wildlife Locations

Figure 3-20.1b: Sensitive Wildlife Locations

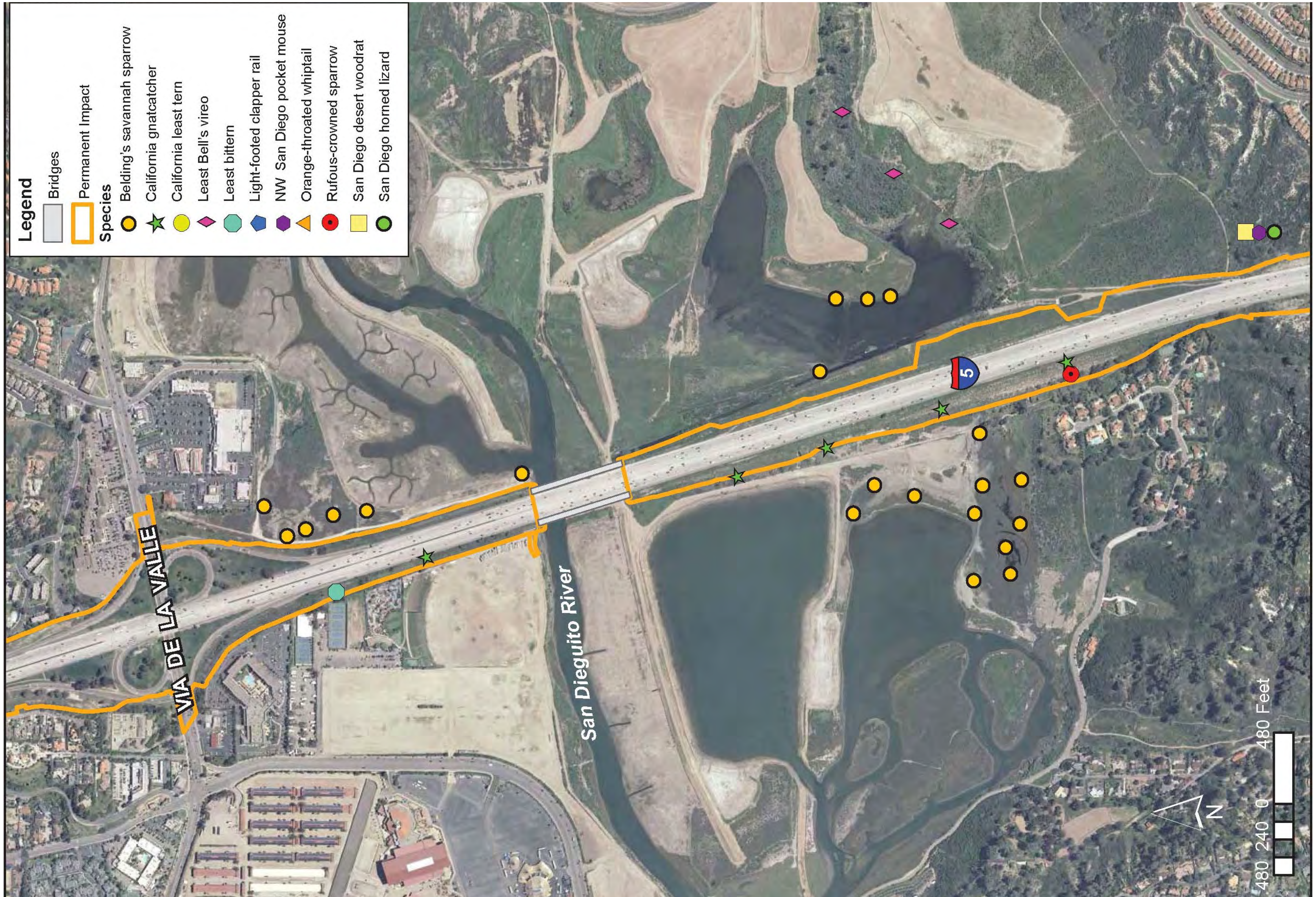


Figure 3-20.1c: Sensitive Wildlife Locations

Figure 3-20.1d: Sensitive Wildlife Locations

Figure 3-20.1e: Sensitive Wildlife Locations

Figure 3-20.1f: Sensitive Wildlife Locations

Figure 3-20.1g: Sensitive Wildlife Locations

3.21 Threatened and Endangered Species

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.21.1 Regulatory Setting

The primary federal law protecting threatened and endangered species is FESA: 16 USC, Section 1531, et seq. See also 50 CFR Part 402. This act and subsequent amendments provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of this act, federal agencies, such as the FHWA, are required to consult with the USFWS and the NOAA/National Marine Fisheries Service (NMFS) to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of formal consultation under Section 7 may include a Biological Opinion with an Incidental Take statement, a Letter of Concurrence, and/or documentation of a no effect finding. Section 3 of FESA defines take as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or any attempt at such conduct.”

California has enacted a similar law at the State level, CESA, California Fish and Game Code, Section 2050, et seq. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate planning to offset project caused losses of listed species populations and their essential habitats. The CDFW is the agency responsible for implementing CESA. Section 2081 of the Fish and Game Code prohibits “take” of any species determined to be an endangered species or a threatened species. Take is defined in Section 86 of the Fish and Game Code as “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.” CESA allows for take incidental to otherwise lawful development projects; for these actions an incidental take permit is issued by CDFW. For projects listed under both FESA and CESA requiring a Biological Opinion under Section 7 of FESA, CDFW may also authorize impacts to CESA species by issuing a Consistency Determination under Section 2080.1 of the Fish and Game Code.

3.21.2 Affected Environment

The section is based upon the NES (June 2008), Manchester Avenue / Interstate 5 Interchange Project NES Report (January 2004); I-5 Widening Project Pacific Pocket Mouse Habitat Analysis and Trapping Program San Diego County, California (June 2003); I-5 Lagoons Marine Resource Investigation (June 2006); and the Noise Report for Sensitive Wildlife Receptors within the I-5 NCC Project *(*September 2006), which are incorporated by reference. The section below discusses listed threatened and endangered species observed within the BSA. These species are shown on *Figures 3-20.1a* through *3-20.1g.*

Arctostaphylos glandulosa ssp. Crassifolia FE
Del Mar manzanita CNPS List 1B
Ericaeae (heath family)

This plant is restricted to San Diego County and northern Baja California. This species is a fire-adapted shrub restricted to sandstone terraces and bluffs, and is associated with a subtype of chaparral known as southern maritime chaparral. About 25 populations exist in San Diego County, including nearby areas at Del Mar and the Torrey Pines State Reserve. The Del Mar manzanita is a federally listed endangered species and is considered endangered by the CNPS. In the BSA, approximately 70 plants were observed at the top of the slopes on both sides of I-5, just north of Del Mar Heights Road to Birmingham Drive (*Figures 3-19.1b* and *3-19.1e*).

Acanothomintha ilicifolia FE/SE
San Diego thornmint CNPS List 1B
Lamiaceae (mint family)

The San Diego thorn-mint is a small annual herb found in broken clay soils within grassy openings in chaparral, coastal sage scrub, and vernal pool communities in San Diego County and northern Baja California (Reiser 1994). This species flowers from April to May. The microhabitat associated with this species is quite distinctive and was not detected during surveys. It is, therefore, unlikely that this species occurs in the vicinity of the project. None was seen during surveys for this report. No impacts to this species are anticipated.

Ambrosia pumilla FE
San Diego ambrosia CNPS List 1B
Asteraceae (sunflower family)

The San Diego ambrosia is a rhizomatous perennial herb that flowers June through September. This species is federally listed as endangered. It is found in chaparral, coastal scrub, valley and foothill grassland, and vernal pool communities in coastal San Diego County, western Riverside County, and northern Baja California. It is often found in disturbed areas within these communities. Many occurrences within the San Diego County have been extirpated. This species is seriously threatened by development. No San Diego ambrosia was observed during any surveys conducted for the I-5 project, and there are no locations recorded in the California Natural Diversity Database (CNDDB) within the BSA. The closest recorded occurrence of this species is 2.5 mi east of I-5 along SR-76.

Baccharis vanessae FT/SE
Encinitas baccharis CNPS List 1B
Asteraceae (sunflower family)

Encinitas baccharis is a perennial, broom-like, and dioecious shrub. This species is endemic to San Diego County, occurring locally in chaparral along the coast from Encinitas to Mira Mesa. This species is federally listed as threatened and State listed as endangered. This species was not observed and would have been identified if it occurred within the project area. The closest known occurrence is approximately 1230 ft east of I-5 near Encinitas Boulevard.

Brodiaea filifolia FT/SE
thread-leaved brodiaea CNPS List 1B
Liliaceae (lily family)

The thread-leaved brodiaea is a bulbiferous perennial herb found in CSS, cismontane woodland, valley and foothill grasslands, and in clay soils in vernal pools. This species is federally listed as threatened and State listed as endangered. It is seriously threatened by residential development, agriculture and vehicles damaging plants. No thread-leaved brodiaea were observed during surveys conducted for the project. The closest known location is approximately 1.86 mi east of I-5 near SR-78.

Chorizanthe orcuttiana Parryi FE/SE
Orcutt's spineflower CNPS List 1B
Polygonaceae (buckwheat family)

Orcutt's spineflower is an annual herb found in chaparral, coastal coniferous forest, and coastal scrub communities from Del Mar to Point Loma, San Diego County (Hickman 1993). It flowers March through April. Most historical habitat has been urbanized. The last known habitat has been developed. The known extant populations are at Oak Crest Park in Encinitas and at Point Loma. This species was not observed during surveys and habitats within the project limits are likely too disturbed to support this species. Therefore, this species is not expected to occur within the project limits.

Chloropyron maritimum FE/SE
salt marsh bird's beak CNPS List 1B
Orobanchaceae (orobanche family)

Salt marsh bird's beak is a federal and State listed endangered species. It is a hemiparasitic plant that uses saltgrass as its primary host plant. This species occurs in saltmarsh and dunes habitat in southern California. This species was not observed during any of the surveys of the project limits. Salt marsh bird's beak is not known to occur in San Diego County north of the San Diego River (CNDDB 2012). This species is not expected to occur within the project limits.

Eryngium aristulatum var. parishii FE/SE
San Diego button celery CNPS List 1B
Apiaceae (carrot family)

San Diego button-celery is an herbaceous annual or perennial plant. This species is federally listed as endangered and is State listed as endangered. This taxon is associated with clay bottom vernal pools. San Diego button-celery is found in Riverside and San Diego Counties, and in Baja California, Mexico. In San Diego County, the species is found on Camp Pendleton, Carlsbad, San Marcos, Miramar Naval Air Station, Clairemont Mesa, and Otay Mesa. There are no vernal pools in the BSA; therefore, the San Diego button celery is not expected to occur within the project limits.

Hazardia orcuttii (Gray) Greene — Candidate/FT
Orcutt's hazardia — CNPS List 1B
Asteraceae (sunflower family)

Orcutt's hazardia is an evergreen shrub found in chaparral and coastal scrub communities. It flowers August through October. It is known from only one occurrence in California, from Lux Canyon in San Diego County. This species was not observed during surveys and would have been identified if it occurred within the project area.

Monardella linoides ssp. *viminea* (Greene) Abrams — FE/SE
Willowy monardella — CNPS List 1B
Lamiaceae (mint family)

The willowy monardella is a perennial herb that inhabits coastal coniferous forest, chaparral, riparian forest, riparian scrub, and riparian woodland communities. It flowers June through August. It is threatened by road improvements, vehicles, non-native plants, and urbanization. This species was not observed during surveys and would have been identified if it occurred within the project area.

Navarretia fossalis — FT
Spreading navarretia — CNPS List 1B
Polemoniaceae (phlox family)

Spreading navarretia is federally listed as threatened and is considered rare by the CNPS. It is a spring-blooming annual plant (April through June). This species typically occurs below 1475 ft in elevation. It is primarily found in vernal pools, although it occasionally occurs in ditches or other artificial depressions. Spreading navarretia occurs in western Riverside and southwestern San Diego Counties and in northwestern Baja California, Mexico. Historically, spreading navarretia occurred in relatively few of the San Diego County vernal pools. In San Diego County, this species is found in Carlsbad, San Marcos, Ramona, and Otay Mesa. It is not expected to occur in the BSA due to a lack of suitable habitat.

Orcuttia californica Vasey — FE/SE
California Orcutt grass — CNPS List 1B
Poaceae (grass family)

California Orcutt grass is federally and state endangered. It is found in vernal pools and slump ponds of the coastal mesas (Beauchamp, 1986). It can be found in Los Angeles, Riverside, and San Diego County, as well as in Baja California, Mexico. It was not observed during surveys. It is not expected to occur in the project area due to a lack of suitable habitat.

Phacelia stellaris — Candidate/--
Brand's phacelia — CNPS List 1B
Boraginaceae (borage family)

Brand's phacelia is a small annual herb that grows in coastal dunes and in coastal sage scrub. This species is a candidate for federal listing. Extant populations are known from near the border fence with Mexico and from the Silver Strand in Imperial Beach. There are no known extant occurrences north of Imperial Beach in San Diego County. This species was not observed during surveys for the project. This species is not expected to occur within the project limits.

Pogogyne abramsii FE/SE
San Diego mesa mint CNPS List 1B
Lamiaceae (mint family)

San Diego mesa mint is an annual aromatic herb in the mint family. This species is federally listed as endangered and is State listed as endangered. San Diego mesa mint is endemic to San Diego County. This spring-blooming (April-June) annual plant is restricted to vernal pools on mesa tops. Its distribution is centered on the mesas north of San Diego, including Miramar Naval Air Station, Tierrasanta, and Kearny Mesa. San Diego mesa mint is not expected to occur in the BSA due to a lack of suitable habitat.

Pacific pocket mouse FE/SSC
Perognathus longimembris pacificus

The Pacific pocket mouse is a federal endangered species and a CDFW species of special concern. The Pacific pocket mouse is the smallest subspecies of the little pocket mouse (*Perognathus longimembris*) and one of the smallest rodents in the world. Its length from nose to tail can be up to 5.24 in and it weighs 0.25 to 0.32 ounces. The Pacific pocket mouse is mostly brown (various shades of), free from bristles or spines, and whitish below. Body color varies within geographical locations. It is an endemic species to the southern California coast from Los Angeles County to near the Mexico-San Diego border. Its habitat requirements are fine-grain and sandy substrates in CSS; however, in San Diego County they have also been found in open patches of ground surrounded by weeds.

Protocol live-trapping for the Pacific pocket mouse conducted for five nights was completed in five locations within the highest quality habitat near the San Dieguito and San Elijo Lagoons in 2003. No pocket mice were caught during the trapping effort. No pocket mice are expected to occur within the project limits.

Light-footed clapper rail FE/SE and CFP
Rallus longirostris levipes

The light-footed clapper rail occurred historically along the southern California coast from Santa Barbara County south to San Quintin, Baja California. Populations have declined due to limited distribution and destruction/degradation of coastal salt marsh habitat. About 253 pairs were reported in 2000, 90 percent of these were reported in just three wetland areas: Anaheim Bay and Newport Bay (Orange County) and Tijuana Estuary (San Diego County). Light-footed clapper rails are typically found in salt marshes dominated by cordgrass, but they also can be found in habitats dominated by cattail (*Typha* spp.) and sedges (*Scirpus* spp.). Nesting occurs from mid-March to the beginning of July.

Focused surveys for the light-footed clapper rail were completed along the San Luis Rey River, Buena Vista Lagoon, Batiquitos Lagoon, San Elijo Lagoon, and San Dieguito Lagoon in 2003, and in Los Peñasquitos Lagoon in 2004 within 500 ft of the existing I-5. Light-footed clapper rails were detected within 500 ft of I-5 in Buena Vista and San Elijo Lagoons (*Figures 3-20.1b* and *3-20.1d* through *3-20.1f*). One pair was observed in the northwestern quadrant of Buena Vista Lagoon, and a single and two more pairs were observed by Zembal (2003) farther east of I-5. Two single males and one pair were detected in San Elijo Lagoon east of I-5 in the marsh adjacent to the I-5 fill slope. No clapper rails were observed in Los Peñasquitos Lagoon within 500 ft of I-5. However, two pairs of rails and a single male rail were detected south of the survey area and north of the City of San Diego's pump station. Updated information from surveys completed by Zembal (2011) at Batiquitos, Agua Hedionda, and Buena Vista Lagoons identified additional light-footed clapper rail at Batiquitos Lagoon, adjacent to the La Costa park and ride, next to the freeway slope northeast of the bridge, and on the north shore of the east basin (Zembal/Konecny pers. comm.). Light-footed clapper rail have moved closer to I-5 within the past eight years with the increase in cordgrass-dominated low marsh adjacent to the fill slopes. It appears that appropriate habitat is more important than noise levels to the clapper rails. During 2011, the light-footed clapper rail previously located at the southwestern corner of the I-5 / SR-78 Interchange was not detected. The clapper rail locations at Agua Hedionda were more than 3000 ft from the project area.

California least tern FE/SE and CFP
Sterna antillarum browni

The California least tern historically nested on coastal beaches from Monterey County to Cabo San Lucas, Baja California. However, substantial population declines have been documented in the last 50 years. The San Dieguito Ecological Reserve has a colony managed by the CDFW. There are also known nesting areas for least terns in San Elijo and Batiquitos Lagoons. The breeding areas are outside of the grading limits; however, some foraging habitat may be impacted during construction. California least terns were observed foraging in San Elijo and Batiquitos Lagoon within the BSA in 2003 (*Figures 3-20.1d* and *3-20.1e*); they also are present at San Dieguito Lagoon.

Western snowy plover FT/SSC
Charadrius alexandrines nivosus

The Pacific coast population of the western snowy plover was listed as federally threatened on April 5, 1993. Western snowy plovers forage on both the dry sand of the upper beach and along the wet sand at the beach-surf interface. In Orange and San Diego Counties, the snowy plover is a common winter migrant and winter visitor and a fairly common localized breeding resident. The species is declining because of development and degradation of feeding and nesting habitat, increased human disturbance at nest sites, vehicular destruction of nests, and increased predation by introduced predator populations. The snowy plover is known to occur in some of the coastal lagoons; however, there is no nesting area within the project footprint. Some foraging habitat for this species may be impacted by this project at Batiquitos and Agua Hedionda Lagoons.

Coastal California gnatcatcher FT/SSC
Polioptila californica californica

This species is listed as threatened by the USFWS and is a CDFW Species of Special Concern. It is a non-migratory resident whose range covers the coastal plains of southern California and northern Baja California. In San Diego County, it occurs in coastal lowlands generally below

1968 ft in elevation and is an obligate resident of CSS. However, it is able to utilize other vegetation types such as chaparral and riparian habitats for portions of its territory. The decline of the coastal California gnatcatcher is attributed to the loss and fragmentation of CSS due to urban and agricultural development.

California gnatcatchers were generally found along the fill slopes and a few cut slopes adjacent to the lagoons and in a few adjacent canyons with coastal sage scrub habitat (*Figures 3-20.1a, 3-20.1c* through *3-20.1e,* and *3-20.1g*). Multiple protocol surveys in the corridor have been completed during multiple years, including 2003, 2005, 2007, 2008, and 2012. *Table 3.21.1* lists the number of territories of California gnatcatchers identified by general area within the larger BSA for I-5. There is critical habitat for the California gnatcatcher within the BSA surrounding San Elijo Lagoon, just south of Batiquitos Lagoon, and near the San Luis Rey River (*Figures 3-21.1a* through *3-21.1d*).

Table 3.21.1: Summary of Coastal California Gnatcatchers Territories Identified within the Study Area between 2003 and 2012

Location	Summary of California gnatcatcher Territories Identified During All Years
Genesee North	5
San Dieguito SW	3-4
San Dieguito NW	1 only, seen 2003, dispersing indiv
San Elijo Lagoon	5-6
Manchester East	3-4
Manchester West	2-3
Batiquitos East	2
Batiquitos West	2
Brooks Street	2
Lawrence Canyon	2
TOTAL	26-31

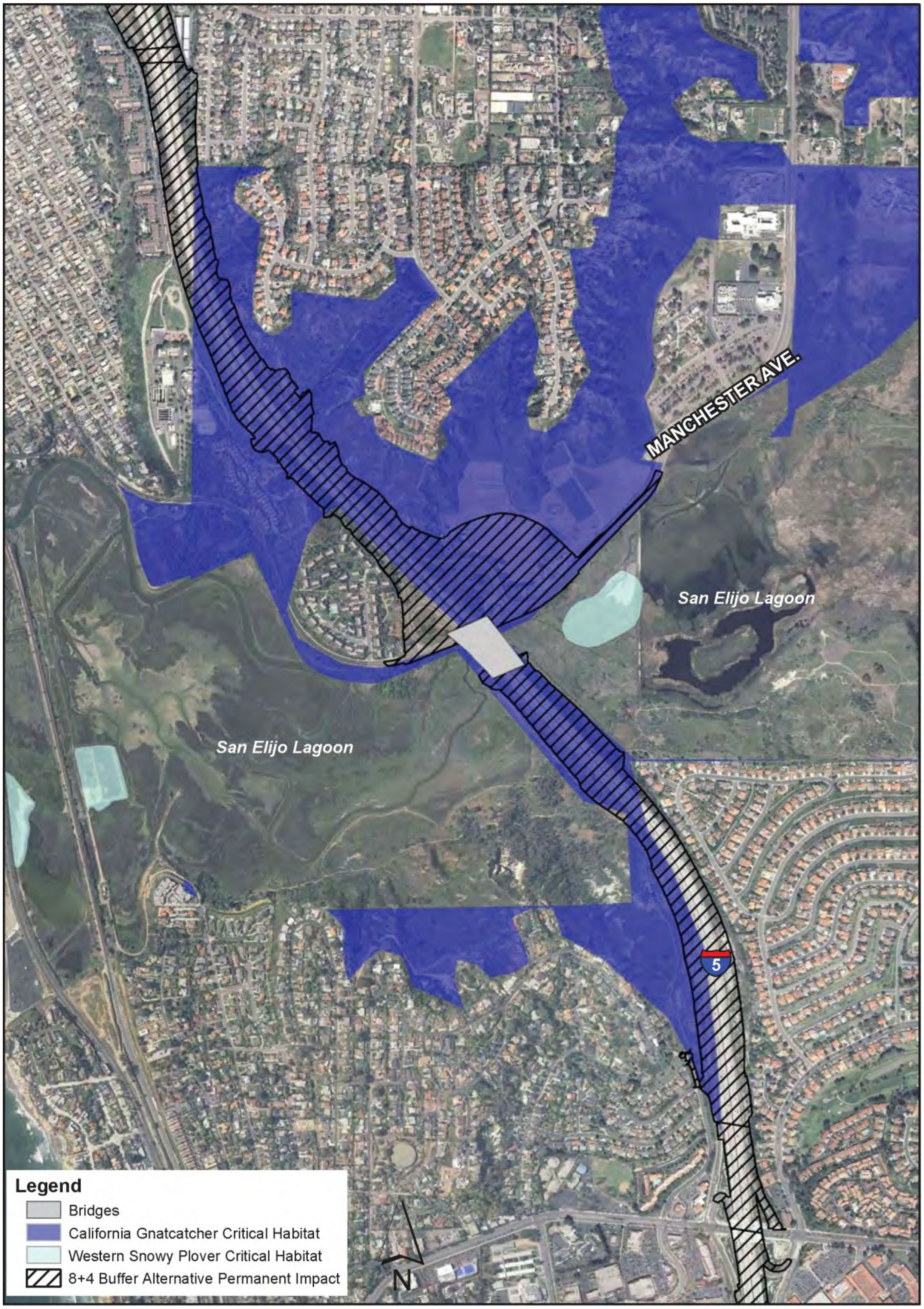


Figure 3-21.1a: California Gnatcatcher and Western Snowy Plover Critical Habitat

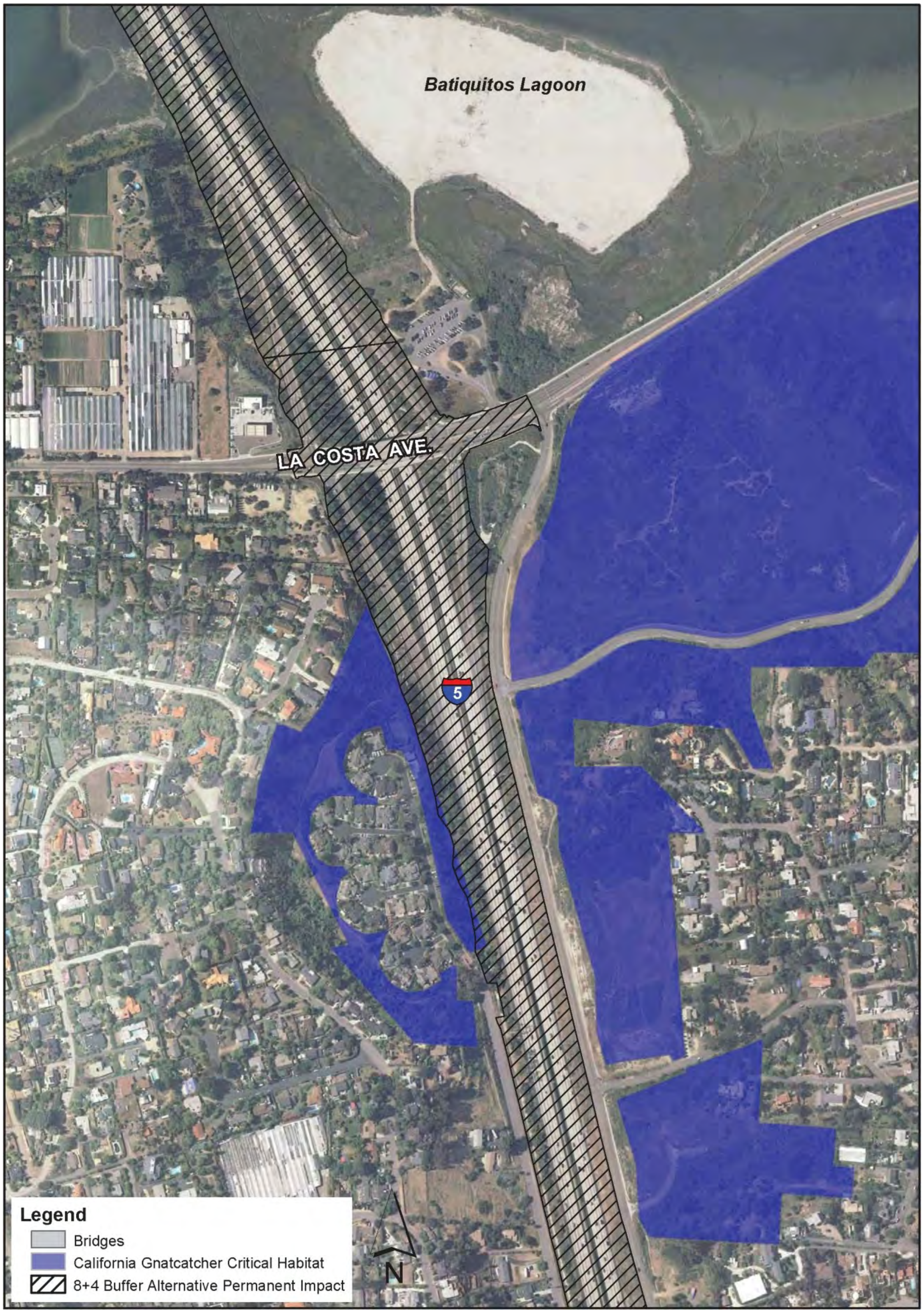


Figure 3-21.1b: California Gnatcatcher Critical Habitat

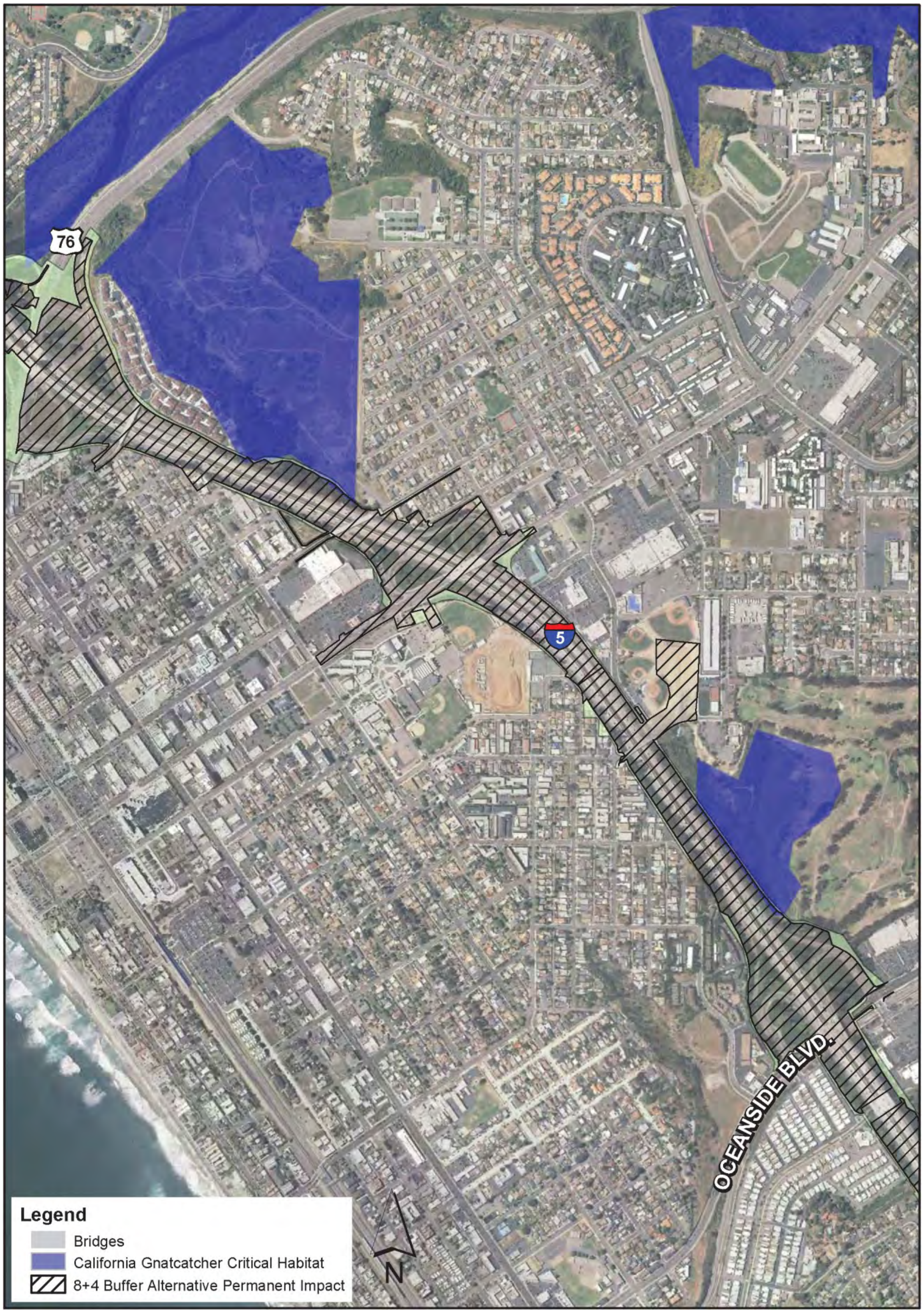


Figure 3-21.1c: California Gnatcatcher Critical Habitat

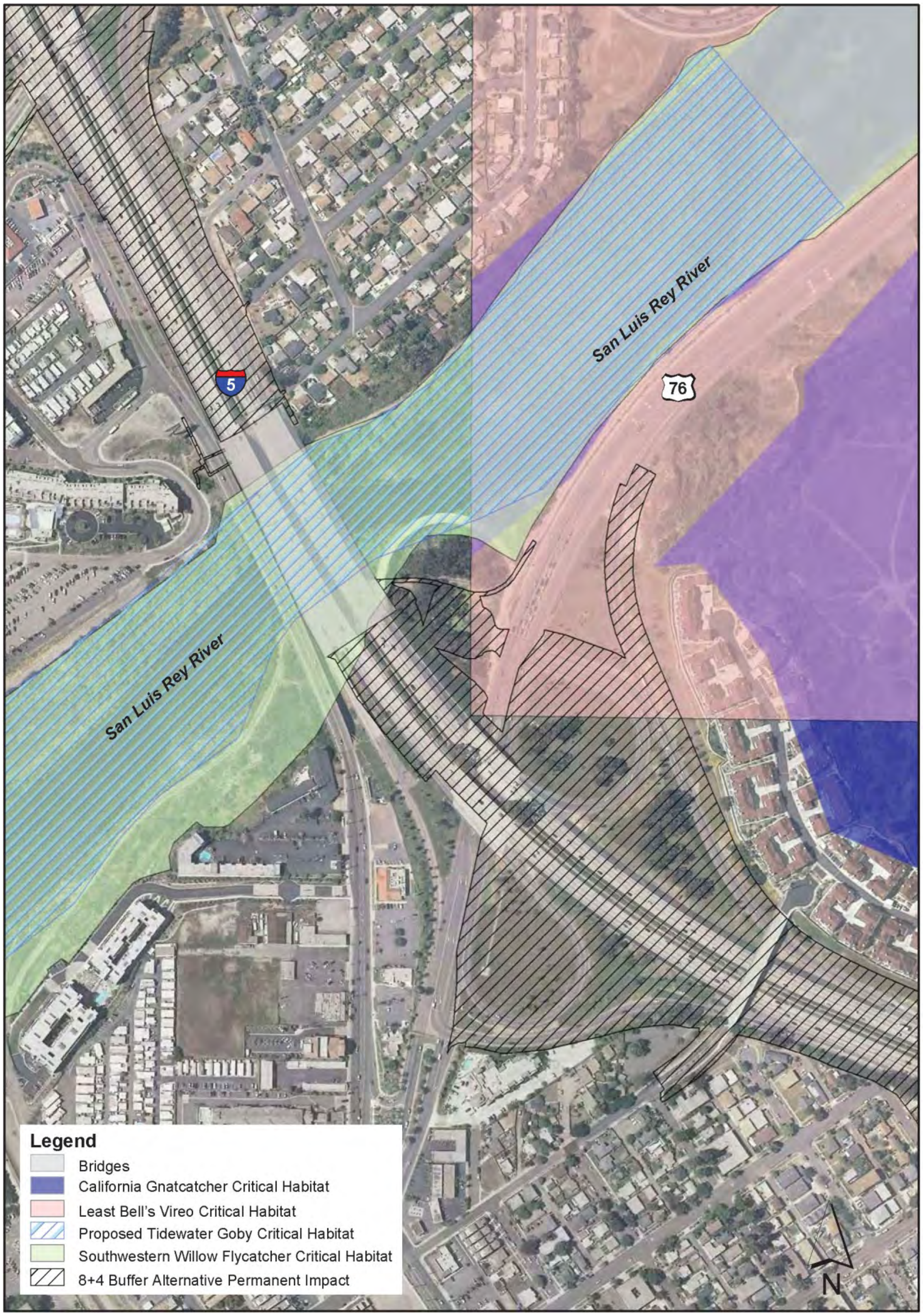


Figure 3-21.1d: California Gnatcatcher, Least Bell's Vireo, Southwestern Willow Flycatcher, and Tidewater Goby Critical Habitat

Least Bell's vireo FE/SE
Vireo bellii pusillus

The least Bell's vireo was once widespread from Tehama County in northern California to northwestern Baja California. This migratory species nests in willows, also using a variety of other shrub and tree species for nest placement. Declines have occurred due to habitat loss and fragmentation, and nest parasitism by the brown-headed cowbird (*Molothrus ater*). Recent population numbers have trended upward. Two vireo territories were detected in the willow woodland east of I-5 near the San Dieguito River; however, they are outside the BSA. Protocol surveys for least Bell's vireo along Moonlight Creek in Encinitas were negative in both 2003 and 2004. Least Bell's vireo were detected during California gnatcatcher protocol surveys near Brooke Street and Lawrence Canyon in Oceanside in small patches of riparian habitat (*Figures 3-20.1c and 3-20.1f*). The vireos were over 426 ft and 738 ft from I-5.

Belding's savannah sparrow SE
Passerculus sandwichensis beldingi

The Belding's savannah sparrow is resident to coastal salt marshes from Santa Barbara County to northern Baja California. In 2006, 32 coastal salt marshes were surveyed and 3,139 breeding territories were identified in 2006. Surveys within the I-5 BSA, within Belding's savannah sparrow habitat were completed during the spring of 2005 and reported sightings during light-footed clapper rail were also noted. In addition, the CDFW provided the results of their surveys for Belding's savannah sparrows at Buena Vista Lagoon for 2005. Belding's savannah sparrows were found in Los Peñasquitos, San Dieguito, San Elijo, Batiquitos, and Buena Vista Lagoons (*Figures 3-20.1b* through *3-20.1f*). Additional surveys were completed at San Dieguito in 2006 that identified more Belding's savannah sparrows in the northeastern portion of the BSA (*Figure 3-20.1c*).

Southwestern willow flycatcher FE/SE
Empidonax traillii extimus

The southwestern willow flycatcher is listed as State and federally endangered. This subspecies is an uncommon spring and fall migrant and a very rare summer resident. It is found among trees or large shrubs throughout San Diego County. Nesting is restricted to willow thickets in riparian woodland; the local breeding population in San Diego County is now extremely small. Its diet consists of berries, insects, and some seeds. It feeds by hovering and gleaning, and nests are commonly parasitized by brown-headed cowbirds. Willow flycatchers arrive in southern California later in the spring than do other breeding migratory passerines. They usually arrive about mid-May, but individuals have been documented as early as the first part of May. Surveys for the southwestern willow flycatcher were completed in the riparian habitat in the San Luis Rey River after one was heard vocalizing during a wetland survey. However, subsequent surveys did not detect the southwestern willow flycatcher again. It is likely that the bird detected was migrating through the area at the time. No other suitable habitat is present within the BSA. The San Elijo Lagoon Conservancy has records of migrant southwestern willow flycatchers at San Elijo Lagoon outside the BSA.

Tidewater goby FE/SSC
Eucyclogobius newberryi

The tidewater goby is listed as endangered by the USFWS and is a CDFW SSC. This small, nondescript fish is endemic to coastal lagoons and lower stream reaches in brackish to fresh, slow moving to still, but not stagnant water. The substrate usually consists of sand and mud, with abundant emergent and submerged vegetation. It feeds on aquatic insects and small crustaceans. The tidewater goby is thought to be a good indicator of the health of small lagoon ecosystems because of their sensitivity to habitat degradation through fresh water supply diversion, pollution, and siltation that often accompanies urban development. Its low mobility, restricted habitat, and short lifespan make it vulnerable to destruction by human disturbance. Decline of this species is probably due to the effects of lowering and eliminating flows in lower reaches of coastal streams; water pollution, particularly by sewage; and filling and channelization of streams. In San Diego County, the tidewater goby has been recorded from San Mateo Creek, San Onofre Creek, Las Pulgas Creek, Agua Hedionda Lagoon, and Buena Vista Lagoon. No other tidewater gobies were observed during fisheries surveys at San Elijo, Batiquitos, and Agua Hedionda Lagoons. Due to the large size, depth, and numbers of predatory fish in the lagoons, tidewater goby are not anticipated within the study area at any of the six lagoons. Tidewater goby were recently discovered in the San Luis Rey River and are presumed extant.

Tidewater goby surveys were completed in 2012 at Batiquitos and Buena Vista Lagoons at the request of the USFWS. There was no suitable habitat for tidewater goby at Batiquitos Lagoon within the BSA; and no tidewater goby were identified in protocol surveys at Buena Vista Lagoon.

Southern steelhead trout – Southern ESU FE/SSC
Oncorhynchus mykiss

Steelhead trout were historically found from Alaska to Baja California, Mexico; southern steelhead trout used coastal drainages from south of San Francisco Bay to Baja California. Urbanization and alteration of the streams from the headwaters to the coast are the major factors affecting the steelhead populations. Water diversions, riparian habitat loss, sediment loads within the streams, and introduced predators are also threats to the steelhead.

The NOAA fisheries listed the southern steelhead trout (within the southern California steelhead evolutionarily significant unit [ESU]) as endangered. Malibu Creek was the southernmost extent of the listed steelhead population in 1997. NOAA fisheries proposed to extend the range of the endangered steelhead to include the population in San Mateo Creek. Steelhead trout were discovered in San Mateo Creek in 1999. In 2002, the range of the southern California steelhead ESU was extended to Baja, Mexico. In May 2007, a steelhead trout was reported by CDFW personnel in the lower San Luis Rey River.

Critical Habitat

Critical habitat for the least Bell's vireo, southwestern willow flycatcher, western snowy plover, tidewater goby, and the California gnatcatcher occurs within the BSA (*Figures 3-21.1a* through *3-21.1d*). Critical habitat for the southwestern willow flycatcher and least Bell's vireo within the BSA occurs along the San Luis Rey River near the I-5 / SR-76 Interchange. Critical habitat for the western snowy plover occurs adjacent to the BSA at San Elijo Lagoon. Tidewater goby critical habitat occurs along the San Luis Rey River within the BSA. Critical habitat for the California gnatcatcher occurs within CSS around San Elijo Lagoon, Batiquitos Lagoon, Lawrence Canyon, and near the Center City Golf Course in Oceanside. A lagoon-specific listed species summary is provided for each lagoon below.

Los Peñasquitos Lagoon

Sensitive species known from the vicinity include Belding's savannah sparrow, western snowy plover (for which critical habitat is located at the coast line of the lagoon), light-footed clapper rail, and coastal California gnatcatcher. Tidewater goby are unlikely to occur in Los Peñasquitos Lagoon due to lagoon size, number of lagoon predators, and distance from known populations of this fish. No further evaluation of this fish is provided for this lagoon.

San Dieguito Lagoon

Sensitive plant and animal species with potential to occur at San Dieguito Lagoon include Belding's savannah sparrow, light-footed clapper rail, western snowy plover (with associated proposed critical habitat), California least terns, and coastal California gnatcatchers. Tidewater goby are unlikely to occur in the San Dieguito lagoon due to high flows in the river channel, distance from the mouth of the estuary, and the large number of predators within the lagoon. In addition, monitoring of fish populations associated with the SONGS mitigation has not identified any tidewater goby. Therefore, no further evaluation of this fish is provided for this lagoon.

San Elijo Lagoon

Light-footed clapper rail have been detected in the cattails east of I-5, as well as in one location west of the I-5 bridge. Belding's savannah sparrows have been identified in the pickleweed west of and adjacent to I-5. Coastal California gnatcatchers have been observed on the fill slopes on both sides of I-5, and critical habitat for this species is located at the lagoon. Critical habitat for snowy plover is located in the eastern basin, approximately 400 feet east of I-5.

Batiquitos Lagoon

Five listed species are known to occur at Batiquitos Lagoon in the vicinity of I-5. Three pairs of threatened coastal California gnatcatchers were identified on the south-facing northern slopes of Batiquitos Lagoon. One pair was identified on the fill slope on the northwestern side of I-5. Federal and State-listed light-footed clapper rail have been identified in the vicinity of I-5 to the northwest, north, and southeast. State-listed Belding's savannah sparrows have been observed on the eastern side of I-5. In addition, there is a large nesting area easterly of I-5 that is used by both the endangered California least tern and the western snowy plover.

Tidewater goby surveys were completed within the biological survey area (within a 500 ft radius of I-5) in 2012, and no appropriate habitat and no tidewater goby were detected. Tidewater goby are unlikely to occur in Batiquitos Lagoon due to high flows in the river channel, distance from the mouth of the estuary, and the large number of predators within the lagoon.

Agua Hedionda Lagoon

Sensitive bird species with potential to occur at Agua Hedionda Lagoon include Belding's savannah sparrow, light-footed clapper rail, and coastal California gnatcatcher; however, no point locations in close proximity to I-5 have been recorded for these species at the lagoon due to lack of appropriate habitat near I-5. Based on review of the current depth and open nature of the lagoon and large number of predators in the lagoon, tidewater goby is considered unlikely to occur.

Buena Vista Lagoon

Wildlife in Buena Vista Lagoon consists primarily of small mammals and birds, with potentially sensitive species presence including light-footed clapper rail and Belding's savannah sparrow. The light-footed clapper rail is known to nest in cattails within the lagoon. Belding's savannah sparrows also nest within the lagoon, but are not found adjacent to I-5 due to the limited amount of appropriate habitat. Striped mullet (*Mughil cephalus*) were the only native fish species identified in the lagoon during sampling in 2003 (Everest 2004). This fish is neither threatened nor endangered and is not a special status species. Although the tidewater goby has been previously recorded at Buena Vista Lagoon, the presence of the tidal weir lowers expectation of their current presence. Previous sampling for the tidewater goby has not detected the species; and sampling in 2012 within 500 ft of I-5 did not detect any tidewater goby.

3.21.3 Environmental Consequences

There would be both permanent and temporary impacts to threatened and endangered species as a result of the four build alternatives. Impacts that are common to all four build alternatives are summarized below. Impacts specific to each of the four build alternatives also are discussed below.

California least terns and western snowy plovers were identified foraging within the lagoons at certain times of the year. No nesting areas for either of these species would be directly impacted. However, there are least tern/snowy plover nesting areas relatively close to where construction would be completed at San Dieguito and Batiquitos Lagoons. Construction noise and activities may affect birds nesting at these sites. In addition, night lighting due to construction related activities may result in potential adverse effects on breeding behaviors of sensitive species.

Widening of I-5 over the San Luis Rey River would require widening the existing bridge. All four build alternatives have the same impact footprint in this area. The existing bent would likely be extended for the widening on the edge of the channel. This would impact steelhead trout habitat; however, there would still be a relatively deep open water channel under I-5 after construction is completed. Therefore, the project would not impact movement of steelhead trout within the San Luis Rey River during or after construction. Avoidance practices and conservation measures are proposed below to minimize any temporary impacts to steelhead trout during construction.

There would be a similar impact to potential habitat for tidewater goby from the widening of the bents at the San Luis Rey River and temporary impacts to habitat during construction.

Critical Habitat

Designated critical habitat for the least Bell's vireo, southwestern willow flycatcher, tidewater goby, and the California gnatcatcher all fall within the project footprint of the four build alternatives (*Figures 3-21.1a* through *3-21.1d*). The least Bell's vireo and southwestern willow flycatcher habitat is near the San Luis Rey River (*Figure 3-21.1d*). Much of the critical habitat shown on the maps is in areas that are currently developed or vegetated with ornamental vegetation such as ice plant and they do not have the primary constituent elements of critical habitat. Permanent impacts to 0.03 ac of least Bell's vireo and southwestern willow flycatcher critical habitat with primary constituent elements would occur. An additional 0.25 ac of southwestern willow flycatcher and 0.20 ac of least Bell's vireo critical habitat would temporarily be impacted during construction. Following construction (including the removal of the old loop ramp, and construction of a park and ride and connection to the existing bike trail) the habitat would be restored. The existing ornamental and disturbed habitat near the San Luis Rey River would be revegetated with southern willow scrub near the river and with coastal sage scrub between the park and ride and wetland habitat as a buffer. All temporary impacts in flycatcher and vireo critical habitat areas would be revegetated with southern willow scrub.

Tidewater goby critical habitat occurs along the San Luis Rey River in a location similar to the vireo and flycatcher critical habitat. Construction of any of the build alternatives at the San Luis Rey Bridge would temporarily impact about 0.2 ac of goby critical habitat, and permanent footings in the river would permanently impact approximately 500 square ft of critical habitat with primary constituent elements. An additional 1.55 ac of proposed critical habitat that does not have primary constituent elements for goby also would be impacted.

Critical habitat coverage for the coastal California gnatcatcher includes the freeway, the lagoons, and other habitats that do not exhibit primary constituent elements (*Figures 3-21.1a* through *3-21.1d*). To determine permanent impacts to critical habitat for the coastal California gnatcatcher, only those upland habitats with the primary constituent elements were counted, including approximately 31.7 ac for the 8+4 Buffer alternative, 33.47 ac for the 10+4 Buffer alternative, 34.28 ac for the 8+4 Barrier alternative, and 37.3 ac for the 10+4 Barrier alternative. No critical habitat for the coastal California gnatcatcher would be impacted by the No Build alternative.

Noise Effects on Wildlife

Increased levels of noise have the potential to affect behavioral and physiological responses in noise sensitive wildlife receptors. Adverse responses to increased noise may include hearing loss or the temporary masking of vocalizations used in communication during the breeding season, nest abandonment, and decreased predator awareness, thereby resulting in a decrease in the reproductive and overall fitness of certain animal species. Increased noise from roadway traffic has the potential to create a situation of long-term hearing loss in wildlife species, while the periodic, point-source noise impacts typically associated with construction activities would result in short-term effects to wildlife species.

A study of the ambient noise and predicted noise levels after completion of the project was completed for each lagoon. Because the noise levels for the four build alternatives are similar, the potential long-term indirect effects of noise are based on the 10+4 Buffer alternative for future noise levels.

Bird species utilize sound, in the form of a variety of vocalizations (e.g., mating calls, contact notes, etc.), throughout their daily activities and, therefore, are the focus of the potential effects analysis of this study. Bird species associated with the BSA include the California least tern, western snowy plover, least Bell's vireo, light-footed clapper rail, southwestern willow flycatcher, and Belding's savannah sparrow—all species associated with the wetland/riparian areas within and adjacent to the coastal lagoons along the I-5 corridor. This analysis also addresses potential effects to the coastal California gnatcatcher, an upland bird species, in suitable habitat that occurs between the I-5 corridor and the coastal lagoons.

Temporary increases in noise levels from construction-related activities are considered a direct impact to wildlife. Noise and vibration would vary with distance from construction and elevation below the freeway.

Long-term increases in noise levels from the completed project may affect wildlife species and, therefore, could be considered an indirect effect to sensitive wildlife species. The study corridor is already relatively noisy due to the eight lanes of traffic on I-5 and local traffic throughout the corridor. Ambient noise levels in the lagoons vary with distance from the freeway and elevation below the freeway. Fill slopes are not as loud as cut slopes, but traffic noise is still apparent. Ambient noise ranges from as high as 84 dBA L_{eq} (one-hour average) on the slopes next to the main lanes at San Elijo Lagoon to the mid 60s in the lagoon. The 60-dBA point is approximately 500 ft from the freeway.

There is no single standard or threshold for determining significant noise effects on all bird species. Prior studies that have indicated a possible noise effect threshold for certain species of songbirds have not been scientifically shown to be valid for those species addressed in this report. Therefore, the existing ambient noise levels within the BSA were compared to the predicted noise levels associated with the proposed future vehicle traffic over the five coastal lagoons along the I-5 corridor. The results for each lagoon are discussed in the lagoon impacts below.

Indirect Effects

Indirect impacts to threatened and endangered species can result from increased lighting, increased exposure to invasive species, edge effects, and increased potential for pollution from runoff, as well as long term increases in noise. I-5 is already at least eight lanes in width throughout the project and as such already has had an effect of increased lighting at night, increased access from invasive species as well as bisecting habitats that could result in the edge effects. The remainder of the corridor has experienced development that has further encroached on the habitats. All four build alternative, therefore, would have incremental increases to indirect effects already affecting the habitat from the current configuration of I-5. Indirect effects such as increased dust, lighting, invasive species, and noise would be minimized through the conservation measures listed in *Section 3.17.3*. For the No Build alternative, some of the projects that would go forward may have indirect effects to habitats adjacent to I-5, but would be limited in comparison to the four build alternatives. There is also a potential for construction-related noise impacts to both bird and fish species from pile driving during bridge footing construction at the abutments (the foundation upon which the bridge rests). The reader is referred to *Section 3.17.3* for discussion.

10+4 Barrier

The 10+4 Barrier alternative would permanently impact six Del Mar manzanita plants *(Table 3.21.2)*. No temporary impacts to this plant would occur under this alternative.

The 10+4 Barrier alternative would permanently impact portions of 12 to 15 coastal California gnatcatcher territories (*Table 3.21.2*). The majority of the coastal California gnatcatchers that would be impacted are on the slopes immediately adjacent to San Dieguito, San Elijo, and Batiquitos Lagoons. Portions of the same territories would also be temporarily impacted by construction of this alternative. This alternative would also both temporarily and permanently impact two Belding's savannah sparrow territories.

The 10+4 Barrier alternative would permanently impact the territory of one pair at Batiquitos Lagoon and of one individual light-footed clapper rail at San Elijo Lagoon. In addition, portions of four light-footed clapper rail territories would be temporarily impacted by the 10+4 Barrier alternative (*Figures 3-20.1b* and *3-20.1d* through *3-20.1f*).

Least Bell's vireo and southwestern willow flycatcher were identified within the BSA; however, no nesting areas would be impacted by this project. Some southern willow scrub habitat that may be used by these species as they migrate through to their nesting grounds would be impacted. Approximately 0.26 ac of southern willow scrub and 1.55 ac of disturbed southern willow scrub would be permanently impacted by the 10+4 Barrier alternative (*Table 3.17.1*). The majority of this habitat is disturbed and in small patches unlikely to be used by these two species.

Table 3.21.2: Threatened and Endangered Species Impacted by the Four Alternatives

Species	10+4 Barrier	10+4 Buffer	8+4 Barrier	8+4 Buffer
Del Mar manzanita, Permanent	6 plants	6 plants	6 plants	6 plants
Light-footed clapper rail, Permanent	1 pair, Batiquitos; 1 territory, San Elijo	1 pair, Batiquitos	1 pair, Batiquitos; 1 territory, San Elijo	1 pair, Batiquitos
Light-footed clapper rail, Temporary	2 territories, San Elijo; 1 territory, Batiquitos; 1 individual, Buena Vista	2 territories, San Elijo; 1 territory, Batiquitos; 1 individual, Buena Vista	1 territory, San Elijo; 1 territory, Batiquitos; 1 individual, Buena Vista	1 territory, San Elijo; 1 territory, Batiquitos; 1 individual, Buena Vista
Coastal California gnatcatcher, Permanent	1 territory, Genesee; 3-4 territories, San Dieguito; 4-6 territories, San Elijo; 4 territories, Batiquitos	1 territory, Genesee; 3-4 territories, San Dieguito; 4-6 territories, San Elijo; 4 territories, Batiquitos	1 territory, Genesee; 3-4 territories, San Dieguito; 4-6 territories, San Elijo; 4 territories, Batiquitos	1 territory, Genesee; 3-4 territories, San Dieguito; 4-6 territories, San Elijo; 4 territories, Batiquitos
Belding's savannah sparrow, Permanent	2 territories, Batiquitos	1 territory, Batiquitos	1 territory, Batiquitos	1 territory, Batiquitos
Belding's savannah sparrow, Temporary	1 territory, Batiquitos; 1 territory, San Elijo	1 territory, Batiquitos	1 territory, Batiquitos	1 territory, Batiquitos

10+4 Buffer

The 10+4 Buffer alternative would permanently impact six Del Mar manzanita plants *(Table 3.21.2)*. No temporary impacts to this plant would occur under this alternative.

The 10+4 Buffer alternative would permanently impact portions of the territories of 12 to 15 coastal California gnatcatcher territories (*Table 3.21.2*). The majority of the coastal California gnatcatchers that would be permanently impacted are on the slopes immediately adjacent to San Dieguito, San Elijo, and Batiquitos Lagoons. Portions of the same territories would also be temporarily impacted by construction of this alternative.

The 10+4 Buffer alternative would permanently impact the territory of one individual Belding's savannah sparrow at Batiquitos Lagoon. A second territory of an individual Belding's savannah sparrow would be temporarily impacted at Batiquitos Lagoon. The 10+4 Buffer alternative would permanently impact the territory of one pair of light-footed clapper rail at Batiquitos Lagoon. In addition, portions of four light-footed clapper rail territories would be temporarily impacted by this alternative (*Table 3.21.2*).

There is no known occupied nesting habitat for the least Bell's vireo or southwestern willow flycatcher within the 10+4 Buffer impact areas. Some southern willow scrub habitat that may be used by these species as they migrate through to their nesting grounds would be impacted. Approximately 0.26 ac of southern willow scrub and 1.31 ac of disturbed southern willow scrub would be permanently impacted by the 10+4 Buffer alternative (*Table 3.17.1*). The majority of this habitat is disturbed and in small patches unlikely to be used by these two species.

8+4 Barrier

The 8+4 Barrier alternative would permanently impact six Del Mar manzanita plants. No temporary impacts to this plant would occur under this alternative.

The 8+4 Barrier alternative would permanently impact portions of the territories of 12 to 15 coastal California gnatcatcher territories (*Table 3.21.2*). The majority of the coastal California gnatcatchers that would be impacted are on the slopes immediately adjacent to San Dieguito, San Elijo, and Batiquitos Lagoons. Portions of the same territories would also be temporarily impacted by construction of this alternative.

This alternative would also permanently impact the territory of one individual Belding's savannah sparrow and temporarily impact the territory of a second individual. The 8+4 Barrier alternative would permanently impact the territory of one pair at Batiquitos Lagoon and one individual territory of light-footed clapper rail at San Elijo Lagoon. In addition, portions of three light-footed clapper rail territories would also be temporarily impacted by the 8+4 Barrier alternative (*Figures 3-20.1a* through *3-20.1e*).

Least Bell's vireo and southwestern willow flycatcher were identified within the BSA; however, no nesting areas would be impacted by this project. Some southern willow scrub habitat that may be used by these species as they migrate through to their nesting grounds would be impacted. A total of 0.26 ac of southern willow scrub and 1.36 ac of disturbed southern willow scrub would be permanently impacted by the 8+4 Barrier alternative (*Table 3.17.1*). The majority of this habitat is disturbed and in small patches unlikely to be used by these two species.

8+4 Buffer (Preferred Alternative)

The 8+4 Buffer alternative would permanently impact six Del Mar manzanita plants *(Table 3.21.2)*. No temporary impacts to this plant would occur under this alternative.

The 8+4 Buffer alternative would permanently impact portions of the territories of 12 to 15 coastal California gnatcatcher territories (*Table 3.21.2*). The majority of the coastal California gnatcatchers that would be impacted are on the slopes immediately adjacent to San

Dieguito, San Elijo, and Batiquitos Lagoons. Portions of the same territories would also be temporarily impacted by construction of this alternative.

The 8+4 Buffer alternative would also permanently impact the territory of one individual Belding's savannah sparrow, and would temporarily impact portions of a second territory. The 8+4 Buffer alternative would permanently impact the territory of one pair of light-footed clapper rail at Batiquitos Lagoon (*Table 3.21.2*). In addition, portions of three light-footed clapper rail territories would also be temporarily impacted by the 8+4 Buffer alternative (*Figures 3-20.1a* through *3-20.1e*).

Least Bell's vireo and southwestern willow flycatcher were identified within the BSA; however, no nesting areas would be impacted by this project. Some southern willow scrub habitat that may be used by these species as they migrate through to their nesting grounds would be impacted. Approximately 0.26 ac of southern willow scrub and 1.25 ac of disturbed southern willow scrub would be permanently impacted by the 8+4 Buffer alternative (*Table 3.17.1*). The majority of this habitat is disturbed and in small patches unlikely to be used by these two species.

No Build

The majority of the projects that would likely go forward under the No Build alternative would not have impacts to threatened and endangered species. However, the I-5 / Manchester Avenue Interchange Project, the I-5 / SR-78 Interchange Project, and I-5 / Genesee Avenue Interchange Improvements Project may impact some habitat for light-footed clapper rail and/or coastal California gnatcatcher. No impacts to endangered plants are anticipated under the No Build alternative.

Lagoon Communities Summary

The following information pertains to environmental consequences in each lagoon for listed species from implementation of the refined 8+4 Buffer alternative (Preferred Alternative). Indirect impacts for each lagoon would be similar. *Table 3.17.4* contains a summary of permanent impacts by construction phase and time period; *Tables 3.17.5* through *3.17.10* are matrices that detail benefits of the refined 8+4 Buffer alternative over the project proposed in the Draft EIR/EIS, with specifics noted for jurisdictional waters effects, etc.

Los Peñasquitos Lagoon

No federally or State-listed threatened or endangered species have been identified within the I-5 construction footprint at Los Peñasquitos Lagoon. Coastal California gnatcatcher were not observed within the vicinity during protocol surveys, and no western snowy plover nesting areas or foraging habitat are present in the project impact footprint or vicinity. No direct impacts to these species are anticipated. Belding's savannah sparrow and light-footed clapper rail occur in the lagoon west of the I-5 / SR-56 interchange; however, no wetlands would be permanently impacted and minimal construction would occur in the vicinity. All known clapper rail and Belding's savannah sparrow locations are over 1000 ft from the proposed Sorrento Valley Road bike bridge. Clapper rail have also been identified upstream of I-805 on Los Peñasquitos Creek; however, the proposed project would not impact the creek and known locations are approximately 480 ft from the anticipated work (as well as being on the east side of northbound I-5 and I-805 from the work to be done). No effects to light-footed clapper rail are anticipated.

San Dieguito Lagoon

Saltmarsh habitat that potentially supports the State-listed endangered Belding's savannah sparrow and CSS that supports federally listed threatened coastal California gnatcatcher would be impacted by widening of I-5 at San Dieguito Lagoon. Although Belding's savannah sparrow occurs in the adjacent SONGS salt marsh habitat, none has been observed in the project impact footprint. Similarly, least tern and western snowy plover nesting areas are nearby I-5 but not within the anticipated impact footprint. Light-footed clapper rail were not observed within the project impact footprint or vicinity during protocol surveys. Portions of territories associated with four pairs of coastal California gnatcatcher and one single male may be impacted due to construction of wider fill slopes.

With respect to potential project operational noise, under existing conditions, noise in excess of 70 dBA occurs over various amounts of wetland and upland habitats that either support, or have the potential to support, special status bird species at coastal lagoons in the North Coast Corridor. Although population numbers have undergone natural fluctuations over the years, these species continue to forage, nest, breed, and otherwise consistently occur within suitable habitat during the breeding season in areas subjected to a wide range of noise levels. Specifically at San Dieguito Lagoon, long-term noise studies identified the loudest existing noise level at 66 dBA L_{eq}, with a predicted future noise level at the same location of 68 dBA L_{eq}, indicating an anticipated increase of 2 dBA. This 2 dBA increase was predicted at three noise sampling locations, with similar increases of 2 to 3 dBA likely across the entire open lagoon area. Within the project vicinity, three species are specifically known: California least tern, Belding's savannah sparrow, and coastal California gnatcatcher. A majority of the documented locations of the Belding's savannah sparrows east of I-5 (6 of the total 10 locations) and coastal California gnatcatcher west of I-5 (8 of the total 11 locations), occurs within the existing 66 dBA L_{eq} noise contour. The Belding's savannah sparrow population west of I-5 occurs in between the existing 56 and 62 dBA L_{eq} contours, and is not subject to the relatively higher noise levels on the eastern side. This is due primarily to the distribution of suitable habitat and naturally sound-attenuating geographic features of the landscape. Regardless, the predicted relative noise increase for these individuals west of I-5 is also approximately 2 dBA.

San Elijo Lagoon

I-5 improvements would result in impacts to portions of four coastal California gnatcatcher territories. The permanent area of effect would not impact Belding's savannah sparrow or light-footed clapper rail habitat. Temporary impact areas and construction noise, however, may have an adverse effect on these two species. Construction noise impacts to wildlife (including both fish and bird species) in San Elijo Lagoon also may occur due to the need for pile driving during bridge falsework construction. Impacts to species and habitats would be mitigated as discussed in *Section 3.17.3* of this document.

Ambient noise levels measured in varying locations at San Elijo Lagoon were between 60 and 67 dBA. Future noise level increases during the noisiest hour at most receptor points are projected to be 1 to 3 dBA, with an increase in traffic-related noise over the entire lagoon of approximately 2 dBA. Noise at Receptor 5 in San Elijo Lagoon would decrease by 1 dBA due to the widening of I-5 closer to intervening topography, and would result in roadway noise being somewhat attenuated or deflected by an abutting steep slope. This increase in overall noise may have an adverse effect on some wildlife species. As described elsewhere in this chapter, however, it should be noted that although population numbers have undergone natural fluctuations over the years, species have continued to consistently forage, nest, and breed, within suitable habitat in areas subjected to a wide range of noise levels (including noise in excess of 70 dBA). Indirect effects such as increased dust, lighting, invasive species, pollutant discharge, and noise would be minimized through the conservation measures identified in *Section 3.17.3*.

Batiquitos Lagoon

One pair of federal and State-listed light-footed clapper rail has been identified within the permanent impact footprint northeast of I-5. One additional pair has been identified in the temporary impact area. Portions of four territories of coastal California gnatcatcher using existing cut slopes of I-5 also would be impacted. Portions of the habitat of at least one pair and one individual of Belding's savannah sparrow would be permanently impacted by the project. Nesting areas used by California least tern and western snowy plover are approximately 250 feet east of the project impact area. There would be no direct permanent impacts to these species; however, there would be potential noise impacts during construction. Impacts to species and habitats would be mitigated as discussed in *Section 3.17.3*.

The documented special status species locations for Batiquitos Lagoon are all relatively close to the I-5 corridor and are located within or adjacent to the existing 66 dBA L_{eq} noise contour. The future traffic noise is projected to be 2 dBA higher, in general, across the entire lagoon. As a result, the majority of the least tern nesting area east of I-5 would experience an increase of 2 dBA over existing conditions, which range from 58 to 64 dBA. Least terns nesting on the western end of the nesting area may be more likely to be adversely affected than those located farther east. Regardless, as described for San Dieguito Lagoon, it should be noted that although population numbers have undergone natural fluctuations over the years, species have continued to consistently forage, nest, and breed, within suitable habitat in areas subjected to a wide range of noise levels (including noise in excess of 70 dBA).

Agua Hedionda Lagoon

There are no known federally or State-listed threatened or endangered species within the I-5 construction footprint or proximity at Agua Hedionda Lagoon; therefore, associated direct impacts are not anticipated.

Similar to the other lagoons, project noise modeling indicates a projected I-5-related noise increase of approximately 2 dBA over a majority of the lagoon, with some portions of the lagoon subject to an increase of up to 3 dBA. No known sightings of any of the special status bird species addressed in this study have occurred at Agua Hedionda Lagoon, however, and indirect impacts to these species are not expected. In addition, I-5 is currently eight lanes in width across the lagoon, and combined with surrounding urban development, results in an existing condition that includes night lighting, invasive species, bisection of habitats, and generation/discharge of urban pollutants. As such, a build alternative would result in only incremental increases to indirect effects already occurring to the minimal native habitat near the lagoon. Indirect effects such as increased dust, lighting, invasive species, and noise would be minimized through the conservation measures identified in *Section 3.17.3*. There is also a potential for construction-related noise impacts to both bird and fish species from pile driving during bridge footing construction at the abutments (the foundation upon which the bridge rests). The reader is referred to *Section 3.17.3*.

Buena Vista Lagoon

Based on surveys to date, a portion of the territory of one pair of clapper rail may be temporarily impacted during construction on the west side of the west- to southbound on-ramp from SR-78 to I-5. Direct impacts to each of these species would be mitigated as described in *Section 3.17.3*. The lack of Belding's savannah sparrow habitat within the I-5 construction footprint eliminates the potential for direct impact to this species. No tidewater goby were identified in 2012 protocol surveys at Buena Vista Lagoon.

The ambient noise levels measured within the lagoon ranged from 63 to 64 dBA. With respect to indirect noise impacts in particular, the anticipated future increase in traffic volumes on I-5 combined with the proposed wider footprint of the facility, would result in an increase of approximately 2 dBA across the lagoon. As described elsewhere in this section, however, it should be noted that although population numbers have undergone natural fluctuations over the years, species have continued to consistently forage, nest, and breed, within suitable habitat in areas subjected to a wide range of noise levels (including noise in excess of 70 dBA). Regardless, most of the sensitive species are located a relatively long distance from the freeway, with a correspondingly lessened sensitivity to a 2 dBA increase in noise. Documented special status bird species with known locations that could be affected include four locations of the light-footed clapper rail (two within the current 62 dBA L_{eq} noise contour, and two within the 56 dBA L_{eq} noise contour), and eight locations of Belding's savannah sparrow (all within, or in close proximity to, the 58 dBA L_{eq} noise contour). Although not expected to nest within the lagoon study area, other sensitive species whose habitat occurs within the lagoon habitat potentially affected by the increased traffic noise include the western snowy plover and California least tern. These species have been documented in the vicinity of the lagoon and may forage over the open water of the lagoon, with an associated potential to be affected by increased noise.

3.21.4 Avoidance, Minimization, and/or Mitigation Measures

Avoidance has been an ongoing design goal throughout project development, starting with the identification of four build alternatives of varying width. Since circulation of the Draft EIR/EIS, the smallest of the four build alternatives (the refined 8+4 Buffer alternative) was identified as the locally preferred alternative in the August 2012 Supplemental Draft EIR/EIS, and is now identified as the Preferred Alternative. As the smallest of the potential build alternatives, efforts at minimization and avoidance of threatened and endangered species, as possible, would continue through final design.

Locations of the endangered Del Mar manzanita have been identified and avoided to the maximum extent practicable. Some of the Del Mar manzanita individuals are growing immediately adjacent to brow ditches that would require reconstruction for proper slope drainage and in those areas the plants could not be avoided. These plants would likely be salvaged and placed in a compensatory mitigation site for the project.

Caltrans has coordinated with NMFS. A request for an informal consultation on steelhead trout was sent to the NMFS on October 24, 2012. An initial response provided on December 12, 2012 opened a dialogue, with Caltrans providing additional information on January 3, 2013. Conversations with NMFS staff on March 25 and 28, 2013 led to submittal of additional information on April 16, 2013. NMFS concurred that the project may affect, but is not likely to adversely affect, steelhead or their habitat with the incorporation of appropriate design features and avoidance, minimization, and/or mitigation measures, which have been incorporated into the measures below. NMFS concluded informal Section 7 consultation in accordance with 50 CFR 402.13 on May 16, 2013. See also *Chapter 5* of this Final EIR/EIS.

The REMP discussed in *Section 3.17* would be implemented to mitigate for impacts to sensitive habitats, plants, and wildlife including listed species. The REMP has been developed to identify compensatory mitigation opportunities to address these unavoidable impacts, and to implement projects that benefit existing natural resources that exceed standard ratio-based compensatory mitigation programs.

The following are proposed measures to minimize impacts to threatened and endangered species during construction. Additional measures associated with habitats and overall construction are listed in *Section 3.17.3*, with a full listing and all details in the project ECR.

- Because the project is expected to be phased over approximately 21 years, Caltrans would conduct updated surveys for the gnatcatcher, rail, and manzanita within one year prior to the commencement of vegetation clearing and construction activities for each project phase to ensure that survey information remains up to date. FHWA and Caltrans acknowledge that Section 7 consultation would be reinitiated if survey results indicate that additional impacts to these species may occur beyond those addressed in the project Biological Opinion.

- Prior to construction equipment entering open water habitat in the San Luis Rey River, all gobies within the project impact footprint would be captured and relocated to a proximal and safe location, and gobies would be excluded from re-entering the project impact footprint. Caltrans would submit a goby capture, relocation, and exclusion plan to the USFWS for review and approval. The plan would include relocation of native species and removal of non-native species captured with gobies during the relocation effort. Capture methods would follow commonly accepted techniques for fish capture such as seining. The plan would be prepared and implementation would be overseen by a USFWS-approved biologist knowledgeable of goby biology and ecology.

- Prior to construction in areas with manzanita, all manzanita in the project impact footprint (including the approximately six individuals currently known and any other individuals found in updated surveys) would be salvaged and translocated to the Dean property, which is near the currently known salvage locations. Caltrans would submit a manzanita translocation plan to the USFWS for review and approval. The plan would be prepared and implementation would be overseen by a USFWS-approved biologist knowledgeable of manzanita biology and ecology and translocating sensitive plant species. There has been limited success with translocation of this species; therefore, seed would be collected prior to impacts and used to propagate additional plants at a facility that has experience working with manzanita and specializes in the propagation of native plants. The manzanita plants grown from seed also would be planted at the Dean property. A field review would be conducted with the USFWS to review and approve the locations for planting of manzanita plants on the Dean property. The translocated manzanita population would be monitored for a minimum of five years to document success or failure of the translocation efforts.

- The clearing and grubbing of native wetland and riparian habitats would occur between September 16 and March 14 and the clearing and grubbing of native upland habitats for the project would occur between September 1 and February 14, to avoid the rail and gnatcatcher breeding seasons, respectively (or sooner than September 16 or September 1, if a biologist knowledgeable of gnatcatcher and rail biology and ecology approved by the USFWS demonstrates to the satisfaction of the USFWS that all rail or gnatcatcher nesting is complete). Caltrans would submit the biologist's name, address, telephone number, and work schedule on the project to the USFWS at least five working days prior to initiating project impacts.

- Pile driving for bridge construction near the lagoons and San Luis Rey River would be completed between September 16 and February 14 to minimize construction noise impacts to rail and gnatcatcher breeding. Pile driving may commence earlier in the fall if a biologist knowledgeable of gnatcatcher and rail biology and ecology approved by the USFWS demonstrates to the satisfaction of the USFWS that all rail and gnatcatcher breeding is complete within the area where construction noise would exceed ambient levels as a result of pile driving. Caltrans would submit the biologist's name, address, telephone number, and work schedule on the project to the USFWS at least five working days prior to initiating project impacts.

- In-water construction activities at the San Luis Rey River would take place outside of the steelhead migration window when steelhead adults and juveniles are expected to be using the lower reach of the San Luis Rey River.

- Silt curtains, coffer dams, and/or other barriers would be used to prevent steelhead from entering the construction zone and prevent sedimentation and debris from entering the river.

- Best management practices would be implemented during construction to minimize impacts on steelhead and aquatic habitat in the San Luis Rey River. These include sediment control measures to minimize erosion and impacts to water quality, measures to prevent debris and fresh concrete from entering the river channel, and fueling and maintenance of heavy machinery in areas away from the river channel and sensitive habitats.

- Soundwalls would be installed at the edge of temporary impact areas near sensitive resources where feasible depending on inundation and effective heights required for walls. Soundwalls would not be effective where fill slopes are significantly higher than impact areas.

- All construction equipment used for the project would be equipped with properly operating and maintained mufflers.

- During in-water bridge construction activities at all lagoons and the San Luis Rey River, bubble curtains or other methods to minimize acoustical impacts to aquatic species would be implemented. These measures would be developed in coordination with the resource agencies to mitigate construction noise on fish species as design continues on each of the bridges in each of the phases of construction. Methodology may be different at different bridges depending on resources present, bridge design, and existing conditions/species.

- If nighttime construction is necessary, all lighting used at night for project construction (e.g., staging areas, equipment storage sites, roadway) would be selectively placed and directed onto the roadway or construction site and away from sensitive habitats. Light glare shields would be used to reduce the extent of illumination into sensitive habitats.

- A USFWS-approved biologist (Biological Monitor) would be on site during: (a) initial clearing and grubbing; and (b) weekly during project construction within 500 ft of off-site gnatcatcher, rail, goby, and manzanita habitat to ensure compliance with all conservation measures. Caltrans would submit the biologist's name, address, telephone number, and work schedule on the project to the USFWS at least five working days prior to initiating project impacts. The contract of the Biological Monitor would allow direct communication with the USFWS at any time regarding the proposed project. The Biological Monitor would be provided with a copy of this consultation. The Biological Monitor and a Caltrans Project Biologist would be available during pre-construction and construction phases to review grading plans, address protection of sensitive biological resources, monitor ongoing work, and maintain communications with the Resident Engineer to ensure that issues relating to biological resources are appropriately and lawfully managed.

- At the bridge construction areas where there is the potential for rail movement under the bridges, fencing would be installed in a manner that would direct rails to the open channel under bridges to the extent feasible.

- A channel large enough for fish movement would be kept open throughout construction within the San Luis Rey River and all of the lagoons. Prior to initiation of construction in those locations, Caltrans would submit a plan to the USFWS for maintaining a channel for fish and/or rail movement in the San Luis Rey River and each of the lagoons.

- Permanent and temporary impacts to gnatcatchers, rails, gobies, manzanita, and critical habitat for the gnatcatcher and goby resulting from the *I-5 NCC Project* would be offset through habitat establishment, restoration, and preservation/enhancement as shown in the REMP. Implementation of these conservation measures would be phased ahead of project impacts. In addition, large-scale lagoon restoration and lagoon management endowments would be implemented to provide additional conservation to offset impacts from the current project, LOSSAN Los Angeles to San Diego rail corridor, and I-5 / SR-78 Interchange Project (with project elements as listed in the REMP).

Due to the length of the project, the sensitive habitats it transverses, and the sensitive species that live along the corridor, there are impacts that could not be avoided and still meet the purpose and need for the project. Compensatory mitigation measures would be used to mitigate for the unavoidable impacts. These measures are described in detail in *Section 3.17.3* and also are fully listed in the project ECR.

3.22 Invasive Species

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.22.1 Regulatory Setting

On February 3, 1999, President Clinton signed EO 13112 requiring federal agencies to combat the introduction or spread of invasive species in the U.S. The order defines invasive species as "any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." FHWA guidance issued August 10, 1999 directs the use of the State's invasive species list, currently maintained by the California Invasive Species Council to define the invasive plants that must be considered as part of the NEPA analysis for a proposed project.

3.22.2 Affected Environment

The slopes of I-5 have varying amounts of invasive species growing on them including pampas grass, ice plant, African fountain grass, and annual species. Recently African veldt grass and onion weed (*Asphodelus fistulosus*) have become increasing problems as they spread along the right-of-way. African veldt grass has become a dominant species on the cut slope of I-5 between Del Mar Heights Road and Birmingham Drive. They are spreading into the habitats around the lagoons as well.

Tamarisk, arundo, castor bean, and fennel are common invasive species within the wetland habitats within the corridor. There are groups working to control these species particularly in the lagoons; however, they are persistent invasive species.

3.22.3 Environmental Consequences

The area already has a number of aggressive invasive species both on the slopes of I-5 and in the wetland habitats. Construction of any of the build alternatives presents the opportunity for these exotic species to spread. The disturbance of ground during construction provides new ground for weeds to germinate. If minimization measures listed below and partnerships are formed, the growth of invasive species may be reduced. The No Build alternative would not disturb any new ground; however, existing invasive species problems would likely become worse through time and species spread.

3.22.4 Avoidance, Minimization, and/or Mitigation Measures

The construction of any of the build alternatives provides an opportunity to control some of the invasive species on the slopes of the project. Through careful handling of the soil and equipment that works the soil, the invasive plants currently within the impact area can be removed. Revegetation of the slopes would require maintenance to keep the weed species from re-invading the new slopes. Partnerships would be required with the lagoon foundations and landowners to simultaneously work to eradicate similar invasive species outside of the impact areas.

There are several invasive weed species already growing within the right-of-way along I-5. Special care would be taken when transporting, using, and disposing of soils with invasive weed seeds. All heavy equipment would be washed and cleaned of debris prior to entering a lagoon area, to minimize spread of invasive weeds.

The REMP and the following specific conservation measures address invasives control. Additional conservation measures for species and compensatory mitigation for the project that could also apply are discussed in *Sections 3.17* and *3.19*. The full suite of measures is also provided in the project ECR.

- Special care would be taken when transporting, using, and disposing of soils with invasive weed seeds. All heavy equipment would be washed and cleaned of debris prior to entering a lagoon area, to minimize spread of invasive weeds.

- Project landscaping would follow the provisions set forth in EO 13112, which mandates preventing the introduction of and controlling the spread of invasive plant species on highway rights-of-way. No invasive species listed in the National Invasive Species Management Plan, the State of California Noxious Weed List, or the California Invasive Plant Council's (Cal-IPC) Invasive Plant Inventory list would be included in the landscaping plans for the proposed project. Landscaping would not use plants that require intensive irrigation, fertilizers, or pesticides adjacent to preserve areas, and water runoff from landscaped areas would be directed away from adjacent native habitats and contained and/or treated within the development footprint.

- *Caulerpa* surveys would be completed before and after construction at each of the lagoons to ensure there is no infestation within the project limits. If *Caulerpa* is found, measures would be implemented to eradicate it from the area.

- Caltrans would submit final project design plans to the USFWS for review and approval, based on the draft plans dated August 22, 2012, with the following revisions: (1) measures, such as the use of fabric weed barriers and mulch, would be incorporated into the design plans to limit the establishment and spread of invasive species along the oleander median; and (2) invasive species would be removed from planting palettes.

3.23 Relationship Between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.23.1 Build Alternatives

Implementation of build alternatives would result in similar effects related to attainment of short-term and long-term transportation and economic objectives at the expense of some long-term social, aesthetic, biological, noise, and other land use impacts. These transportation improvements are based on State and local comprehensive planning, which considers the need for present and future traffic requirements within the context of present and future land use development. Given the I-5 corridor's importance as a transportation corridor, the local short-term impacts and use of resources by the proposed project would be consistent with maintenance and enhancement of long-term productivity for the local area, San Diego region, and State.

Short-term losses associated with the proposed project could include economic losses experienced by businesses affected by relocation, construction impacts such as noise, and motorized and non-motorized traffic delays or detours, as well as short-term construction-related trail detours or closures. Short-term benefits of the project would include increased jobs and revenue generated during construction.

Long-term losses associated with the proposed build alternatives would include residential relocations; an loss of plant and wildlife resources; a permanent visual impact; energy and fuel use; and use of construction materials including concrete, steel, and asphalt. Long-term productivity would include benefits such as the improvement of the transportation network of the region and project vicinity; increased access facilitating economic growth, maintenance, or improvement in future congestion and delay; and preservation and restoration of some biological resources to a level anticipated to give ecological lift to the entire lagoon system within the North Coast Corridor. Additional benefits include regional and community enhancement opportunities for pedestrian and bike trail amenities, which would provide community cohesive features.

3.23.2 No Build Alternative

This alternative would offer none of the gains or have any of the losses listed above. It also would do nothing to resolve worsening congestion on I-5 or local streets whereas an improved I-5 would substantially benefit long-term function on I-5 and is expected to pull some future traffic off local streets (latent demand) as they become increasingly congested under projected conditions. Private funding to provide the regional and community enhancements, as well as the substantial mitigation package proposed as part of the PWP/TREP within the project timeframe, would be unlikely.

3.24 Irreversible and Irretrievable Commitments of Resources that Would be Involved in the Proposed Project

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

Some irreversible effects would curtail the range of potential future uses of the environment with either the No Build alternative, or any of the four build alternatives.

Implementation of any of the proposed build alternatives involves a commitment of a range of natural, physical, human, and fiscal resources. Land used in the construction of the proposed facility is considered an irreversible commitment and would preclude conversion to any other future use of this land except for the proposed transportation facility. However, if a greater need arises for the land use or if the highway facility is no longer needed, the land could be converted to another use. At present, there is no reason to believe such a conversion would ever be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material are expended during construction. Additionally, large amounts of labor and natural resources are used in the making of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use would not have an adverse effect upon continued availability of these resources. Construction also would require a substantial one-time expenditure of both State and federal funds, which are not retrievable; savings in energy, time, and a reduction in accidents would offset this. In addition to the costs of construction and right-of-way, there would be costs for roadway maintenance, including pavement, roadside, litter/sweeping, signs, and markers, as well as electrical and storm maintenance.

The commitment of these resources is based on the concept that residents in the immediate area, region, and State would benefit from the improved quality of the transportation system. These benefits would consist of improved accessibility and safety, which are expected to outweigh the commitment of these resources.

3.25 Cumulative Impacts

The 8+4 Buffer alternative has been refined since the Draft EIR/EIS was publically circulated in 2010. This alternative was presented as the locally preferred alternative (LPA) in the August 2012 Supplemental Draft EIR/EIS, and has now been identified as the Preferred Alternative. The refined 8+4 Buffer alternative has the least amount of impact of any build alternative and also meets purpose and need.

3.25.1 Regulatory Setting

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of this project. A cumulative effect assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor, but collectively substantial, impacts taking place over a period of time.

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive types of agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, disruption of migration corridors, changes in water quality, and introduction or promotion of predators. They can also contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

CEQA Guidelines, Section 15130, describes when a cumulative impact analysis is warranted and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts under CEQA can be found in Section 15355 of the CEQA Guidelines. A definition of cumulative impacts under NEPA can be found in 40 CFR, Section 1508.7 of the CEQ Regulations.

3.25.2 Affected Environment

Cumulative Analysis Methodology

This cumulative impact analysis evaluates resources directly or indirectly impacted by the proposed project, even if the project impacts would be relatively small. The environmental analyses in the preceding sections in *Chapter 3.0* document the source and degree of impact for each issue addressed in this section. Because each issue addressed could be affected to some degree by the proposed project, a resource study area (RSA) is defined for each issue and an evaluation is made regarding whether the health, condition, or status of each issue is improving, stable, or in decline. A determination is also made regarding whether the proposed project would make a considerable contribution to a cumulative impact on the identified resources.

Section 3.25.3, Environmental Consequences, presents analysis of those issues where the project's contribution could be cumulatively considerable, with a detailed analysis of impacts that could occur in combination with other current and reasonably foreseeable future actions or projects. CEQA Guidelines Section 15130(b) presents two possible approaches for considering past, present, and future reasonably foreseeable projects. It indicates that either of the following could be used:

- A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or
- A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area-wide conditions contributing to the cumulative impact.

This Final EIR/EIS uses the first method, where specific reasonably foreseeable projects are identified. As discussed in more detail in *Section 3.25.3*, information on past, present, and reasonably foreseeable future projects and identified project impacts were gathered from CEQAnet (updated in January 2013).

Based on the results of the cumulative impact analysis of the proposed project and reasonably foreseeable projects, avoidance, minimization, and/or mitigation measures are then presented for issues where the project's contribution may remain cumulatively considerable.

Evaluation of Resource Health and Project Contributions to Cumulative Impacts

This section is the baseline evaluation of the cumulative analysis, with identification of RSAs, resource health or status, and project contribution to cumulative effects, based on the individual evaluations provided below and summarized on *Table 3.25.1*.

RSAs are generally based on the natural boundaries of the resource affected, rather than jurisdictional boundaries. The geographic scope (or area within which projects may contribute to a specific cumulative effect) of the cumulative impact analysis varies depending upon the specific environmental issue area being analyzed.

Table 3.25.1: Resource Study Areas and Resource Evaluations

Environmental Issue	Geographic Scope of Resource Study Area (RSA)	Resource Health/Status	Project Contribution to Cumulative Impacts
Human Environment			
Land Use	North Coast Corridor	Stable	Less than considerable
Growth	San Diego region	Stable	Less than considerable
Farmlands / Agriculture Lands	San Diego region	Stable	Less than considerable
Community Cohesion / Relocations / Environmental Justice	North Coast Corridor	Stable	Less than considerable
Utilities and Emergency Services	North Coast Corridor	Stable	Less than considerable
Traffic and Transportation	North Coast Corridor	Declining	Less than considerable

Table 3.25.1 (cont.): Resource Study Areas and Resource Evaluations

Environmental Issue	Geographic Scope of Resource Study Area (RSA)	Resource Health/Status	Project Contribution to Cumulative Impacts
Human Environment (cont.)			
Visual / Aesthetics Resources	Visual resources RSA	Declining	Considerable
Cultural Resources	San Diego region	Declining	Less than considerable
Physical Environment			
Hydrology / Drainage / Floodplains	Drainage basin, watershed, or waterbody and its tributary area	Impaired but stable	Less than considerable
Water Quality / Storm Water	Drainage basin, watershed, or waterbody and its tributary area	Declining	Less than considerable
Geology / Soils / Seismic / Topography	San Diego region	Stable	Less than considerable
Paleontology	San Diego region	Stable	Less than considerable
Hazardous Waste / Materials	I-5 Construction Zone	Stable	Less than considerable
Air Quality / Climate Change	San Diego Air Basin	Declining	Less than considerable
Noise	North County	Declining	Less than considerable
Energy	San Diego Region	Stable	Less than considerable
Biological Environment			
Natural Communities	Biological Resources RSA	Declining	Considerable
Wetlands and Other Waters	Hydrologic subareas associated with coastal lagoons	Declining	Considerable
Plant Species	Entire area that species or habitat is known to occur in, including San Diego region or all of southern California	Declining	Less than considerable
Animal Species	Entire area that species or habitat is known to occur in, including San Diego region or all of southern California	Declining	Less than considerable
Threatened and Endangered Species	Entire area that species or habitat is known to occur in, including San Diego region or all of southern California	Declining	Less than considerable
Invasive Species	Biological Resources RSA	Stable	Less than considerable

Land Use

The project corridor traverses six municipalities, including San Diego, Del Mar, Solana Beach, Encinitas, Carlsbad, and Oceanside. The majority of land adjacent to the freeway corridor is developed and urban in nature in most of these jurisdictions, and policies are in place within approved general plans and community plans to guide future development. Land use planning efforts are routinely addressed through these local agency plans and planning efforts and formal approval processes and are considered stable.

Section 3.1 of this Final EIR/EIS discusses whether the proposed project would have impacts to existing and planned land uses and policies within land use planning documents. The Final

EIR/EIS concludes that the proposed project would not shift existing land uses, nor would it affect any future land use trends within the jurisdictions in the North Coast Corridor. A detailed analysis of consistency with land use planning documents concludes that while the proposed project has the potential to be inconsistent with several community and general plan element policies, these inconsistencies are not considered to result in different planning outcomes. The proposed project involves the expansion of an existing designated major transportation corridor and has been designed to minimize impacts to existing community land use patterns.

The proposed project would have a less than cumulatively considerable contribution to cumulative land use modifications.

Growth

The majority of the RSA, which includes San Diego, Del Mar, Solana Beach, Encinitas, Carlsbad, and Oceanside, is largely developed with urban uses. Few vacant developable parcels of land are remaining in the immediate vicinity of I-5, and no known projects in the vicinity are dependent on implementation of the proposed project. Patterns of development in areas available for growth are regulated by land use plans and municipal codes of the responsible jurisdictions. Resource status is evaluated as stable.

Section 3.2 of this Final EIR/EIS discusses whether the proposed project would result in otherwise unforeseen direct, indirect, or secondary growth, or would otherwise influence growth. Further growth in the project area and surrounding region is projected and planned for by the land use agencies (regional planning agencies and local cities) and would be expected to occur with or without implementation of the proposed project. The *I-5 NCC Project* is growth-accommodating rather than growth-inducing.

The proposed project would have a less than cumulatively considerable contribution to regional growth.

Farmlands/Agriculture Lands

With regard to the County overall, although percentages of specific crops have varied, agricultural use continues to provide a vibrant economic resource. In 1986, farming acreage (nursery crops, flower crops, fruit and nut crops, vegetable crops, and field crops) totaled 172948 ac (San Diego County Department of Agriculture, Weights and Measures [County Department of Agriculture] 1997). In 2010, these same crops totaled 307291 ac (County Department of Agriculture 2010). Nursery, field, and flower crops are the types of crops grown most actively in the North Coast Corridor. Therefore, despite past conversions of agricultural lands, the types of farmland that would be impacted by the proposed project are not decreasing in quantities within the County, and resource status is evaluated as stable.

The largest build alternative would result in the conversion of less than 27 ac of prime farmland and unique farmland that are currently in agricultural production. This was not considered a substantial impact for the project because the loss was substantially below the Natural Resources Conservation Service (NRCS) threshold for detailed agricultural evaluation. Impacts would be even less under the refined 8+4 Buffer alternative footprint, where approximately 11 ac of active farmland would be impacted (see *Section 3.3* of this Final EIR/EIS).

Agricultural impacts associated with I-5 improvements would occur within the coastal zone. The above discussion relative to County impacts overall would also apply to coastal agriculture.

Specifically with regard to parcel viability, as discussed in *Section 3.3* of this EIR/EIS, there is one location in the North Coast Corridor where project impacts to agricultural lands (adjacent to Manchester Avenue in Encinitas) raise potential consistency issues with Sections 30241 and 30242 of the Coastal Act. In this location, approximately 28 percent of an agricultural parcel would be impacted by the Preferred Alternative. As described in *Section 3.3*, the answer of continued agricultural viability is positive.

The proposed project would have a less than cumulatively considerable contribution to the stable condition cumulative farmlands/agricultural lands impacts.

Community Cohesion/Relocations/Environmental Justice

Environmental justice and community cohesion are issues that are specific to an affected population or community. No other projects were identified with potential environmental justice impacts or community cohesion impacts within the community affected by the proposed project; therefore, resource status is evaluated as stable.

Urban development in the *I-5 NCC Project* area has primarily occurred on undeveloped land and impacts to local communities, such as displacements and disproportionate effects on populations, have been minimized. New construction and/or right-of-way acquisition associated with the implementation of the *I-5 NCC Project* in conjunction with other transportation projects in the region could result in displacement impacts to residences and/or businesses. Such impacts would be isolated to a very few locations, as discussed in *Section 3.4* of this Final EIR/EIS.

The proposed project would have a less than cumulatively considerable contribution to community cohesion, relocations, and environmental justice impacts.

Utilities and Emergency Services

Public utilities are located throughout the North Coast Corridor. These utilities include existing gas, electric, television/cable, and sewer and water lines, and are often placed within public right-of-way. Utilities are maintained by various jurisdictions responsible for their uninterrupted service to customers. Although facilities such as pipelines, overhead power lines, and treatment plants may experience intermittent problems or localized failure, such issues are expeditiously addressed and corrected. CHP and emergency vehicles regularly use the general purpose lanes, median, outside shoulders, and other areas within Caltrans' right-of-way without incident. Resource status is evaluated as stable.

Section 3.5 of this Final EIR/EIS notes that above-ground and below-ground utility relocations would be required due to the proposed project, and some utilities may require protection in place during construction. It is not anticipated that utility services would be interrupted during construction and utility relocation activities. Coordination between Caltrans and utility companies has been ongoing and would continue throughout the project design process. Regarding emergency services during construction, emergency access would be retained as one of the TMP required elements. In the long term, response time for emergency services and law enforcement would likely improve over No Build conditions with the implementation of the proposed project, due to an anticipated reduction in traffic congestion as well as improved street and freeway access.

The proposed project would have a less than cumulatively considerable contribution to regional utilities and emergency services impacts.

Traffic and Transportation

Traffic congestion exists along the freeway system and travelers experience extensive delays traveling through the area. With the regional population projected to increase in the future, the expectation is that congestion delays would continue to increase in duration. Resource status is evaluated as declining.

Section 3.6 of this Final EIR/EIS outlines the existing and future traffic conditions in the North Coast Corridor and the effects of the proposed project. The *I-5 NCC Project* would add capacity and improve circulation within the North Coast Corridor as traffic volumes continue to increase. Therefore, the project would have beneficial effects on the regional transportation system and would not generate new traffic in the San Diego region. Other transportation improvements planned in the North County area and addressed in the RTP would also improve operating conditions.

The proposed project would have an incrementally beneficial impact on regional traffic conditions and a less than cumulatively considerable adverse contribution to cumulative traffic and transportation impacts.

Visual/Aesthetics Resources

The landscape of northern coastal San Diego County is characterized by the Pacific Ocean and natural features formed by the action of water on earth. Sandy beaches, sandstone bluffs, coastal lagoons, broad river valleys, steep canyons, expansive mesas, and rolling foothills constitute the predominant landforms. Along the I-5 corridor there are various scenic areas including lagoons and harbors, coastal parks, and prominent land and water features. Much of the coastal plain has been developed with varying densities of urban and suburban development. The region is aesthetically appealing and a major tourist destination.

The I-5 freeway passes through San Diego's North County seaside communities, the visual components of which establish the character of the corridor. Although each community has a unique visual identity, a powerful unity is also present because of shared landform components. The San Diego coast continues to boast a beautiful landscape, and the scenic area continues to draw new visitors and residents each year. The intense urban development, however, of the past 30 years has changed the character of the corridor greatly; therefore, resource status is evaluated as declining.

As discussed in detail in *Section 3.7* of this Final EIR/EIS, adverse visual quality impacts would result from the creation of manufactured slopes and noise barriers and the loss of landscaping and decreased visual buffers proposed for the project within the viewshed of the freeway.

Although project-specific measures integrated into the proposed project, such as landscaping, contour grading, potential use of transparent soundwalls in specific locations, and use of a gap where necessary in a solid soundwall would minimize the visual contrast, the project would still result in visual and aesthetic impacts anticipated to result in a cumulatively considerable contribution to changes in the corridor, as discussed below under *Section 3.25.3*.

Cultural Resources

Development of towns along the coastal zone has resulted in the loss of a number of known (and anticipated but unknown) prehistoric and historic cultural resources associated with past populations. Cultural resources are non-renewable resources. As such, their loss results in the loss of cultural information and scientific data that cannot be regained. Regardless of the efforts to avoid impacts, the more open land that is converted to developed uses, the greater the potential for impacts to cultural resources. In addition, redevelopment of developed land would increase the potential loss of historic resources through their physical demolition, destruction, or relocation, or alteration of their surroundings. Because these resources are now protected by federal, State, and local regulations, each project would be required to comply with the regulations in order to reduce their project-level impacts to appropriate levels. Because loss of historic and prehistoric resources in the developed coastal zone has largely already occurred due to existing development, resource status is evaluated as declining.

As discussed in *Section 3.8* of this Final EIR/EIS, the *I-5 NCC Project* would have no impacts to known and potentially eligible prehistoric sites along the I-5 corridor. A similar finding was made for historic built resources. For most known resources, no impacts to known and potentially eligible built structures, or their setting, along the I-5 corridor would occur. Sliver impacts to one built property would not affect any structures or setting elements that contribute to property eligibility. Any (currently unanticipated) impacts occurring to potentially eligible sites that are unknown but discovered during construction would be mitigated in accordance with measures identified in *Section 3.8*, which would allow for retention of site data and coordination with the Most Likely Descendant (MLD).

The proposed project would have a less than cumulatively considerable contribution to cumulative cultural resources impacts caused by development in the region.

Hydrology/Drainage/Floodplains

Within the drainage and floodplains RSA are lagoons, creeks, and rivers, the majority of which are designated as Federal Emergency Management Agency (FEMA) floodways or floodplain. These features are part of larger drainage basins, and include varied development patterns. The Los Peñasquitos Creek watershed, composed partly of the hydrologic subarea surrounding Los Peñasquitos Lagoon, encompasses a land area of approximately 100 square mi including portions of the Cities of San Diego, Poway, and Del Mar. The Rancho Santa Fe hydrologic subarea surrounding San Dieguito Lagoon is part of the San Dieguito River watershed, which extends through a diverse array of habitats from its eastern headwaters in the Volcan Mountains to the outlet at San Dieguito Lagoon and the Pacific Ocean. The Carlsbad hydrologic unit encompasses 210 square mi within northern San Diego County that extends well beyond the boundaries of the City of Carlsbad. It covers substantial portions of the Cities of Oceanside, Vista, San Marcos, Escondido, Encinitas, and Solana Beach in addition to most unincorporated portions of the County of San Diego. The hydrologic unit is separated into several hydrologic subareas, including San Elijo, Batiquitos, Los Monos, and El Salto. The San Elijo hydrologic subarea extends to the east of the San Elijo Lagoon. Coast Highway 101, the San Diego Northern Railway (SDNR), and I-5 divide San Elijo Lagoon into three basins connected by narrow channels. Batiquitos Lagoon, within the Batiquitos hydrologic subarea, is also divided into three basins by El Camino Real, Carlsbad Boulevard, Highway 101, I-5, and the SDNR. The El Salto hydrologic subarea encompasses Buena Vista Creek and Buena Vista Lagoon. Similar to Batiquitos and San Elijo Lagoons, Buena Vista Lagoon is crossed by I-5, Coast Highway 101, and the SDNR, dividing it into four basins. The San Luis Rey watershed originates in the Palomar and Hot Springs Mountains and includes an area of approximately 562 square mi in northern San Diego County. The San Luis Rey River is the principal drainage in this watershed and extends generally west from its headwaters for over 55 mi before ultimately discharging to the Pacific Ocean near the City of Oceanside. Local hydrologic subareas include Mission near the coast (including the I-5 corridor) and adjacent upstream areas, as well as Bonsall extending further inland.

These features are currently affected by abutting development and prior berming/encroachment into the floodplain. North-south berming to support primary transportation routes (e.g., Coast Highway, railway, and I-5) crosses east-west draining features and affects current flow. Regulations are now in place to address drainage issues. Each project in the RSA would be required to implement drainage control measures and comply with applicable storm water regulations on a project level in order to prevent downstream impacts; including runoff volumes, velocities, and flood levels. Resource status is evaluated as stable.

Potential project impacts to drainages in the proposed project corridor are discussed in *Section 3.9* of this Final EIR/EIS. Several bridges over coastal lagoons in the study area would be replaced as part of the proposed project and would allow for wider and deeper channels. Site-specific improvements, such as detention features, also are integrated into the *I-5 NCC Project* design to prevent adverse impacts to downstream drainages.

The proposed project would have a less than cumulatively considerable contribution to cumulative hydrology, drainage, and floodplain impacts.

Water Quality/Storm Water

Existing development in the coastal zone has resulted in impaired water bodies resulting from development runoff. Historically, the primary watershed areas contain area lagoons, each of which has been subject to water quality impacts. A summary of elements leading to current resource status is provided in the paragraph below.

Los Peñasquitos Creek discharges to a 384-ac lagoon that is identified as an impaired water body on the California 303(d) list for sedimentation. Los Peñasquitos Lagoon originally supported Native American settlements. More recently, surrounding areas were used for grazing, and from 1962 to 1972, treated sewage was discharged into the lagoon. In San Dieguito Lagoon, sewage was discharged into oxidation ponds and into channels from 1940 to 1974. An area between the channel arms supported an airfield and light industry between 1942 and 1964 (a Coastal Commission study dates airfield construction to the 1920s). Farming has occurred intermittently at the site of the lagoon both east and west of I-5 since the 1920s, and the racetrack and fairground were built on fill in 1935. The Agua Hedionda, Buena Vista, and San Elijo Lagoons are experiencing impairments to beneficial uses due to excessive coliform bacteria and sediment loading from upstream sources, as well as being bisected by primary transportation routes. Other water bodies in the Carlsbad hydrologic subarea have been identified as impaired on the California 303(d) list for elevated coliform bacteria, including several locations in the Pacific Ocean near creek and lagoon outlets. Similar to Batiquitos and San Elijo lagoons, Buena Vista Lagoon is crossed by I-5, Coast Highway 101, and the SDNR, dividing it into four basins. The railroad was built in 1883, and salt evaporation ponds were constructed in 1900. Treated effluent was discharged into the lagoon from 1956 to 1965; since 1960, 160 ac of marsh have been filled for development purposes. Surrounding lands were dedicated to grazing and farming prior to the rapid urbanization that began in the 1970s. The San Luis Rey River west of Interstate 15 is listed as impaired on the State 303(d) list for a number of constituents (e.g., bacteria and total dissolved solids), with identified sources including mining, urban and agricultural uses. Overall, resource status is considered impaired, but stable due to Statewide regulations.

With regard to highway improvements, new construction proposed by the project within the North Coast Corridor has the potential to impact water quality during the construction phase, as well as during operation. Potential sources of constituents from construction activities could be generated from construction materials and activities, such as vehicle fluids, asphaltic emulsions from paving activities, joint and curing compounds, concrete curing compounds, solvents and thinners, paint, sandblasting material, landscaping materials, treated lumber, Portland cement concrete rubble, and general litter. Examples of construction activities that have the potential to contribute such constituents include clearing and grubbing, grading operations, soil import operations, sandblasting, landscaping, and utility excavation. During operation, potential sources of pollutants found in highway runoff, for example, include sediment from natural erosion; nutrients (nitrogen and phosphorus) from tree leaves or other vegetation debris, mineralized organic matter in soil, fertilizer runoff, nitrite from automobile exhausts, atmospheric deposition, emulsifiers, and surfactants; pesticides; and metals (dissolved and particulate) from combustion products of fossil fuels, wearing of brake pads, and corrosion.

State regulations and Caltrans design requirements, however, are in place to address measures to control these water-borne pollutants. Caltrans would address water quality through the installation of “treatment” best management practices (BMPs) as well as existing “treatment” BMPs (described in *Section 3.10* of this Final EIR/EIS). The proposed project would be required to implement BMPs and comply with applicable storm water and water quality regulations on a project level in order to prevent the downstream migration of sediments and pollutants. An equivalent of all new I-5 pavement proposed under the project would be subject to “treatment,” and a percentage of existing I-5 pavement that is currently not subject to “treatment” also would receive “treatment” with project implementation. This would improve the existing condition.

The proposed project would have an incrementally beneficial effect on the current impaired status of water quality in the watersheds, and have a less than cumulatively considerable adverse contribution to cumulative water quality and storm water impacts.

Geology/Soils/Seismic/Topography

Similar to the rest of southern California, the San Diego County region is prone to seismic and geologic hazards due to the presence of regional faults and other geologic hazards. These geologic features increase the risk of structural damage and public harm caused by earthquakes and other seismic conditions. Soil conditions also vary, with some soils exhibiting more erosion potential than others. The implementation of proper building techniques and project designs that take these hazards into account reduce potential property damage, harm to humans, and siltation. Impacts caused by geologic hazards are generally confined to a specific project area where development is proposed, and are prevented by requirements to implement design standards prescribed in the site-specific geotechnical reports. With regard to soils, requirements to implement BMPs and comply with applicable storm Water and water quality regulations prevent the downstream migration of sediments. Resource status is evaluated as stable.

Similar to other projects throughout the region, the proposed project would implement the requirements necessary to prevent geology and soils impacts, as discussed in *Section 3.11* of this Final EIR/EIS.

The proposed project would have a less than cumulatively considerable contribution to geology and soils impacts.

Paleontology

The project area contains formations that are known to contain important land mammal and marine invertebrate fossil assemblages, and may produce important microfossil specimens. Development within the coastal zone has resulted in disturbance of geologic formations with moderate to high paleontological resource potential, with ongoing development resulting in some continuing excavation of fossils. Impacts to paleontological resources are generally confined to a specific project area where development is proposed. Construction monitoring required by local jurisdictions is a typical site-specific requirement, and the professional retrieval and preservation of fossils continues to yield new scientific information that benefits fossil research. Resource status is evaluated as stable.

Similar to other projects throughout the region, the proposed project would implement the monitoring and retrieval requirements necessary to mitigate impacts to paleontological resources, as discussed in *Section 3.12* of this Final EIR/EIS. As a result, non-renewable resources would not be lost, but would be retrieved and evaluated, thereby supporting fossil research.

The proposed project would have a less than cumulatively considerable contribution to paleontology impacts.

Hazardous Waste/Materials

The project is located in an area that has experienced changes in development patterns over its history; including agricultural uses, commercial uses now subject to redevelopment, support uses such as gas stations, etc. These past and current uses can leave residues in the soils related to oils, gases, pesticides, etc. that can be hazardous when disturbed. New construction has the potential to disturb soils and other materials containing hazardous materials, such as aerially deposited lead, petroleum hydrocarbons, pesticides, herbicides, and other contamination due to historic uses in and around the project areas. All projects are required to comply with the applicable regulations pertaining to the safe handling and removal of hazardous waste/materials. Resource status is evaluated as stable.

Wherever possible, the *I-5 NCC Project* would use the existing I-5 alignment to avoid and/or minimize impacts from hazards and hazardous materials. Where avoidance is not possible, the project incorporates measures to avoid potential disturbances of contamination areas, as described in *Section 3.13* of this Final EIR/EIS.

The proposed project would have a less than cumulatively considerable contribution to regional hazardous waste/materials impacts.

Air Quality/Climate Change

The San Diego Air Basin (SDAB) currently meets the federal air quality standards for all of the criteria air pollutants except ozone (O_3), as noted in *Section 3.14* of this Final EIR/EIS. Development and increasing traffic in the region continue to occur, resulting in the potential for emissions to exceed planned estimates, for emissions levels to contribute to a violation of standards, for a substantial increase in pollutant levels to occur, or for sensitive receptors to be exposed to substantial pollutant concentrations. Greenhouse gases refer to emissions that trap heat in the atmosphere. As described in *Chapter 4, Section 4.6, Climate Change*, of this document, this is a global condition that is generally considered to be worsening. Resource status is evaluated as declining.

The proposed project in the North Coast Corridor would increase transportation capacity, relieve congestion, improve operations, and provide better circulation. In addition, the proposed project would accommodate--and not increase--population growth (which produces new emission sources within the region). To the extent that it is feasible, the following measures are included in the project to reduce the GHG emissions and potential climate change impacts from the project: (1) Caltrans and the CHP are working with regional agencies to implement ITS to help manage the efficiency of the existing highway system; (2) Caltrans, SANDAG, participating corporations, and local governments are providing ridesharing services and park and ride facilities to help manage the growth in demand for highway capacity; and (3) the project would incorporate the use of energy efficient lighting, such as light-emitting diode (LED) traffic signals. These LED bulbs consume 10 percent of the electricity of traditional lights, which would also help reduce the projects CO_2 emissions. Based on detail provided in *Section 4.6,* the project would result in improved conditions over the No Build alternative.

The proposed project would have a less than cumulatively considerable contribution to cumulative regional air quality impacts and climate change within the SDAB.

Noise

The North Coast Corridor is located within a setting of urban development and interspersed open space in north San Diego County. Due to relative dense urban uses and the presence of major transportation corridors such as I-5, rail lines, and Coast Highway as well as surface street activity, noise levels are generally elevated. Specifically adjacent to the I-5 corridor, noise is currently elevated for a number of sensitive receptors, with noise primarily attributable to vehicle usage along the freeway. As traffic increases, noise will continue to increase. Resource status is evaluated as declining.

The predicted future peak hour $L_{eq}(h)$ at the representative noise-sensitive receptors with the proposed project would range from 57 to 82 dBA. This would exceed the noise abatement criteria (NAC) that are used to determine when a noise impact would occur at most locations, as discussed in *Section 3.15* of this Final EIR/EIS. Many of the same noise receptors would experience noise in excess of the NAC without the proposed project (i.e., under no build conditions), as a result of community-wide growth. The *I-5 NCC Project* would increase noise levels from without project conditions by 3 dBA or less for the great majority of noise sensitive receptors. This is an increase that is generally not heard by the normal healthy human ear. To address the project's noise impacts, soundwalls are recommended in various locations along the *I-5 NCC Project*, as described in *Section 3.15*. In some instances, sound walls were found to be not "feasible" or not "reasonable." Regardless, although the project would contribute to increases in noise immediately adjacent to the I-5 corridor, when the North County region as a whole is evaluated, the focused nature of I-5 results in I-5 noise being relatively restricted in nature. While audible to those receptors immediately abutting the facility, it generally fades with distance, so that noise generators closer to the hearer take precedence.

The proposed project would have a less than cumulatively considerable contribution to regionally cumulative noise impacts.

Energy

Direct and indirect energy consumption continues to increase as population and the economy grow. The majority of existing energy consumption is traffic related. Demand stimulates fossil fuel production, but there is also a stimulus for energy production from renewable sources. Resource status is evaluated as stable.

As discussed in *Section 3.16* of this Final EIR/EIS, construction activities such as the use of heavy machinery, detours, lane closures, the import and export of materials and equipment, etc., could substantially increase energy consumption, but post-construction and operational requirements of the facility should be less with the proposed project. In addition, efforts would be made to minimize energy consumption during construction, including implementing recycling and using energy-efficient construction vehicles.

The proposed project would have a less than cumulatively considerable contribution to regional energy impacts.

Natural Communities

Development west of I-5 is essentially built to capacity, with redevelopment projects also occurring. East of I-5, development continues rapidly, with projects adjacent to I-5 nearing capacity and increasing farther inland. The areas around the lagoons, Los Peñasquitos Canyon in the south, and Camp Pendleton to the north are the main remaining areas of open space in the project corridor. The natural community RSA is therefore considered coastal San Diego County between El Camino Real and the Pacific Ocean.

Development over time throughout the coastal region has reduced the amount of native habitat and species in the region. This development has also limited the ability to expand habitat around the lagoons and large open space areas. There is, however, currently a large effort to restore salt marsh habitat around San Dieguito Lagoon, and there are plans to restore San Elijo, Agua Hedionda, and Buena Vista lagoons.

The regional decline in native habitats and the plant and wildlife species they support has resulted in County-wide conservation efforts. The San Diego Multiple Species Conservation Plan (MSCP) was developed as a regional plan to provide for the long-term preservation of sensitive plant and animal species and natural vegetation within the City of San Diego, while allowing for continued economic development within the region. Subsequently, the Multi-habitat Conservation Plan (MHCP) and the North County MSCP have been developed for portions of San Diego County that were not originally addressed in the San Diego MSCP.

Historical development along the I-5 corridor has impacted each of the watersheds and lagoons in the RSA. Construction of the railroad and Pacific Coast Highway resulted in causeways across the coastal lagoons, limiting tidal influences and forcing flows through one area, in the late 1800s and early 1900s. The original construction of I-5 in the 1960s further impacted the wetlands of the lagoons and constrained lagoon hydraulics with placement of fill and bridges over the lagoons east of the railroad bridges. Some of the restoration projects for San Elijo and Buena Vista lagoons plan to reduce tidal muting and enhance flows and wetland habitats in the lagoons. Resource status within the RSA overall is evaluated as declining.

As discussed in detail in *Section 3.17* of this Final EIR/EIS, the proposed project would generate substantial impacts to a variety of natural communities throughout the corridor. Due to surrounding uses (including abutting sensitive habitats) mitigation is not always feasible in the area of the direct impact.

The potential exists for the *I-5 NCC Project* to make a cumulatively considerable contribution to natural communities impacts in the RSA, as discussed below under *Section 3.25.3*.

Wetlands and Other Waters

The proposed project traverses several wetlands and waters that are fed by a number of streams and rivers. Los Peñasquitos, San Dieguito, San Elijo, Batiquitos, Agua Hedionda, and Buena Vista lagoons, and the San Luis Rey River are the major wetland and open water bodies along the project corridor. Therefore, for the purposes of this cumulative discussion, the RSA is defined as the hydrologic subareas associated with these coastal lagoons.

Los Peñasquitos Creek watershed, encompasses a land area of approximately 100 square mi; including portions of the Cities of San Diego, Poway, and Del Mar. The watershed is highly urbanized, with a population of approximately 400,000 residents. The creek discharges to a 384-ac lagoon that is identified as an impaired water body.

The San Dieguito River watershed extends through a diverse array of habitats from its eastern headwaters in the Volcan Mountains to the outlet at San Dieguito Lagoon and the Pacific Ocean. There are several important natural areas within the watershed that sustain a number of threatened and endangered species. Among these are the 55-mi long, 80,000-ac San Dieguito River Park; the 150-ac San Dieguito Lagoon; and five water storage reservoirs including Lake Hodges, Lake Sutherland, and Lake Poway. Southern California Edison (SCE) started a large restoration project in San Dieguito Lagoon in 2006. The project created approximately 150 ac of tidal wetlands to mitigate for offshore impacts resulting from the warm water outfall at SONGS.

As noted above, the Carlsbad hydrologic unit encompasses 210 square mi within northern San Diego County. It covers substantial portions of the Cities of Oceanside, Vista, San Marcos, Escondido, Encinitas, and Solana Beach in addition to most unincorporated portions of the County of San Diego. The hydrologic unit is separated into several hydrologic subareas, including San Elijo, Batiquitos, Los Monos, and El Salto. The Agua Hedionda, Buena Vista and San Elijo coastal lagoons represent critical regional resources that provide freshwater and estuarine habitats for numerous plant and animal species.

Coast Highway 101, the SDNR and I-5 divide San Elijo Lagoon into three basins connected by narrow channels. San Diego County, with the assistance of the California Department of Fish and Wildlife (CDFW; previously California Department of Fish and Game), manages all three basins as an Ecological Reserve. The Reserve has 10 mi of trails and accommodates approximately 50,000 visitor-days per year; passive recreational activities such as fishing and horseback riding are the predominant uses, which are permitted in selected areas. Several dikes and levees were constructed between 1880 and 1940 to create access roads, duck ponds, and sewage treatment ponds in San Elijo Lagoon. The dikes have eroded and hunting was discontinued in 1971. From 1940 until as late as 1973, the lagoon received wastewater from the City of Escondido.

Batiquitos Lagoon, within the Batiquitos hydrologic subarea, is also divided into three basins by El Camino Real, Carlsbad Boulevard, Highway 101, I-5, and the SDNR. In 1983, the lagoon was designated a CDFW State Ecological Reserve. Passive recreation is the predominant use, and there are two trails along the north shore of the lagoon. In the eastern basin, 25 ac were used as evaporation ponds from 1901 to 1910, and secondary treated wastewater was discharged into the lagoon from 1967 to 1974.

In the Agua Hedionda Lagoon, SDG&E constructed the Encina Power Plant and a tidal basin to provide its cooling water in the 1950s. A mitigation project involving restoration of several wetland habitats was undertaken in 1985 and considered unsuccessful. SDG&E expects to implement a dredging project in the future, which may include revegetation of some areas with eelgrass.

Buena Vista Lagoon is within a State Ecological Reserve in which fishing and passive recreation are permitted uses, and a visitor center run by the local chapter of the National Audubon Society offers interpretive information. Similar to Batiquitos and San Elijo lagoons, Buena Vista Lagoon is crossed by I-5, Coast Highway 101, and the SDNR, dividing it into four basins. The railroad was built in 1883, and salt evaporation ponds were constructed in 1900. Treated effluent was discharged into the lagoon from 1956 to 1965; since 1960, 160 ac of marsh have been filled for development purposes. Surrounding lands were dedicated to grazing and farming prior to the rapid urbanization that began in the 1970s.

The wetlands RSA is home to six major lagoon systems which represent some of southern California's most important natural resource areas. These lagoon systems and upper watersheds provide large, contiguous habitat areas that support sensitive habitats for a variety of plant and wildlife species, and that provide water quality, flood control, groundwater recharge, and recreation benefits. The North Coast Corridor's lagoon systems and their habitats are biologically unique and cannot be replicated elsewhere. Resource status is evaluated as declining.

As discussed in detail in *Section 3.18* of this Final EIR/EIS, the proposed project would generate substantial impacts to wetland resources throughout the corridor. Although no net loss of wetlands would occur as a result of project design, planning, and mandatory regulatory requirements, due to abutting uses (including the presence of sensitive habitat) mitigation may not occur in the watershed where the impact occurs.

The potential exists for the *I-5 NCC Project* to make a cumulatively considerable contribution to cumulative wetlands and other waters impacts in the RSA, as discussed below under *Section 3.25.3*.

Plant Species

The North Coast Corridor features a number of sensitive plant species, including Del Mar sand aster, coastal scrub oak, Orcutt's pincushion, sea dahlia, wart-stemmed ceanothus, coast barrel cactus, southern tarplant, and Torrey pine. Several of these species only reside in the coastal area of San Diego County. Their range and number of individuals has been reduced due to past disturbances by urban development and related infrastructure, including I-5. These "special-status" species are rare and/or subject to population and habitat declines and are afforded varying levels of regulatory protection. Resource status is evaluated as declining.

As discussed in detail in *Section 3.19* of this Final EIR/EIS, the proposed project could generate impacts to certain sensitive plants, including each of the species noted above. Avoidance, minimization, and mitigation measures for the proposed project specify that seed would be collected or plants would be salvaged to the extent practicable in the impact areas. Salvaged plants and seed would be planted in mitigation sites, on revegetated new slopes, or in revegetated areas that are temporarily impacted.

The proposed project would have a less than cumulatively considerable contribution to cumulative sensitive plant species impacts.

Animal Species

The North Coast Corridor features a number of special status wildlife species whose ranges and numbers have declined due to past disturbances by urban development and related infrastructure, including I-5. These “special-status” species, including San Diego horned lizard, Coronado Island skink, orange-throated whiptail, rufous-crowned sparrow, raptors, loggerhead shrike, desert woodrat, and San Diego pocket mouse, are rare and/or subject to population and habitat declines and are afforded varying levels of regulatory protection. Resource status is evaluated as declining.

As discussed in detail in *Section 3.20* of this Final EIR/EIS, the proposed project could generate impacts to certain sensitive animals, including the species noted above. Because of the status of such sensitive animal species, the *I-5 NCC Project* would take precautions to avoid construction-period impacts. Habitat removals would be minimized and mitigated, as discussed in *Sections 3.17* through *3.22* of this document.

The proposed project would have a less than cumulatively considerable contribution to cumulative sensitive animal species impacts in the RSA.

Threatened and Endangered Species

The North Coast Corridor features a number of threatened and endangered plant and wildlife species whose ranges and numbers have declined due to past disturbances by urban development and related infrastructure, including I-5. These species have been subjected to both direct and indirect effects as the North County Coastal area has developed over the years. Implementation of additional development and/or infrastructure improvements could result in additional permanent and temporary impacts to threatened and endangered species, even though compliance with applicable MSCP or MHCP policies is generally required to compensate for impacts to threatened and endangered species. Resource status is evaluated as declining.

As discussed in detail in *Section 3.21* of this Final EIR/EIS, the proposed project could generate impacts to certain species, including designated critical habitat for the least Bell’s vireo, southwestern willow flycatcher, tidewater goby, and the California gnatcatcher. Sensitive bird species that forage and nest within the lagoons at certain times of the year could experience adverse effects on breeding behaviors. Potential temporary impacts could occur to steelhead trout habitat within the San Luis Rey River. Designated critical habitat for several threatened or endangered bird species (i.e., least Bell’s vireo and coastal California gnatcatcher) would be removed. In all cases, the *I-5 NCC Project* would be required by regulations to minimize and/or mitigate for impacts to sensitive wildlife. Avoidance, minimization, and mitigation measures identified in *Sections 3.17* through *3.22* would reduce all project-level impacts to these species and would prevent adverse effects on the long-term conservation of these high-interest species.

The proposed project would have a less than cumulatively considerable contribution to cumulative threatened and endangered species impacts in the RSA.

Invasive Species

The adverse effects of invasive species are highly localized. The RSA already has a number of aggressive invasive species both on the slopes of I-5 and in the wetland habitats. As development proceeds in the RSA, projects would remove existing invasives, install non-invasive species and control invasive species through maintenance activities. Past and planned lagoon restoration work in the lagoons would further remove invasive species in those portions of the I-5 corridor. Resource status is evaluated as stable.

As discussed in detail in *Section 3.22* of this Final EIR/EIS, construction would provide an opportunity to control some of the invasive species, which represents a benefit to other desirable species. The *I-5 NCC Project* would control some of the invasive species on the slopes of the project by carefully removing soil containing invasive plants and revegetating slopes to prevent their expansion and re-population.

The proposed project would have a less than cumulatively considerable contribution to cumulative invasive species impacts.

Resource Evaluation Conclusions

As indicated on *Table 3.25.1*, based on the above analysis of resource health or status and the level of project contributions to cumulative impacts, the *I-5 NCC Project* would make a cumulatively considerable contribution to cumulative impacts to the following resources:

- Visual/aesthetics resources (*Section 3.7*)
- Natural communities (*Section 3.17*)
- Wetlands and other waters (*Section 3.18*)

The health or status of each of these resources has been evaluated as declining. The environmental consequences of cumulative impacts for these three issues are discussed in more detail in *Section 3.25.3* below.

For all other issues, the proposed project would not make a cumulatively considerable contribution to cumulative impacts, even though some resources may be evaluated as having declining health (see *Table 3.25.1*). These issues, which are not discussed further in this section, are the following:

- Land Use (*Section 3.1*)
- Growth (*Section 3.2*)
- Farmlands/Agricultural Lands (*Section 3.3*)
- Community Impacts *(Section 3.4)*
- Utilities and Emergency Services (*Section 3.5*)
- Traffic and Transportation/ Pedestrian and Bicycle Facilities (*Section 3.6*)
- Cultural Resources (*Section 3.8*)
- Hydrology/Drainage (and Floodplains) (*Section 3.9*)
- Water Quality and Storm Water Runoff (*Section 3.10*)
- Geology/Soils/Seismic/Topography (*Section 3.11*)
- Paleontology (*Section 3.12*)
- Hazardous Waste/Materials (*Section 3.13*)
- Air Quality (*Section 3.14*)
- Noise (*Section 3.15*)
- Energy (*Section 3.16*)
- Plant Species (*Section 3.19*)
- Animal Species (*Section 3.20*)
- Threatened and Endangered Species (*Section 3.21*)
- Invasive Species (*Section 3.22*)

3.25.3 Environmental Consequences

Resources Addressed

Based on the resource evaluations in *Section 3.25.2*, the issues where the proposed project could make a cumulatively considerable contribution to cumulative impacts are visual/aesthetic resources, natural communities, and wetlands and other waters. A detailed analysis of impacts that could occur for these three issues in combination with other current and reasonably foreseeable future actions or projects is presented below.

Future Actions or Projects

As mentioned above, information on past, present, and reasonably foreseeable future projects and identified project impacts was gathered from CEQAnet (updated in January 2013). *Figure 3.25-1, Approximate Locations of Cumulative Projects*, presents the projects within the *I-5 NCC Project* cumulative study area. *Table 3.25.2* summarizes those projects within the cumulative study area (comprised of specific RSAs) that would result in adverse impacts to those resource areas to which the *I-5 NCC Project* would contribute cumulative impacts (i.e., visual resources, natural communities, and wetlands and other waters).

If projects within the RSAs would not affect these same resources or are outside the RSA, there is no potential for cumulative impacts and they are not listed in *Table 3.25.2*. The locations of other projects within the visual resources RSA are presented in *Figure 3-25.2*. The locations of other projects within the natural communities RSA are presented in *Figure 3-25.3*. The locations of other projects within the wetlands and other waters RSA are presented in *Figure 3-25.4*.

The following detailed assessment of potential cumulative impacts for each of the three issues summarizes impacts of the *I-5 NCC Project*, discusses related impacts of other cumulative projects (listed in *Table 3.25.2*), and presents conclusions of the cumulative analysis.

Visual/Aesthetics Resources

Impacts of the I-5 NCC Project to Visual/Aesthetics Resources

The Visual Impact Assessment identifies 18 different Landscape Units and 17 “Key views” in order to assess the visual impacts of the project. These Landscape Units encompass the area along the proposed project corridor that could be visually affected by the project. For the purposes of this analysis, the visual RSA is therefore defined as these identified landscape units and everything west to the Pacific Ocean, as shown in *Figure 3-25.2*.

Of the 17 “Key views” identified in the Visual Impact Assessment (two assessments were made for Holiday Park), 8 have been assessed to have High visual impact, 7 have been assessed to have Moderately High visual impact, 1 has been assessed to have Moderate visual impact, 1 has been assessed to have a Moderately Low visual impact, and 1 has been determined to have No Adverse Visual Impact, as identified in *Section 3.7*. As shown in *Figure 3-7.112,* there would be visual resource impacts to 7 of the 18 Landscape Units, including loss of view of resource and impact to resource. There are also corridor impacts to 15 Landscape Units, including loss of desirable view or “tunnel effects,” large walls or structures and loss of mature trees. There are 14 Landscape Units that have been identified to have community visual impacts because of their proximity to the freeway and incompatible community entry.

Impacts of Other Cumulative Projects to Visual/Aesthetics Resources

There are several planned projects in or near the project limits that could have visual impacts as outlined in *Table 3.25.2* and described below.

The I-5 / Genesee Avenue Bridge Widening and Interchange Improvement, I-5 / SR-56 Direct Connectors, I-5 / SR-78 Interchange, and the recently completed I-5 / Lomas Santa Fe Drive Interchange projects would all potentially contribute to visual impacts along the I-5 corridor. The LOSSAN projects in the North Coast Corridor would also contribute to the degradation of visual quality along the corridor because of new structures around the lagoons. In addition, increased visibility to the Carlsbad Energy Center in Carlsbad would also contribute to the degradation of visual quality along the corridor due to removal of screening vegetation. The Hall Community Park project in Encinitas is located directly adjacent to the freeway corridor and would potentially contribute to the visual impacts along the corridor due to lighting impacts. Other projects that are located within the RSA and may contribute to overall visual impacts through contributions to urbanization and/or light and glare include the Scripps Hospital La Jolla Master Plan and One Paseo Project in San Diego; 22nd District Agricultural Association Fairgrounds facilities in Del Mar; U.S. Army Corps of Engineers Shoreline Protection Project in Encinitas and Solana Beach; and Agua Hedionda Sewer Lift Station and Force Main Replacement, Caruso Affiliated Project, and Northern Inlet Jetty Restoration project in Carlsbad. Some cumulative projects are located within the RSA but would not contribute to overall visual impacts because they are not located within the corridor viewshed or would not contribute to urbanization along the corridor, and would not contribute to cumulative visual effects associated with the proposed project. These projects include the Flower Hill Promenade, Via de la Valle Road Widening, and San Dieguito River Park Nature Center projects in San Diego; Riverview Offices Project in Del Mar, Coral Cove Residential Project, Scripps Hospital Encinitas Modifications, and North 101 Corridor Streetscape Improvements in Encinitas; Northern Inlet Jetty Restoration and Westfield Carlsbad Project in Carlsbad; and Oceanside Pier Resort, Mesa Ridge, and Inns at Buena Vista Creek projects in Oceanside. The Solana Beach Gateway Resort project, a 30-unit hotel development with various associated amenities that would have had visual impacts, was terminated and the site was purchased by the San Elijo Lagoon Conservancy for dedication to an open space park in December 2011. The Mixed-Use Solana Beach Train Station ("Cedros Crossing") project was terminated in 2008. Elimination of these previously planned projects reduces urbanization and associated cumulative visual effects along the corridor.

Cumulative Impact Analysis Conclusion for Visual/Aesthetics Resources

The projects that are located within the I-5 viewshed would incrementally contribute to a cumulative change in visual character within the RSA from semi-urban to more urban. The changes to the visual resource of the area brought about by these planned projects, including the *I-5 NCC Project,* would constitute cumulatively considerable contributions to cumulative visual/aesthetics impacts.

Natural Communities

Impacts of the I-5 NCC Project to Natural Communities

I-5 improvements would permanently impact up to 25.55 ac of wetland habitats and several sensitive species associated with that habitat. This project would also impact up to 69.43 ac of sensitive upland habitats and associated species, as detailed in *Table 3.17.4* and described in *Section 3.17*. Caltrans and SANDAG, with input from the resource agencies, have prepared a programmatic plan (the PWP/TREP [Appendix R] and REMP [Appendix P], respectively) for addressing the cumulative biology impacts to the North Coast area attributable to their related transportation projects. That plan, discussed in detail in *Section 3.17* of this Final EIR/EIS, and available for review at www.keepsandiegomoving.com, takes a holistic and comprehensive approach to mitigating impacts to biological resources within the North Coast Corridor. The PWP/TREP would employ a combination of measures to mitigate for coastal resource impacts resulting from implementation of the North Coast Corridor transportation improvements and community enhancement projects.

Impacts of Other Cumulative Projects to Natural Communities

Many cumulative projects would not contribute to the loss of habitat in the RSA due to their locations on already disturbed sites. Large foreseeable future projects within the corridor that have the potential to incrementally impact additional habitats and sensitive species include the LOSSAN projects in the North Coast Corridor, and the connector ramps at I-5 and SR-78 near Buena Vista Lagoon. The I-5 / SR-78 Interchange project would involve structures over the wetland habitat at Buena Vista Lagoon; however, wetlands would still be impacted by bridge columns. Mitigation for the I-5 / SR-78 Interchange project would occur in advance of the project with the *I-5 NCC Project* mitigation. There have been discussions concerning using the LOSSAN projects to build longer railroad bridges and remove some of the fill within these coastal lagoons. A programmatic environmental document for the LOSSAN project has been prepared and it is anticipated that the project would impact wetlands and other sensitive natural communities along the corridor. The I-5 / Genesee Bridge Widening and I-5 / SR-56 Direct Connectors projects would have potential impacts to upland natural communities that would be mitigated. Other projects that may contribute to the loss of habitat even though their impacts would be mitigated include the Via de la Valle Road Widening and San Dieguito River Park Nature Center projects in San Diego; Riverview Offices and 22nd District Agricultural Association Fairgrounds and Horsepark Master Plan in Del Mar; U.S. Army Corps of Engineers Shoreline Protection Project in Encinitas and Solana Beach; Northern Inlet Jetty Restoration, Agua Hedionda Sewer Lift Station and Force Main Replacement, and Caruso Affiliated Project in Carlsbad; and Mesa Ridge Project and Inns at Buena Vista Creek in Oceanside.

Cumulative Impact Analysis Conclusion for Natural Communities

The *I-5 NCC Project* would have an incremental contribution of up to 25.55 ac of wetland loss and 69.43 ac of sensitive upland loss. The project would also impact territories of the coastal California gnatcatcher, light-footed clapper rail, and Belding's savannah sparrow within the already constrained habitats in the corridor. The incremental impacts within the biological RSA of the *I-5 NCC Project* and other cumulative projects would be small; however, and would be adequately mitigated by implementation of the PWP/TREP, which would provide ecological lift throughout the region. Accounting for implementation of the regional program over the entire project, the impacts to natural communities would not result in a cumulatively considerable contribution to the corridor's cumulative impacts to natural communities and territories of sensitive species.

Wetlands and Other Waters

Impacts of the I-5 NCC Project to Wetlands and Other Waters

As discussed in *Section 3.18*, wetland habitat impacts associated with each of the alternatives include impacts at the six lagoons, as well as the San Luis Rey River, Loma Alta Creek, Encinas

Creek, Cottonwood Creek, and numerous small lined and unlined drainage ditches that run parallel to I-5. All drainage ditches, arundo scrub, and salt marsh transition habitats are included in the wetland habitats of the State. The majority of project impacts to wetland habitats are associated with widening of the freeway corridor at the lagoons. Impacts to southern coastal salt marsh, coastal brackish marsh, coastal brackish marsh (disturbed), mud flat, and open water are primarily related to impacts at the lagoons. Overall, depending on alternative selected and following mitigation, the proposed project would permanently impact between 11.61 and 17.17 ac of USACE, and 15.92 to 23.03 ac of State, jurisdictional wetland habitats.

The proposed REMP regarding the *I-5 NCC Project* contains a combination of measures to mitigate for coastal resource impacts resulting from implementation of the North Coast Corridor transportation improvements and community enhancement projects. The plan recognizes that opportunities to protect these lagoon systems from potential future degradation and to enhance and expand habitat within these systems require comprehensive solutions with mitigation efforts focused less on ratio-based mitigation and more on ecosystem-wide enhancements.

Impacts of Other Cumulative Projects to Wetlands and Other Waters

Many cumulative projects would not contribute to the loss of wetland habitat in the RSA due to their locations on already disturbed sites. There are several projects located near the lagoons that may contribute to cumulative impacts to wetlands. The 22nd District Agricultural Association Fairgrounds facilities could impact jurisdictional wetlands near San Dieguito Lagoon. Near San Elijo Lagoon in Encinitas, the Coral Cove Residential Project, a 69-unit development, would have substantial water quality impacts during construction. At Agua Hedionda Lagoon, there is potential for cumulative impacts with the Northern Inlet Jetty Restoration Project, Agua Hedionda Sewer Lift Station and Force Main Replacement Project, and Caruso Affiliated Project. The I-5 / Genesee Bridge Widening and Interchange Improvements Project would contribute to wetland impacts upstream of Los Peñasquitos Lagoon. The I-5 / SR-78 Interchange Project would involve structures over the wetland habitat at Buena Vista Lagoon, and wetlands would be impacted by bridge columns. The LOSSAN projects could impact up to 20-27 ac of wetlands, and up to 12 ac of lagoons, a number of which are within the Wetlands and Other Waters RSA, contributing to a cumulatively considerable impact. Other projects within the Wetlands and Other Waters RSA that have the potential to contribute to cumulative wetland impacts, but for which project-specific wetland impact information is currently unknown, include the Via De La Valle Road Widening Project in San Diego; U.S. Army Corps of Engineers Shoreline Protection Project in Encinitas and Solana Beach; and Inns at Buena Vista Creek in Oceanside.

There are also restoration plans and projects being planned or implemented within the lagoons along the project corridor. Restoration is currently ongoing at San Dieguito Lagoon, while work is proposed at Buena Vista Lagoon. In addition, restoration programs are planned for San Elijo Lagoon, as well as preparation of a comprehensive lagoon study of all lagoons and identification of specific restoration opportunities within each. The Solana Beach Gateway Resort, a 30-unit hotel development with various associated amenities that would have had cumulative impacts to San Elijo lagoon, was terminated and the site was purchased by the San Elijo Lagoon Conservancy for dedication to an open space park in December 2011. These restoration efforts would benefit wetland habitats within the lagoon.

Cumulative Impact Analysis Conclusion for Wetlands and Other Waters

Planned restoration work would reduce some of the cumulative impacts to lagoons and wetlands along the project corridor resulting from the proposed project and other cumulative projects. The specific impacts of the *I-5 NCC Project* would be adequately mitigated by implementation of the REMP regarding the *I-5 NCC Project*, which would ensure no net loss of wetlands and provide ecological lift throughout the region. Other projects would also be obligated to ensure no net loss of wetlands to obtain permits from Wildlife Agencies. Accounting for implementation of the regional program over the entire project area, the impacts to wetlands and other waters would not result in a cumulatively considerable contribution to the corridor's cumulative impacts to wetlands and other waters resources.

3.25.4 Avoidance, Minimization, and/or Mitigation Measures

Visual/Aesthetics Resources

Mitigation measures for adverse and cumulatively considerable impacts to visual/aesthetics resources are located in *Section 3.7* and also addressed in the project Design Guidelines (Appendix L). Implementation of the measures in this section would partially mitigate adverse effects of the project and its contribution to cumulative impacts. Despite the implementation of the measures, cumulative visual/aesthetics impacts would not be fully mitigated.

Natural Communities

Mitigation measures for adverse and cumulatively considerable impacts to natural communities are located in *Section 3.17.* Impacts to natural communities would not be fully mitigated using standard mitigation ratios. Caltrans has engaged in detailed negotiations with resource agencies to develop the REMP regarding the *I-5 NCC Project*. This is a regional plan that would address the mitigation for a series of planned transportation projects in the corridor, and is being developed for identified transportation project impacts within the jurisdiction of the Coastal Commission, with specific reference to I-5. The North Coast Corridor mitigation program for the *I-5 NCC Project* described in *Section 3.17* has been developed to identify compensatory mitigation measures to address these unavoidable impacts, and to implement resource enhancement opportunities that exceed the benefits of standard compensatory mitigation programs. Mitigation for impacts to native upland communities would reduce these cumulative impacts to less than considerable levels.

Wetlands and Other Waters

Mitigation measures for adverse and cumulatively considerable impacts to wetlands and other waters of the U.S. are located in *Section 3.18*.

As discussed above, there are a number of restoration plans and projects currently under development for the various lagoons located along the corridor. These plans focus on restoring the ecological functions and values of each of the coastal lagoon ecosystems, taking into account historic habitat regimes, hydraulic functioning, tidal flows, and species distribution, among other factors. Rather than focusing on a ratio-based mitigation program, Caltrans proposes to mitigate potential project impacts along the I-5 North Coast Corridor by implementing components of lagoon restoration, as determined appropriate by lagoon stakeholders. This more comprehensive mitigation approach outlined in the REMP regarding the *I-5 NCC Project* would provide a more holistic restoration of coastal wetlands and other waters than could be achieved by a ratio-based approach, and would reduce cumulative impacts to wetlands within San Diego County more effectively than alternative mitigation. Because this approach would more effectively reduce cumulative impacts to wetlands along the coast and is expected to provide ecological lift to the coastal region beyond no net loss, the project would not result in a cumulatively considerable contribution to impacts to wetlands and other waters.

Mitigation for impacts to wetlands and other waters would reduce these cumulative impacts to less than considerable levels.

Table 3.25.2: Summary of Cumulative Projects

Map Number/ Project Name	Location	Proposed Development	Identified Cumulative Impacts	Project Status
San Diego				
1. Scripps Hospital La Jolla Master Plan	Genesee Avenue and I-5	Demolition of existing hospital and construction of three hospital towers, two medical office buildings, outpatient care pavilion and additional parking	Visual Resources – Cumulative impacts related to aesthetics/neighborhood character and lighting/glare identified as less than significant	DEIR Public Review ends January 4, 2013; Initial construction projected for 2015
2. Flower Hill Promenade Project	San Andreas Drive and I-5	Demolition of movie theater, improvements to existing retail center and construction of new grocery store, 400-space parking structure, 28,000-square-foot medical space and 8,000 square feet of retail space	Visual Resources – No cumulative impacts identified for neighborhood character/visual effects	Final Recirculated EIR complete February 2011; Construction completion projected for early 2013
3. One Paseo Project	Del Mar Heights Road and El Camino Real	Construction of mixed-use, office, and retail uses	Visual Resources – Cumulative impacts related to viewsheds and neighborhood character identified as less than significant	DEIR Public Review ended May 14, 2012; FEIR under preparation as of December 2012 with no projected EIR completion or project construction dates
4. Via De La Valle Road Widening	Via De La Valle from El Camino Real west to San Andreas Drive	Widening of existing two-lane road segment to four-lanes	Not available: No environmental documentation as of December 2012.	Project is in review phase
5. San Dieguito River Park Nature Center	Via De La Valle and San Andreas Drive	Construction of nature center, parking and educational facilities	Visual Resources – Less than significant impacts Natural Communities – Less than significant impacts due to graded condition of site	Project is in review phase
Del Mar				
6. Riverview Offices Project	Jimmy Durante Boulevard and San Dieguito Drive	Construction of two multi-level commercial office buildings at the southeast corner of the intersection	Visual Resources – Potential impacts not identified Natural Communities – Potential impacts mitigated to less than significant	DEIR completed in December 2007; site remains undeveloped
7. 22nd District Agricultural Association Fairgrounds and Horsepark Master Plan	Via De La Valle and Jimmy Durante Boulevard and Via De La Valle and El Camino Real	Renovation of existing exhibit halls and barns; construction of office/ticket box space, (potential) hotel, health club, and fire station; restoration of salt marsh habitat; enhanced parking and support for seasonal train platform	Visual Resources – Less than significant impacts to I-5 corridor associated with new construction near freeway. Significant impacts related to new light and glare sources. Natural Communities – Direct removal of 0.16 ac of native vegetation communities, including Diegan coastal sage scrub, southern coastal salt marsh, and riparian habitat. Indirect impacts to riparian habitat in Stevens Creek (0.04 ac). Wetlands and Other Waters – Temporary and permanent impacts to jurisdictional areas, including up to 0.49 ac of federal and State waters	Project approved in April 2011; CEQA litigation settled in December 2012
8. Solana Beach Gateway Resort Project	Highway 101 and E. Circle Drive	Construction of 30-unit hotel development with associated clubhouse, outdoor pool, and spa	Wetlands and Other Waters – Substantial loss of wetlands from San Elijo Lagoon	Project terminated. Site purchased by San Elijo Lagoon Conservancy for dedication to an open space park in December 2011

Table 3.25.2 (cont.) Summary of Cumulative Projects

Map Number/ Project Name	Location	Proposed Development	Identified Cumulative Impacts	Project Status
Solana Beach				
9. Mixed-Use Solana Beach Train Station ("Cedros Crossing")	Lomas Santa Fe Drive and North Cedros Avenue	Parking facility and mixed-use, transit-oriented development	Visual Resources –Substantial visual impact cumulative impacts to visual/aesthetics associated with introduced building heights, which are incongruent with surrounding land uses	The Cedros Crossing project was terminated in 2008 due to concerns that it was not compatible with the City's General Plan. The $72 million mixed-use development included retail shops, restaurants, boutique office space, 141 housing units and a $19 million underground parking garage that would have added about 120 parking spaces.
10. U.S. Army Corps of Engineers, Encinitas and Solana Beach Shoreline Protection Project	Up to 8 miles of shoreline in the Cities of Encinitas and Solana Beach	Restoration of shoreline to reduce storm-related wave attack and shoreline erosion along the base of the associated bluffs and beaches. Both structural and non-structural approaches to be considered, including off-shore sand dredging local beach replenishment over a 50 year period, and notch infills.	Not available: No environmental documentation as of December 2012.	Environmental review phase pending
Encinitas				
11. Hall Property Community Park	Santa Fe Drive and I-5	44 ac of public park, including skate park; dog park; and fields for soccer, softball, baseball, and unrestricted play	Visual Resources –Substantial visual impact cumulative impacts to visual/aesthetics associated with light and glare extending to adjacent properties	Final EIR approved 2008, Coastal Commission approval finalized in 2009, construction began August 2012 and is scheduled for completion by the end of 2013
12. Coral Cove Residential Project	Ashbury Street and Vulcan Avenue	69 units on a 10-ac project site	Wetlands and Other Waters – Substantial water quality impacts during construction	Project approved 2006; site graded but remains undeveloped
13. Scripps Hospital Encinitas Master Plan	Santa Fe Drive and I-5	Modification and expansion of existing hospital; including two-story facility for emergency department and medical-surgical beds, new central energy plant, and various infrastructure improvements	No significant cumulative impacts identified for visual resources, natural communities, or wetlands and other waters	Second phase of construction to be completed by 2014
14. North 101 Corridor Streetscape Improvements	Highway 101 from A Street to La Costa Avenue	Landscaping and circulation improvements	Visual Resources – Beneficial effects to aesthetics of road	Project approved; construction began June 2012
Carlsbad				
15. Northern Inlet Jetty Restoration	Agua Hedionda Lagoon	Reconstruction/seaward extension of existing northern tidal inlet jetty	Visual Resources – Potential impact due to decreased beach width south of northern inlet Natural Communities – Loss of surfgrass habitat offshore of North Beach Wetlands and Other Waters – Potential for decreased beach width at Middle Beach and South Beach from deflection	Project in review phase
16. Agua Hedionda Sewer Lift Station and Force Main Replacement	Between Agua Hedionda Lagoon and the Encina Water Pollution Control Facility	Approximately 2.35 linear mi of sewer trunk line, a 50-million gallon per day (mgd) sewer lift station, a 140-foot sewer support bridge, and associated improvements	No known information available on the status of the CEQA document or related cumulative issues/impacts	Project MND approved by City December 2011

Table 3.25.2 (cont.) Summary of Cumulative Projects

Map Number/ Project Name	Location	Proposed Development	Identified Cumulative Impacts	Project Status
Carlsbad (cont.)				
17. Westfield Carlsbad Project	El Camino Real and Marron Road	Renovation of existing shopping center, including construction of 35,417-square-ft expansion	Visual Resources – No impacts to scenic vistas, corridors, or resources Natural Communities – No impacts to natural communities Wetlands or Other Waters – No impacts to jurisdictional areas	Project in review phase; construction projected for spring 2013
18. Caruso Affiliated Project	Cannon Road and I-5	Retail and possible housing project on site occupied by agricultural fields	Not available: No environmental documentation as of December 2012.	Application not yet submitted for review
19. Carlsbad Energy Center Project (CECP)	Cannon Road and I-5	Construction of 558 Megawatt (MW) generating facility on site of existing Encina Power Station, including retirement of boiler units at existing facility	Visual Resources – Significant impacts from construction of new generating facility identified in the California Energy Commission (CEC) final decision document dated June 2012 (CEC-800-2011-004-CMF)	The CEC adopted the final decision for the CECP on May 31, 2012 The CEC will serve as CEQA lead agency during the CECP licensing
20. Poseidon Desalination Plant	Located at the Encina Power Station, near Cannon Road and Highway 101	50-mgd seawater desalination plant and associated water delivery pipelines	No significant cumulative impacts identified for visual resources, natural communities, or wetlands and other waters in Final EIR certified in June 2006, or the related Addendum dated August 2009	All approvals received; water purchase agreement with SDCWA was approved November 2012, clearing the way for financing and construction to proceed; project could be completed by 2016
Oceanside				
21. Oceanside Pier Resort	Pacific Street and Pier View Way	Development of 136 timeshare units, 32 hotel units, 4780 square ft of restaurant space, and 7730 square ft of retail space	Visual Resources – Substantial visual impact due to mid-rise towers. Incongruent with current visual character	Project completed
22. Mesa Ridge Project	Mesa Drive and Foussatt Road	Development of 70 townhomes on a 23.8-ac site	Natural Communities – Project results in permanent loss of 12.20 ac of non-native grassland. Mitigation to occur at a 0.5:1 ratio	EIR approved 2008; site at northeast corner of Mesa Drive and Foussatt Road remains undeveloped
23. Inns at Buena Vista Creek	Jefferson Avenue and SR-78	Construction of a business hotel, an extended stay hotel and a family-oriented vacation-type hotel for a total of 426 rooms	Not available: No environmental documentation as of December 2012.	Application under review
Caltrans Highway Projects				
24. I-5 / Genesee Avenue Bridge Widening and Interchange Improvements	City of San Diego at I-5 / Genesee Avenue Interchange	Reconstruction of existing I-5 / Genesee Avenue Interchange; add southeast and northwest loops; signalize interchange	Visual Resources – Potential impacts due to retaining walls and structures mitigated to less than significant. Cumulative impacts concluded to not be substantial. Natural Communities – Potential impacts to coastal sage scrub, coyote brush scrub, and non-native grassland mitigated to less than significant. Cumulative impacts concluded to not be substantial. Wetlands and Other Waters – Potential impacts to southern willow scrub and non-wetland streambed mitigated to less than significant. Cumulative impacts concluded to not be substantial.	MND/EA approved June 2011; construction is scheduled for fall 2013
25. I-5 / SR-56 Direct Connectors	City of San Diego I-5 / SR-56 Interchange	Construct HOV/Managed Lanes freeway-to-freeway connectors via direct ramps or local street connections	Visual Resources – Potential impacts due to reduction in screen plantings, retaining walls, and soundwalls not mitigated to less than substantial; cumulative impacts would occur Natural Communities – Potential impacts to coastal sage scrub, southern mixed chaparral, and southern maritime chaparral mitigated to less than substantial. The proposed project was concluded to not result in significant adverse cumulative impacts to natural communities.	Draft EIR/EIS completed public review; environmental estimated completion in late 2013

Table 3.25.2 (cont.) Summary of Cumulative Projects

Map Number/ Project Name	Location	Proposed Development	Identified Cumulative Impacts	Project Status
Caltrans Highway Projects (cont.)				
26. I-5 / Lomas Santa Fe Drive Interchange	City of Solana Beach at interchange of I-5 and Lomas Santa Fe Drive	Construct Auxiliary lanes and modify existing interchange	Visual Resources – Overall moderate adverse effect of visual quality of moderate extended duration due to the introduction of new structures and improvement of existing structures	Project completed
27. I-5 / SR-78 Interchange	I-5 at SR-78	Direct connectors, potentially by construction of a Managed Lane/HOV Connector, between I-5 and SR-78	Visual Resources – Potential impacts due to Managed Lane/HOV Connector ramps Natural Communities – Potential impacts to sensitive habitat (wetlands at Buena Vista Lagoon) Wetlands and Other Waters – Potential impacts to wetlands	Preliminary design phase; environmental review set to begin in spring 2013
LOSSAN Projects				
28. Los Angeles to San Diego (LOSSAN) Rail Improvements, including North Coast Corridor projects listed below*	From Los Angeles to San Diego	Program-level evaluation of double-tracking of railroad tracks and other improvements including bridge and track replacements, new platforms, pedestrian undercrossings, and other safety and operational enhancements	Community Cohesion – Possible impacts include displacement of commercial and residential properties; community and neighborhood disruption Visual Resources – Potentially significant cumulative impacts to visual/aesthetics Natural Communities – Potential impacts to several sensitive biological species and habitats Wetlands and Other Waters – Potential impacts to several water resources and wetlands	Environmental completed 2009
29. Eastbrook to Shell Double Track (San Luis Rey River Bridge)	North Oceanside Double Track (Control point [CP] Eastbrook to CP Shell)	Add approximately 0.5 mi of second track just south of SR-76 to south of Harbor Drive and replace San Luis Rey River Bridge	Cumulative effects identified in programmatic document; see Project 28 above	Design completion fall 2014
30. San Luis Rey Transit Center	Vandegrift Boulevard and North River Road	New bus transit facility including four covered shelters with seating and restrooms	Cumulative effects identified in programmatic document; see Project 28 above	Construction began April 2012, estimated completion spring 2013
31. Oceanside Through Track	Oceanside Transit Center	Add platform and third track to accommodate COASTER and/or Metrolink trains	Cumulative effects identified in programmatic document; see Project 28 above	Construction to begin early 2013
32. Carlsbad Village Double Track	From Carlsbad Village Drive to the north	1.1 mi of double track, including a new rail bridge across Buena Vista Lagoon	Cumulative effects identified in programmatic document; see Project 28 above	Design completion late 2014
33. Carlsbad Double Track	From Carlsbad Village Drive southward past Cannon Road	1.9-mi second main track and a new rail bridge over Agua Hedionda Lagoon	Cumulative effects identified in programmatic document; see Project 28 above	Construction completed spring 2012
34. Poinsettia Station Improvements	Poinsettia Station in Carlsbad	Improve station to include new grade-separated pedestrian crossing and signals	Cumulative effects identified in programmatic document; see Project 28 above	Construction to begin late 2013
35. Encinitas Pedestrian Crossings	Santa Fe Drive, El Portal Street, Montgomery Avenue, and Hillcrest Drive	Four grade-separated pedestrian crossings including utility relocation, underpasses, landscape improvements, environmental mitigation, and street crossing improvements on adjacent roadways	Cumulative effects identified in programmatic document; see Project 28 above	Completion of Santa Fe Drive undercrossing construction in early 2013
36. San Elijo Lagoon Double Track	CP Cardiff to CP Craven	Add 1.5 mi of second track, enhance existing pedestrian crossing at Chesterfield Drive, and replace San Elijo Lagoon Bridge	Cumulative effects identified in programmatic document; see Project 28 above	Construction to begin late 2014

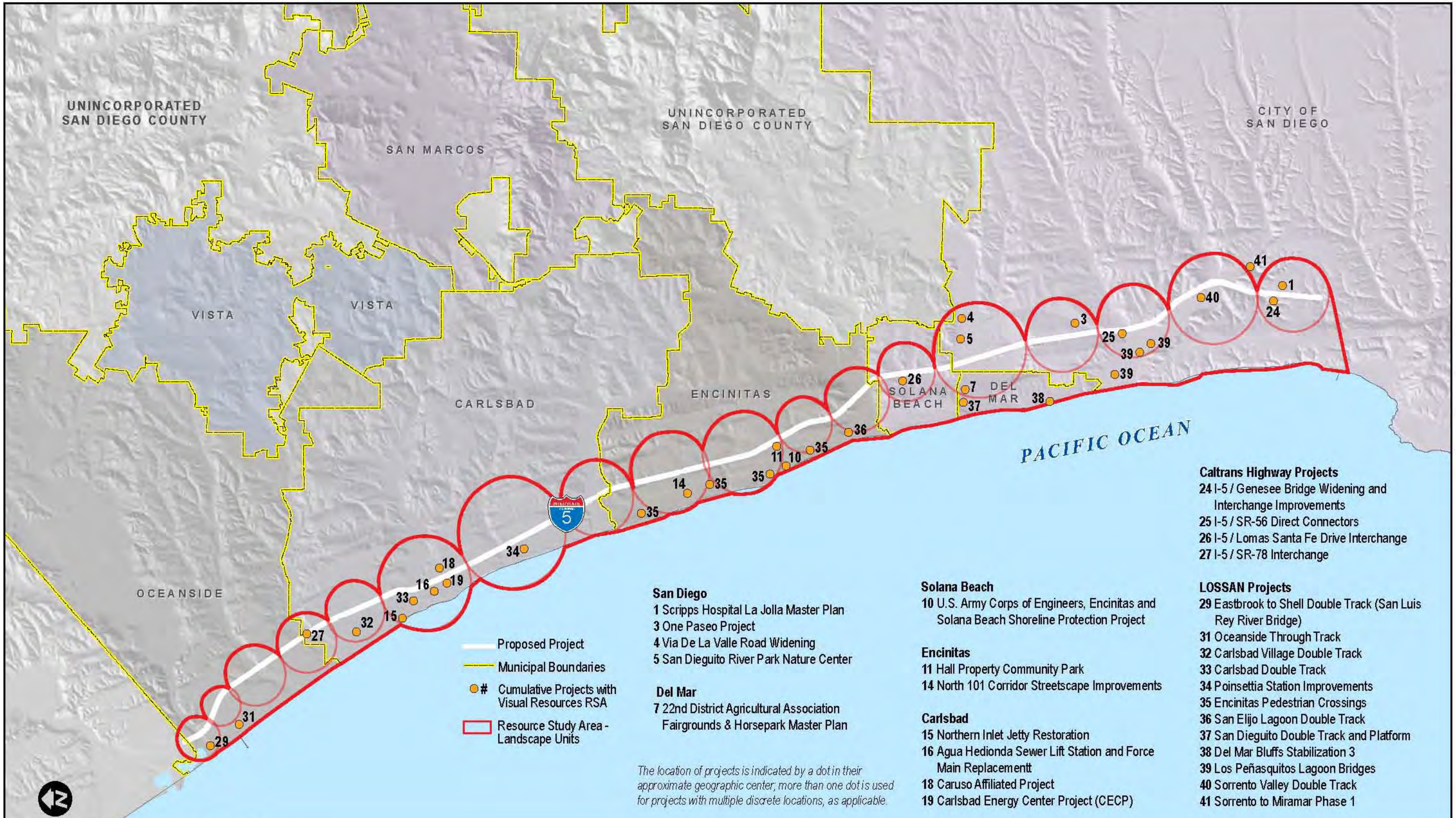
Table 3.25.2 (cont.) Summary of Cumulative Projects

Map Number/ Project Name	Location	Proposed Development	Identified Cumulative Impacts	Project Status
LOSSAN Projects (cont.)				
37. San Dieguito Double Track and Platform	From just south of Dahlia Drive in Solana Beach and continuing 1.1 miles south across the San Dieguito Lagoon	Replace 96-year-old San Dieguito Railway River Bridge wooden trestle, add 1.1 mi of second mainline rail track south of Solana Beach, and add a special events platform at the Del Mar Fairgrounds for NCTD COASTER and Amtrak Pacific Surfliner trains	Cumulative effects identified in programmatic document; see Project 28 above	Environmental completion early 2014
38. Del Mar Bluffs Stabilization 3	Between Seagrove Park and Torrey Pines State Beach in the City of Del Mar	Stabilized portions of the 1.6 mi of coastal bluffs with soldier piles and an architecturally enhanced pile cap	Cumulative effects identified in programmatic document; see Project 28 above	Construction completed spring 2012
39. Los Peñasquitos Lagoon Bridges	Los Peñasquitos Lagoon	Replacement of three aging railroad bridges	Cumulative effects identified in programmatic document; see Project 28 above	Design in process
40. Sorrento Valley Double Track	From the Sorrento Valley Station to approximately 1.1 miles to the north	Add a second mainline rail track, raise portions of track bed, replace three wooden trestle bridges, install embankment protection system along the westerly side of the track adjacent to Los Peñasquitos Creek, and build retaining walls adjacent to the tracks near the parking lots	Cumulative effects identified in programmatic document; see Project 28 above	Construction to begin fall 2013 and completed by mid-2015
41. Sorrento to Miramar Phase 1	Between the Sorrento Valley Station and Miramar Road in the City of San Diego (in two phases)	Add 1.1 mi of second track and replace a wooden trestle bridge south of the Sorrento Valley COASTER station	Cumulative effects identified in programmatic document; see Project 28 above	Construction completion late 2013
42. Sorrento to Miramar Phase 2	Between the Sorrento Valley Station and Miramar Road in the City of San Diego (in two phases)	Add 2.0 mi of passing track to the coastal rail corridor between I-805 and Miramar Road and straighten the sharp curves in this segment	Cumulative effects identified in programmatic document; see Project 28 above	Design completion early 2015

* Not shown in *Figure 3-25.1* due to programmatic nature of project.

Source: SanGIS 2006; EDAW 2007
Scale: 1:126,000; 1 inch = 10,500 feet

Figure 3-25.1: Approximate Locations of Cumulative Projects

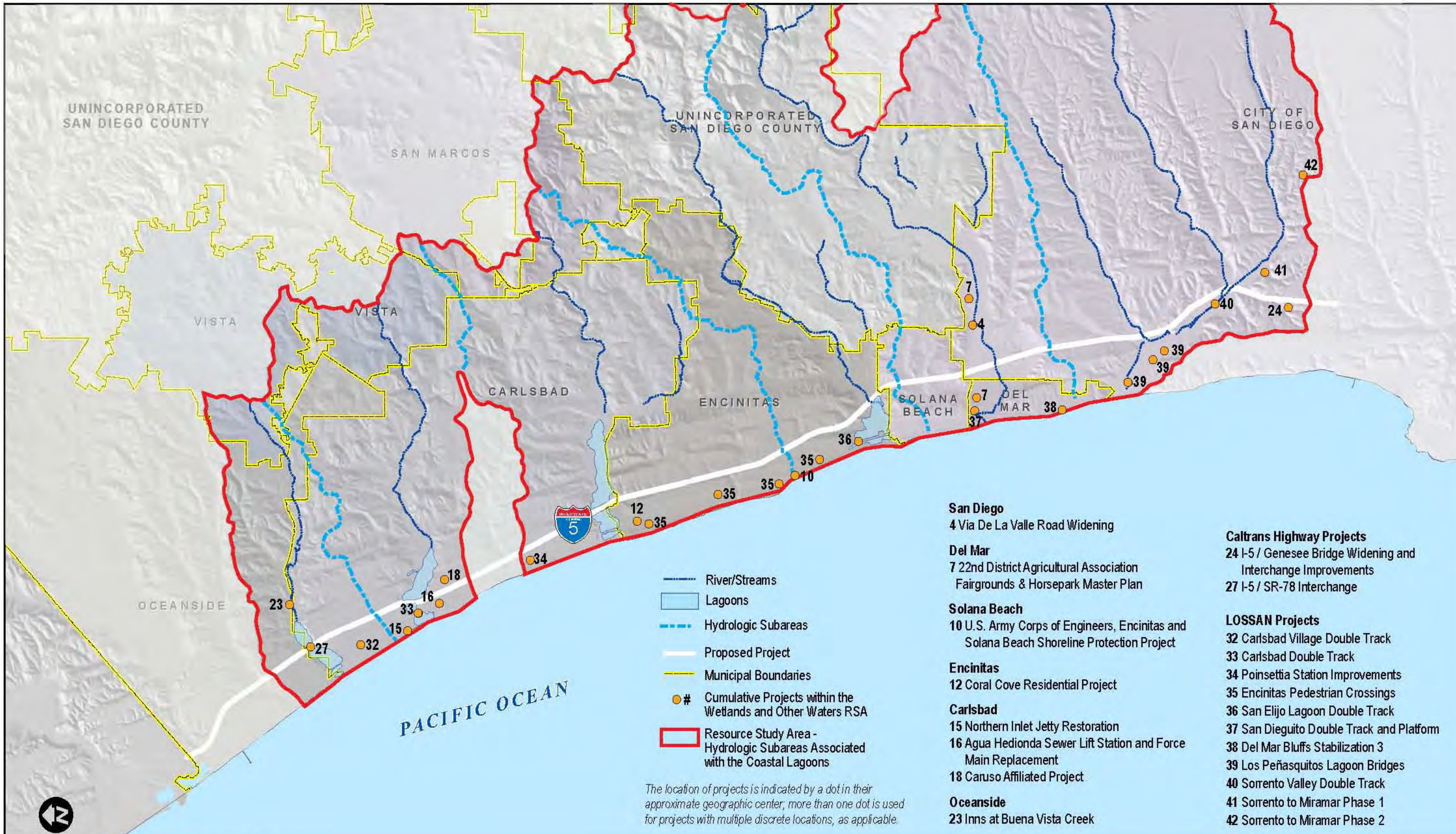


Source: SanGIS 2006; EDAW 2007 Scale: 1:126,000; 1 inch = 10,500 feet

Figure 3-25.2: Cumulative Projects within Visual Resources RSA

Source: SanGIS 2006; EDAW 2007 Scale: 1:126,000; 1 inch = 10,500 feet

Figure 3-25.3: Cumulative Projects within Natural Communities RSA



Source: SanGIS 2006; EDAW 2007 Scale: 1:126,000; 1 inch = 10,500 feet

Figure 3-25.4: Cumulative Projects within Wetlands and Other Waters RSA